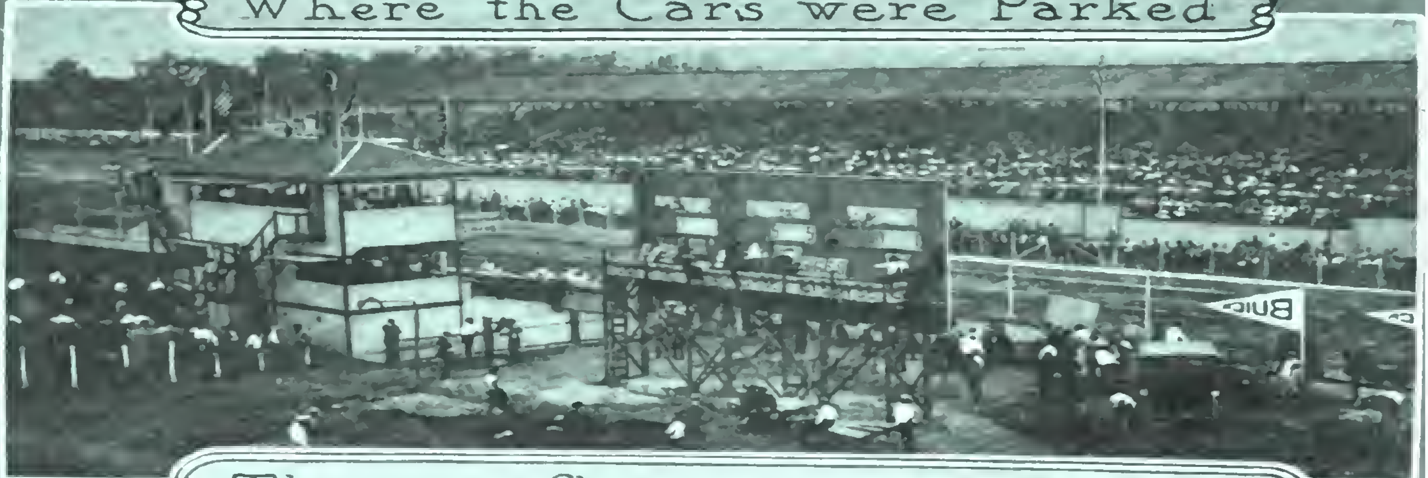
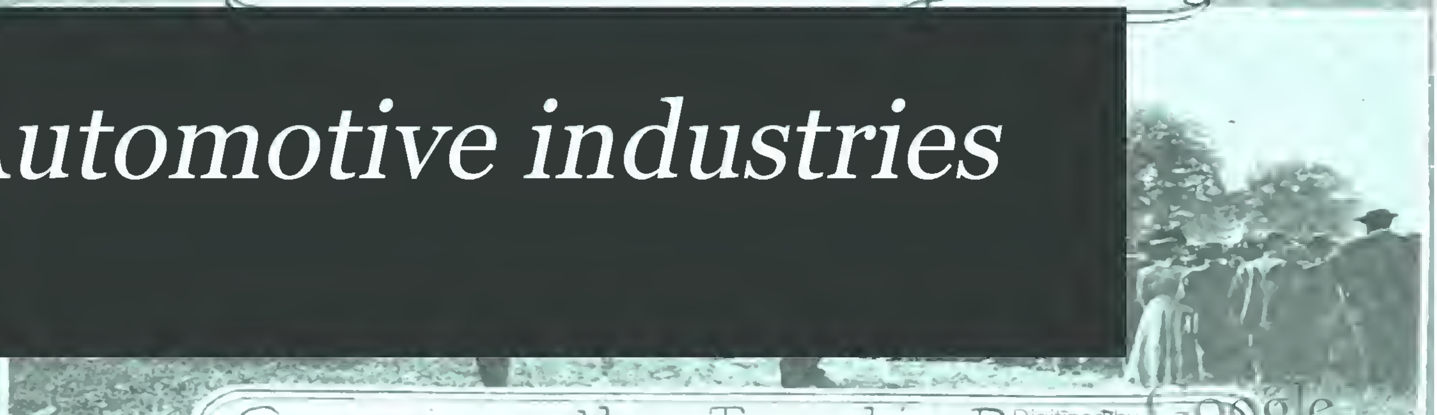
Automotive industries

Where the Cars were Parked



The overflowing Grand Stand

As the Crowd Surged in.



Crossing the Tracks Bridge

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THE AUTOMOBILE

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THE AUTOMOBILE

FRENCH RACE HAS ONE-LUNG WINNER

By W. F. Bradley

BOULOGNE-SUR-MER, June 20—The fifth annual voiturette race has proved conclusively that more power, and consequently higher speed, can be obtained from a single cylinder car of 39-10 by 10 inches bore and stroke, than from a four-cylinder of 2½ by 5½ inches. This year's race was specially designed to encourage the construction of small four-cylinder engines, and in the opinion of the one-lunger exponents, the multiple cylinder engines had been given too much liberty. The results of the race proved, however, that even with the increased bore and stroke for the four-cylinder engines they were not equal to the one-lungers. for first prize was won by a single, second by a twin, third and fourth by a single, leaving all places from fifth to ninth for the four-cylinder cars.

Giuppone, an Italian driver handling a French Lion Peugeot car, secured the first prize by covering the 282½ miles of hilly course in 5 hours 56 minutes 29 3-5 seconds, which is at the rate of nearly 48 miles an hour. No records were broken, but this is accounted for by the fact that the course was much more hilly than any one on which previous voiturette races have been run. Twelve rounds had to be made, each giving a series of hills, with grades of respectively 10 and 12 per cent in two cases, with a sharp bend at the base and a length of nearly a mile.

Second prize also went to a Lion Peugeot car, a special two-cylinder model driven by Goux, who came in six minutes behind his team mate. Thomas, the ex-motorcyclist, got third position with a Le Gui car, driven by a single-cylinder De Dion engine having the same dimensions as the winner. Lion Peugeot slipped in again in fourth position, with a one-lunger identical with the winning car, and driven by Boillot.

A fine display was made by the Hispano-Suiza cars, four-cylinder models hailing from Barcelona, which were grouped in fifth, sixth, and seventh positions. They are pleasing looking cars with little of the freak appearance that characterized the four single-cylinder racers, hut they were certainly not as fast as these latter. They were more than equal, however, in individual and team regularity. England, who figured for the first time in a French

Giuppone, the French-Italian, Winning the Fifth Annual Voiturette Cup with Lion Peugeot Car

Weighing In Two-Cylinder Lion Peugeot Which Took Second Place In the French Voiturette Race

voiturette race, took eighth and ninth positions with a couple of Calthorpe four-cylinder cars that were marvels of regularity, but could be left standing by the speedy one-lungers. The only other car to finish the race was a four-cylinder Demeester, the performance of which was not in any way remarkable.

How Race Was Run—Nineteen cars lined up for the start, which by reason of a heavy sea fog had to be postponed for half an hour. At 8 A.M. the weather had cleared sufficiently to allow of a departure being made, and the cannonade of open exhausts began, while the spectators were forcibly reminded that castor oil was the general lubricant for the little racers. France, England, Spain and Belgium were represented. England and Spain had each a team of four cylinder cars, Belgium had a pair of four-cylinder cars, and while France had singles, twins and four-cylinder cars, the singles were in the majority.

Few of the drivers were well known to the public, and there was not, consequently, much enthusiasm as the starts were made, Maurice Fournier, brother of Henry, coming in for a cheer as he went by; the Lion Peugeot team exciting interest by reason of their previous victories, and the Englishmen present supplying the shouting for their Calthorpe cars.

Goux took the Lion Peugeot round the 23½-mile course in 29:28, closely followed by Thomas on the Le Gui, with Giuppone not far behind him and the green-jersied Spaniards also hard on his heels. Maurice Fournier had trouble with his one-lunger Werner almost from the start, and after working on both magneto and carbureter, went out with a broken bearing in the front wheel. Crespelle, driving a single-cylinder car of his own make, discovered that his steering gear was faulty, and in consequence retired so as not to endanger the others. A little later the competitors were further reduced by the overturning of another Crespelle and the burning of a third one. One of the English Calthorpes stripped a gear, the two Belgium Fif cars were not properly tuned up, and the single Renault-Schneider car went out early.

Rather Odd-Looking English Calthorpe with Porter at Wheel

The race was absolutely devoid of exciting moments, though never lacking in interest. When the field was reduced to ten cars it was believed for a time that the four-cylinder Spaniards might give the Frenchmen some trouble, but this fear being removed, the point of interest was which of the Lion Peugeots would get first prize, or whether dare-devil Thomas would manage to dash to the front. Goux, who has been victorious in the two previous voiturette races run in Europe this season, kept the lead for the first five rounds with his two-cylinder Lion-Peugeot. Then Giuppone on the single-cylinder model began to get more speed out of his car, passed his companion, took the lead, and maintained it to the end. Boillot, the driver of the second one-lunger Lion Peugeot, shook off the bad luck which had kept him back at the beginning of the day, and on the ninth round made the record of covering the course in 26:43, equal to a speed of 54 2-10 miles an hour. He had lost too much, however, at the beginning to get near the leader, notwithstanding the fact that during the last four rounds he was the fastest man on the course. Thomas, on the Le Gui, was the most daring, but he also had been kept back at the beginning.

Derny and Four-Cylinder Hispano Suiza—Caillola and Faroux in Rear

How Prizes Were Distributed—The Voiturette cup and the City of Boulogne prize went to Giuppone, and the regularity prize was secured by Lion-Peugeot for first, second, and fourth positions; the special prize for the best four-cylinder performance went to Hispano-Suiza; while the Bennett prize for the car showing the least difference in time round by round was awarded to Burgess, the Calthorpe driver.

Normally the winning engine, a Boudreaux-Vernet design turned at 1,600 revolutions a minute, but could be accelerated to over 2,000 revolutions. The average lineal speed of the piston is 45 feet, rising to as high as 72 feet, when the engine was pushed to its extreme limits. As on all the single-cylinder racers valve area was enormous, the Lion Peugeot having, instead of a single inlet and exhaust, three of each for the one cylinder, the operation being by means of rocker arms. For such high lineal speed lubrication had to be given special attention, the fuel employed being castor oil. This, however, has now replaced all other types of lubricant in French speed tests.

Course Treatment Satisfactory—Instead of tar, the course was treated with calcium chloride, the result being that there was no dust and not a single driver suffered in the least from his eyes. The times of all finishing the race follow:

Giuppone, single-cylinder Lion Peugeot	5:56:29 3-5
Goux, two-cylinder Lion Peugeot	6:20:50 4-5
Thomas, single-cylinder Le Gui	6:14:13 2-5
Boillot, single-cylinder Lion Peugeot	6:20:12
Piliverde, four-cylinder Hispano-Suiza	6:27:25
Zuccarelli, four-cylinder Hispano-Suiza	6:33:55
Derny, four-cylinder Hispano-Suiza	6:34:51
Porter, four-cylinder Calthorpe	7:05:08
Burgess, four-cylinder Calthorpe	7:09:24
Vallee, four-cylinder Demeester	7:27:40

Thomas with Le Gui One-Lunger which finished in Third Position, Taking Hairpin Turn Near Boulogne

DETROIT READY FOR THE GLIDDEN TOUR FESTIVITIES

DETROIT, June 28—Another week and "Glidden tour days," now a pleasing anticipation, will become a reality. If present indications count for anything, fulfillment will far outstrip anticipation in the matter of enjoyment. Everything is practically in readiness for the coming of the Glidden tourists, the executive body of the A. A. A. and members of the A. L. A. M. and A. M. C. M. A., all of whom, in addition to visiting newspaper men and autoists, will gather here during the days immediately preceding the start of the contest. When it is all over those fortunate enough to be in Detroit at any time during that period will have experienced the strenuous life in a manner that will long be remembered.

That Detroiters are keenly alive to the situation, and appreciate what such gatherings mean to the city, is shown by the ready response to a request for funds. The amount determined upon by the Detroit Auto Dealers' Association as sufficient to keep things moving every minute, during the five days when the visitors will be here, has been exceeded by the contributions received. The hearty co-operation being extended the committee in charge of the affair presages success, and, with ample assistance promised, nothing will be lacking.

As indicating the spirit displayed on every hand, Mayor Breitmeyer's attitude is worthy of note. It was at his suggestion that the city offered an additional trophy for the Glidden tour, a magnificent cup that will go to the winner in the baby tonneau class. A massive gold key is being made to present to Chairman Hower, with the freedom of the city. Mayor Breitmeyer, who is the leading florist of the city, has expressed his desire to have the matter of decorating for the big banquet, the night of July 9, left entirely to him, of itself assurance that the floral end of the spread will be worth while. He has also offered the use of the city hall steps for the band concerts Saturday evening and Monday morning, just prior to the start of the tour. The Maxwell Briscoe band is coming all the way from Tarrytown, N. Y., to give eclat to the occasion. It will also provide music for the boat ride on the big *City of Cleveland* on Sunday, in addition to featuring in the auto parade, which will be *the* event on Saturday.

In order to make this day go down in Detroit's history, Mayor Breitmeyer will request that all business houses and residences along the line followed by the parade be decorated. He has also urged that Detroit automobile manufacturers make Saturday a half holiday, so that their employees may participate in the festivities. Inasmuch as at the present time there are not less than ten thousand of these, it will be seen that large accessions to the turnout will come from this source. Some manufacturers have gone further than this, and will give their employees sufficient time off Monday morning to witness the getaway of the Gliddenites, which will take place from the city hall at 9 o'clock. It is anticipated that others will follow suit, wherever conditions are such as to permit suspension of operations, and that the Glidden tour, in addition to providing plenty of enjoyment for entrants, will prove instructive to local automobile interests. At the same time, nothing will be left undone to demonstrate the important position Detroit holds as the hub of the industry.

Wisconsin Horsemen are Notified of Tour

MILWAUKEE, June 28—Frank P. Hixon, president of the La-Crosse Automobile Club, has mailed a circular letter to the editors of all papers in that section of Wisconsin. He asks them to warn farmers and drivers of horses that on July 15, 100 cars participating in the annual A. A. A. tour for the Glidden trophy will run over the roads from Madison to LaCrosse, and asking that horses unaccustomed to machines be kept off the road, especially at hills and crooked points. The Milwaukee and Madison clubs are making preparations in a like manner. Madison, the State capital, will arrange a brilliant welcome for the tourists.

WRIGHTS ARE BUSY AT FORT MEYER

WASHINGTON, D. C., June 29—Orville and Wilbur Wright have been tuning up their aeroplane at Fort Meyer preparatory to the government tests. This afternoon they had difficulty, which was located in the engine and not in the forward planes, as Wilbur thought. A flight of about 600 yards was accomplished by moonlight, the machine being in the air less than a minute.

The Weighing in of the Cars Was Attended with the Usual Conscientious Formalities

NEWS MADE IN GERMANY

BERLIN, June 20—The Prince Henry tour was participated in by 108 cars out of the 113 entered. This was a decrease compared with last year's 144, although the combined activity of the four big clubs: Imperial, Bavarian, Austrian, and Hungarian, made promise of a far larger list.

The tour led through Prussia to Hungary and Austria, winding up in Munich, 1839 kilometers in all, in six daily stages, from June 10 to 18.

In order to level out the chances of the competitors, a handicap of three debit points was worked out for all drivers who had competed in big international events and had been successful in the principal German tours as well. But this handicap was cleverly evaded in numerous cases by other drivers being nominated, while men like Poege officiated as chauffeurs! At the weighing-in, several cars were refused sanction until several alterations had been made, Poege's Mercedes being among the number. The exhaust was wrongly placed, while in one or two vehicles the exhaust box was entirely missing.

The start for the first stage—Berlin-Breslau—was made June 10, Prince Henry of Prussia and the official cars starting ahead of the ruck. One first speed trial took place on the Guben-Krossen stretch. The best time was achieved by Lochner's Opel with 2:42, or an average speed of 122 kilometers, while the highest number of points went to Wilhelm Opel's car with 6.38 points. Poege's Mercedes was second, 5.95 points.

The 101 vehicles which entered Breslau in the pouring rain were all sent off on the longest run of the tour the day following, to Tatralomnicz and Tatrafüred, 409 kilometers, where the strenuous roads accounted for a severe thinning of the ranks.

The Étappe-Breslau-Tatrafüred run was wound up in pouring rain, but on the next day brilliant sunshine and far better roads favored the competitors on the stretch to Buda Pesth, 312 kilometers, when 97 cars reached the Hungarian capital, and the reception was a brilliant one.

Sunday, June 13, was a rest day which ended with a big banquet for 300 persons, arranged by the Hungarian Automobile Club. Prince Henry made a witty speech and concluded with a toast in Hungarian which brought the entire assembly to its feet.

June 14 the start was only made at 9 A. M. for Vienna, a concession much appreciated after the 5 o'clocks of the preceding days. The run was finished by all the 97 cars, and one or two of the damaged ones of earlier days closed up as well. The reception at Vienna quite equaled that at Buda Pesth as far as official circles go, but the Austrian populace itself was very reserved in its treatment of the tourists.

June 15 was a day of rest, when exchange of compliments took place between the old Emperor and Prince Henry and the German and Austrian military sets. In between the lunches and dinners, the committee dealt with protests.

June 16 witnessed the most beautiful run of the whole event, from Vienna to Salzburg, amid wonderful scenery and on splendid roads. Unfortunately, however, two of the favorites had serious tire trouble on the way, these being Count Kolowrat and Poege. Of the 95 cars started at Vienna, 93 entered Salzburg.

June 17, from Salzburg to Munich, 202 kilometers, was done in the pouring rain. The second speed trial for the Forstenried stretch was included in the final day's itinerary. Luckily the weather cleared up on Bavarian territory, and the test was held amid brilliant sunshine. The best accomplishment was achieved by F. Mouson's Opel, which averaged a speed of 120 kilometers an hour, his time being 2:46 4-5. All the cars, 92 in number, arrived in Munich, where June 18 the tour terminated with a banquet and the distribution of prizes.

The first prize was won by W. Opel, who has the honor of gaining the Prince Henry cup and the beautiful prize of the Imperial Automobile Club; the second award went to Poege, Mercedes; the third to S. Kittsteiner, Opel; the fourth to Forcheimer, Benz; fifth, Sachs, Opel; sixth, L. Opel, Opel; seventh, Count Kolowrat, Laurin.

The full official lists will be published later, but Herr Opel has won the prizes for the speed trials both at Krossen and Forstenried, both of which were closely contested.

MARKS SPOT WHERE BLERIOT BEGAN

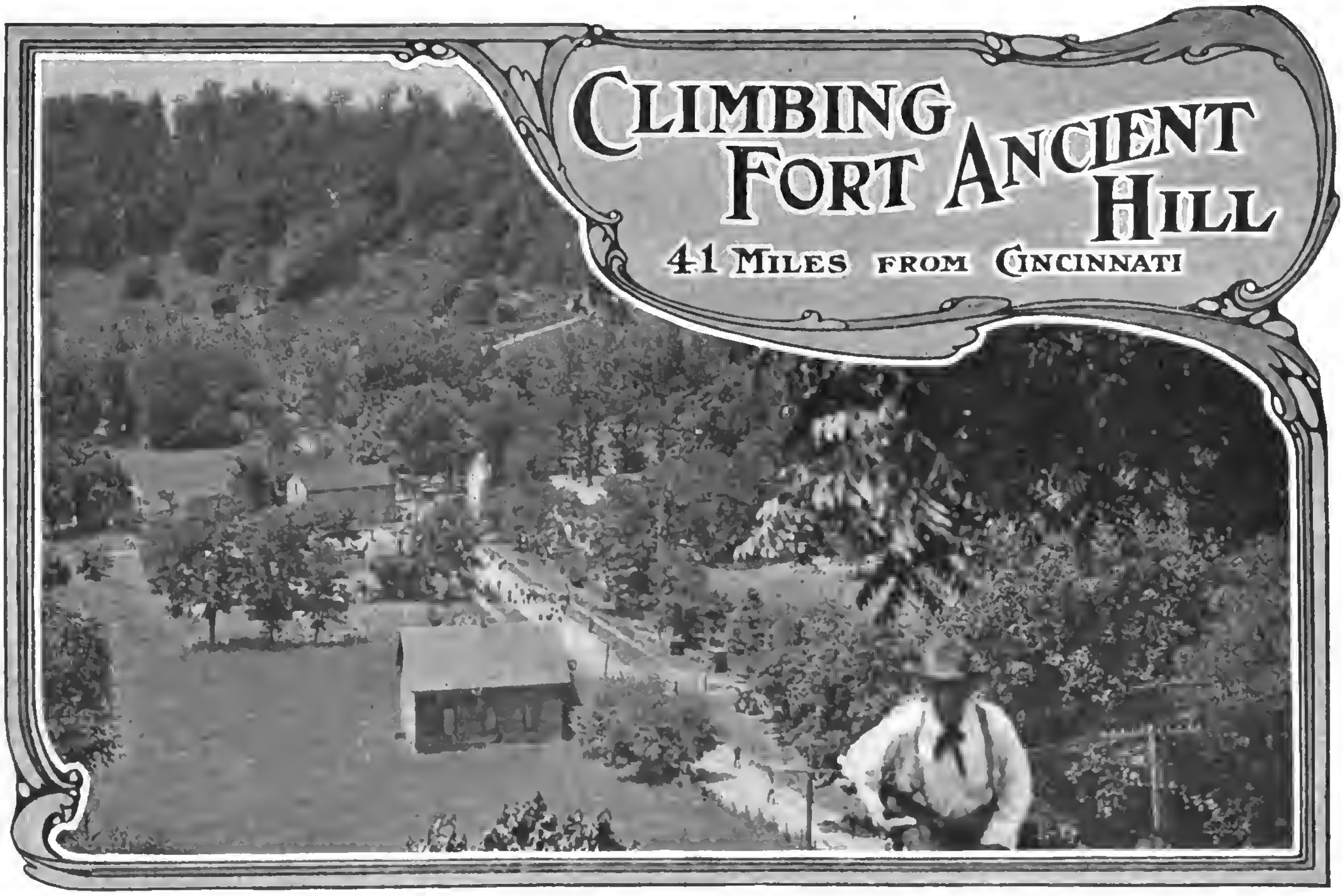
PARIS, June 10—A granite monument, backed by a full-sized model of an aeroplane, now marks the spot where Louis Bleriot left the ground on the first round trip on a flying machine. The little town of Toury being proud of the honor of having been selected as the starting and finishing point of the trip made by the French aeronaut last October, decided on the monument and made its inauguration the occasion of a local fête, where flags and bunting, gendarmes and firemen, local officials and the common people were much in evidence.

In connection with the inauguration of the monument Louis Bleriot attempted to repeat his voyage of a few months ago, but after covering eight miles ran short of gasoline and had to come back to Mother Earth. A second attempt was even less successful, for after flying at low altitudes for a certain distance some of the trip being immediately above the open highway, the aeroplane was seized by a strong gust of wind and thrown into the ditch, where it suffered rather serious injury.

Japanese Aeronautic Progress Kept Secret—That airships are being built in the land of the Rising Sun without letting the world know of the progress in the science on the islands, is the opinion of many persons who recently learned of certain patents placed in that country. Some time ago the commander-in-chief of the army commissioned an officer to investigate aeroplane and dirigible construction with a view to making improvements over the methods empoyed in the late Russo-Japanese war. The result is the taking out of a patent by Yamada on a "safe and free airship." Experiments are to be conducted this summer at a point some distance from Tokio.

Climbing Fort Ancient Hill

41 Miles from Cincinnati



CINCINNATI, June 26—To Cincinnati people, hills "as are hills," to ordinary people seem trivial. And so it happened that the Automobile Club of Cincinnati searched far and wide for a hill to tax autos to the limit, and finally "discovered" Fort Ancient hill. This is forty-one miles from the center of the city, direct east to be exact, and on the line of the C. H. & D. Railway.

The course for real climbing is only two-thirds of the seven-eighths of a mile covered, and therein comes the rub, for cars must be prepared for the two to fifteen per cent. grade, and, so prepared, cannot speed on the one-third of the stretch which is level ground. Prepared for the level, they won't climb; and there you are! In other words, the hill is a "four speed" hill and with two ugly turns or hairpins close together. The hill goes up and up, and steep side hills form beautiful natural grand stands. From the mountain sides the start may be seen down in the valley.

Cincinnati auto enthusiasts, and farmers by the hundreds, turned out to see the climb, and many a private car stuck in the heavy going of the hill, while horses even stopped to rest. But twenty cars were entered, the competition being very keen, however.

Fastest in the climb was the Stoddard-Dayton which had participated on the Saturday previous in the Cobe Cup race at Crown Point, Ind. Driven by Miller, it made the ascent in 1:11 1-5, this being in the $3,000 to $4,000 class. But in the free-for-all the car did not work at its best, the throttle-lever sticking and thus preventing a sufficient supply of gasoline on the level part of the course. Its climb was in 1:32 4-5, some seconds slower than the 1:17 of the Oakland winner, driven by Harry Bauer, a youngster who handled his car exceptionally well. In one event he swung wide on the first turn, almost capsized, and in the coolest manner possible straightened up the car and hit the next curve without hesitation. This happened in the $1,250 to $2,000 class.

The opening event for cars selling for $850 or less went to the Hupmobile, which won twice, being protested on the first trial for not carrying one cushion. The Schacht and Maxwell were other competitors.

William Walker's E-M-F, driven by "Sid" Black, plain and fancy trick rider of bicycle days, and now as fat as an alderman, won the event for stock cars selling for $851 to $1,250.

It was in the event for cars of $1,251 to $2,000 selling price that Harry Bauer took desperate chances and won in grand style over three Buicks.

Two Stoddard-Dayton cars fought it out in the $2,001 to $3,000 class. Carl Wright drove the winner and S. T. Anderson was the loser. Again the Stoddard-Dayton won in the $3,001 to $4,000 class, with Miller up, and in the course record of 1:11 1-5.

It was close in the club members race, for Conkling won in his Stevens-Duryea "Six" in 1:29 2-5 over Pounsford, also with a Stevens "Six," only 2-5 slower. The summary:

STOCK CARS—$850 OR LESS

Pos.	Car	H.P.	Driver	Time
1	Hupmobile	16.9	Gem City Auto Co.	2:22 1-4
2	Schacht	15	Schact Mfg. Co.	2:24 1-5
3	Maxwell	16	J. A. Kilpatrick	2:51 1-5

STOCK CARS—$851 TO $1,250

Pos.	Car	H.P.	Driver	Time
1	E-M-F	30	Sid Black	1:43 1-5
2	Buick	22.5	DeWitt	1:45 2-5

STOCK CARS—$1,251 TO $2,000

Pos.	Car	H.P.	Driver	Time
1	Oakland	40	Harry Bauer	1:22
2	Buick	32.4	O .V. Parrish	1:29 2-5
3	Buick	32.4	DeWitt	1:42 4-5

STOCK CARS—$2,001 TO $3,000

Pos.	Car	H.P.	Driver	Time
1	Stoddard-Dayton	36	Carl Wright	1:19 2-5
2	Stoddard-Dayton	45	S. T. Anderson	1:46

STOCK CARS—$3,001 TO $4,000

Pos.	Car	H.P.	Driver	Time
1	Stoddard-Dayton	45	Miller	1:11 1-5
2	Palmer & Singer	60	Ed. Jungclas	1:31 1-5
3	Stevens-Duryea	44	H. A. Pounsford	1:34
4	Stevens-Duryea	36	E. A. Conkling	1:38 2-5

FOR CLUB MEMBER "OWNERS"

Pos.	Car	H.P.	Driver	Time
1	Stevens-Duryea	36	E. A. Conkling	1:29 2-5
2	Stevens-Duryea	36	H. A. Pounsford	1:29 4-5
3	Stevens-Duryea	54.1	F. H. Miller	1:36 2-5

FREE-FOR-ALL—ALL WEIGHTS AND POWERS

Pos.	Car	H.P.	Driver	Time
1	Oakland	30	Harry Bauer	1:17
2	Stearns	46	A. C. Eggers	1:20 4-5
3	Stoddard-Dayton	45	Miller	1:32 4-5
4	Stevens-Duryea	36	E. A. Conkling	1:33

The Fort Ancient hill will become historic now, for the contest is to be made an annual and at the even mile distance. President Charles L. Bonfield was referee of the contest. Flagmen kept the course very clear and the contests, starting at noon, were over at 3 o'clock.

CHARTER DAY CLIMB IN PLAINFIELD, N. J.

PLAINFIELD, N. J., June 28—Johnston's Drive, beautiful and shady, will be the scene of the Charter Day hill climb, July 6. This is the first contest of its kind near this city, and a course seven-tenths of a mile has been marked out on which six events will be run, four with classifications and two free-for-alls. The entire city and North Plainfield will enter into the celebration, and the Freeholders of Somerset County have granted the necessary permission for the use of the hill and road. Events are open to all comers, according to the entry blanks—amateur and professional, private owners and dealers—and there will be first, second, and third prizes, the first gold medals and the second silver.

Under the sanction and rules of the A. A. A. contest board the classes have been arranged as follows: Cars selling at $1,100 or less, with equipment; cars selling between $1,100 and $1,650; those between $1,650 and $3,000; cars selling for $3,000 and over; free-for-all for runabouts; free-for-all. A special class may be arranged for steamers. Mail entries will close July 5. although it is announced that post entries may be made. The event is under the direction of Alexander Milne, of the newly formed Plainfield Automobile Club, and F. J. Titus, who is acting manager of the climb.

THAT ROADS CONVENTION OF THE A. A. A.

NEW YORK, June 28—Should ample preparation be a qualification, the Second Annual National Good Roads Convention will be a memorable one. Already plans promulgated have been set in motion, and, although the conference does not occur until the latter part of September, those who are connected with its arrangements have commenced their work.

The American Automobile Association and the National Grange join forces in this movement for better highways, and Cleveland will be the scene of their activity in the fall. Secretary Elliott, of the A. A. A., has returned from a trip to see those of Cleveland, Buffalo and Detroit who are interested, at Cleveland meeting George C. Diehl, chairman of the Good Roads Board, as well as the officers of the Cleveland Automobile Club and the Ohio State Automobile Association. The sentiment expressed by the Ohioans was one of genuine enthusiasm, representing that of the manufacturers and owners of that section. The exact date of the convenfion will be announced shortly.

Powell Evans, chairman of the touring board of the A. A. A., has sailed for Europe to represent this country in the annual congress of the Ligue Internationale Association des Touristes. which will be held in London, July 7, 8 and 9. This body includes the largest touring organization in the world, and the A. A. A. has been informed that its application for membership will be acted upon at the coming meeting.

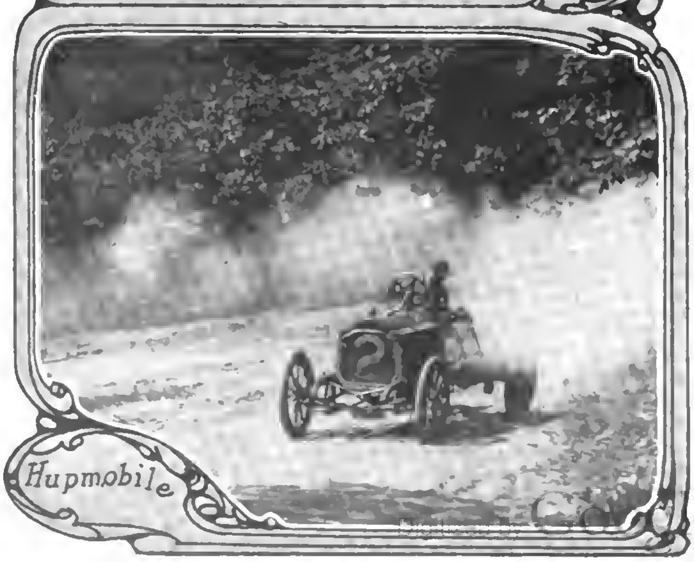
ELECTRIC VEHICLE WILL PAY DIVIDEND

HARTFORD, CONN., June 28—By the order of Judge Cross, of the United States Circuit Court, the receivers of the Electric Vehicle Company will pay all holders of unsecured proven claims a 20 per cent. dividend. They are permitted, also, to pay the same dividend on claims aggregating $101,094.35, which were filed out of time, but must bar all creditors who have not presented their claims heretofore. The petition for the order states that the unsecured claims amount to $2,721,585.76, exclusive of interest, to which must be added the new set. The receivers have $150,000 in cash and the offer of $430,000 for the concern and its assets. It has been decided to sell to the newly-organized Columbia Motor Car Company, and the receivers will make their final report sixty days after July 1.

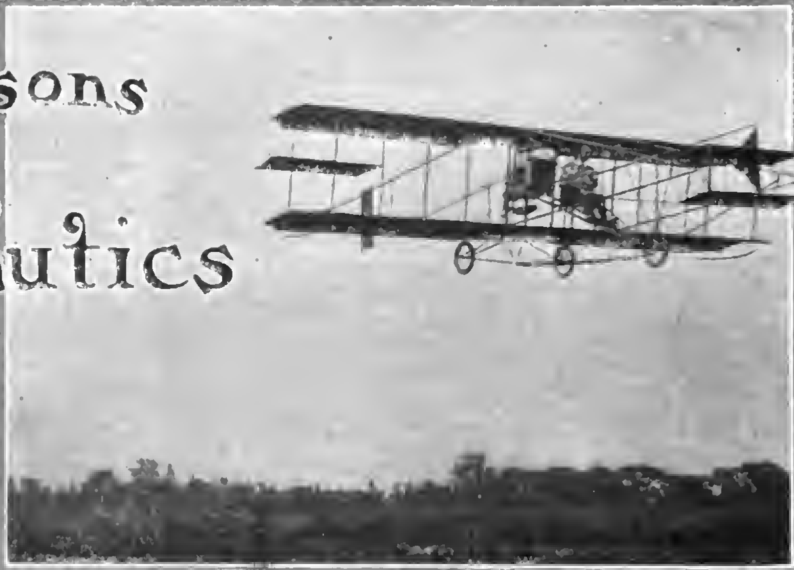

Stoddard-Dayton


Oakland


Stevens-Duryea


Hupmobile

New York Taking Lessons in Aeronautics



Aviator Curtiss Making His Flight That Demonstrated Such Wonderful Control of Machine

NEW YORK, June 26—With a surprisingly perfect flight of one mile, Glenn H. Curtiss, of Hammondsport, N. Y., brought to a close a very successful innings of flying at the old Morris Park race track, located in the Bronx. This was the last event on the program of the Aeronautic Society's first exhibition and contest of all types of aeronautical devices ever held.

In this series of flights, Curtiss has been very successful, and has proven beyond dispute the ability of the machine to fly early, often, and regularly. Beginning with the first attempt the day after the machine had been unpacked and put together, he gave an idea of what might be expected later on, when the machine had been well tuned up, by making an excellent flight of nearly a quarter of a mile. Following this, each successive attempt resulted in an increased length of flight.

In distance alone, this latter was not so very remarkable, but it was the perfect control of the machine by the operator which made it differ from other and longer flights. Rising from a point near the grand stand, Curtiss rose to a height of about 100 feet, and circled around the mile oval as readily as if the machine had been an automobile. At the conclusion of the mile-long excursion, he descended within a few yards of the starting point.

Throughout the circuit of the track, Curtiss rose and fell with ease, whenever an obstacle in the form of a tree made a different elevation either desirable or necessary. Moreover, in turning, the new apparatus was shown to be in keeping with the rest of the machine, in that it obeyed perfectly. Essentially a perfected product, every part of the machine has a finished appearance, in which it differs from the earlier machines constructed by the Wright Brothers. These latter were built with considerable economy, so that many of the parts bore the marks of lack of funds. With the new Curtiss machine, this is not so, and the excellent appearance and correct interrelation of the parts made a very favorable impression, even before the machine had been proven out in actual flight. So excellent was this impression that a local company, which has secured the agency for the Curtiss-Herring machines, was able to dispose of one, within twenty-four hours of taking the agency.

Mechanical Details of Curtiss Flyer—The most successful of the half-dozen aeroplanes with which experiments are now being made is the latest Curtiss machine, as illustrated in the accompanying photographs. This is named Curtiss Aeroplane No. 1, because the first built entirely by Curtiss, at the Hammondsport factory. All previously built machines were the property of the Aerial Experiment Association, including the *June*

Interested Aeronautical Enthusiasts Watching the Experiments at Morris Park Last Week

Bug, Red Wing, White Wing, and *Silver Dart.* The flying machine now at Morris Park track has just been purchased by the Aeronautic Society for experimental work. It is the lightest aeroplane yet built by Curtiss, and in fact is the lightest that has made successful flights, with the exception of the Santos-Dumont monoplane. It made four or five flights of upwards of three-quarters of a mile before it was shipped to New York.

The Curtiss aeroplane is a most interesting and pleasing machine, being well proportioned and showing careful and well-finished workmanship. The woodwork, which is all of Oregon spruce, with the exception of two ash braces extending from the motor to the front wheel and the bamboo poles supporting the front horizontal rudder and the "tail" or combined horizontal plane and vertical rudder at the rear, is neatly shaped, smoothed down and shellacked. The supporting surfaces are made of rubberized silk, the lower planes of light yellow color and the upper surfaces of light chocolate shade. The surfaces are made in sections having metal eyelets pressed into the edge by means of which they are laced to the frame. The combined area of the wheel. It is turned to right or left by the movement of the vertical rudder in the rear, controlled by turning the steering wheel to right or left. Lateral equilibrium is maintained by two movable tips at the extreme ends of the wings, hinged half way between them and projecting half their length beyond the ends of the main planes. These tips are elevated or depressed by the movement of the operator's body against a steel tube shoulder brace plainly seen. The instinctive and subconscious movement of the trunk of the body, away from the side of the machine that begins to drop, causes the tip on that side to present a greater angle to the air, forcing the machine to rise on that side, while a corresponding but reverse movement of the opposite wing occurs, allowing that side to drop. The machine is fitted with a pedal to cut out the ignition and to apply a brake to the front tire. This is useful while landing.

The aeroplane has a speed of thirty-five to forty miles an hour, but must attain a headway of nearly thirty miles before rising from the ground. This is due to its light weight in proportion to the load it must carry. And presenting less surface than the

Martin Glider Which Came to Grief Through the Too Energetic Action of the Auto Which Towed It

supporting surfaces aggregates about 250 square feet, yet it is said that the machine has sufficient lifting power to raise two men from the ground.

Extremely Light Weight a Feature—The total weight, ready to fly, but without the operator, is about 400 pounds, or just about half the weight of the *June Bug* and less than half the weight of the Wright machines. It is driven by a Curtiss aeronautical engine of new design, which is soon to be put on the market. Stripped, the engine weighs only 85 pounds, and with radiator, tanks, etc., the weight is about 150 pounds. It develops from 25 to 30 horsepower. There are four cylinders, copper-jacketed and fitted with mechanical inlet and exhaust valves. The cylinders exhaust directly from ports on the right side into the open air. A Bosch magneto furnishes ignition current, and the water and oil are circulated by geared pumps. Fuel is carried in the cylindrical tank above the engine and lubricating oil in the irregular shaped tank suspended below. A two-blade wooden propeller, 6 feet in diameter and of 5 feet pitch, painted black, is keyed directly upon the end of the crankshaft. Speed of the engine is governed by the throttle.

Over all, the machine measures 29 feet, and it is also 29 feet wide from tip to tip of wings. The biplanes are each 4 feet 6 inches deep and just alike.

There are three means of control of the machine when in the air. It is elevated or lowered by manipulation of a box front control, operated by pushing or pulling on the hand steering

earlier machines, it is to be hoped that it will have to progress at higher speed and prove correspondingly more stable. Moreover, it is probable that this is the best aeroplane in the United States, barring only the Wright machine, than which it is better finished and has a more workmanlike appearance. It remains to be proven more efficient, either in maneuvering or straightaway flight.

Sharing with Curtiss the honors of entertaining the crowd of 10,000 people present, were the glider of W. H. Martin, and the balloon ascensions. Martin comes from Canton, O., where he has made many successful gliding flights, but to-day he did not have the best of luck. Worse than that, he came very close to losing his life. The glider is a monoplane and, lacking a starting means, an automobile was used to tow it. This proved a trifle too speedy, and the bewhiskered operator had a thrilling experience. After the machine had lurched and plunged along for quite a distance, it took a sudden lurch into the race track fence, smashing both fence and glider.

Some excitement was also furnished by the balloon ascension and consequent parachute drops, particularly when the drop made by a woman amounted to about two miles. The dangerous feature of this last drop lay in the fact that the parachute was not properly attached to the balloon, but despite this the woman continued to go up before trying the drop, even after receiving the signal to descend.

An aeroplane built by Frederick Schneider refused to fly, although engine and propellers seemed to be working properly.

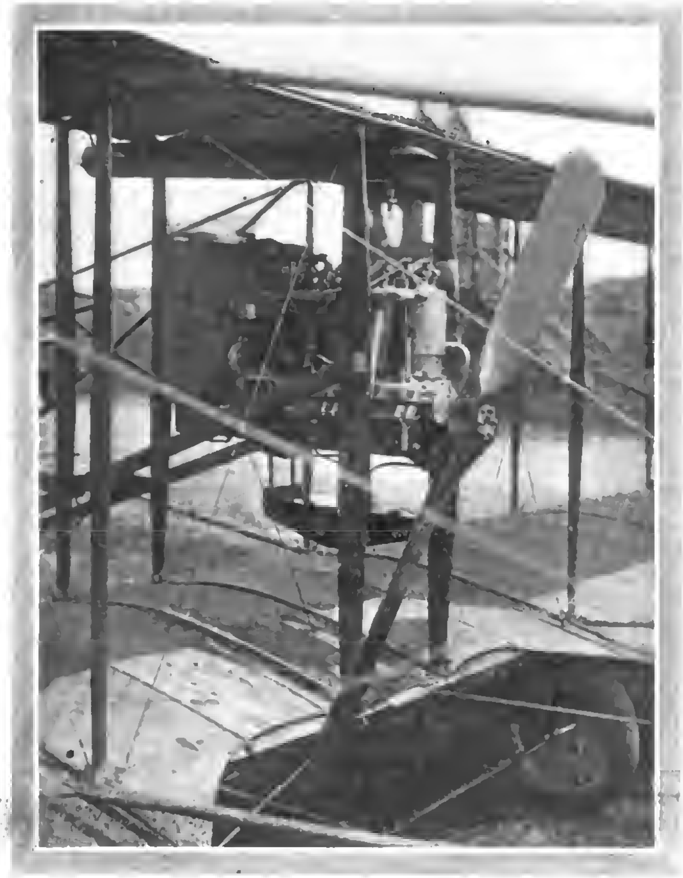
Curtiss Aeroplane at Close Range—A Rear View

FRANCE APPRECIATES AVIATION SUCCESSES

PARIS, June 24—The cause of aviation in France has received a substantial reward by the awarding of the Osiris prize of $20,000 to Gabriel Voisin and Louis Bleriot. The terms of the will of M. Osiris were that the million francs which he bequeathed should be invested and the revenue devoted to recompense the most scientific discovery or reward the most useful work. The selection was to be made by the Institut de France every three years. Only two previous awards have been made, one being to the director of Pasteur's Institute, and the other to M. Sorel, historian and member of the academy.

In the opinion of the Academy of Sciences, which had to report on this subject, the most important work in the year 1908 was the flight of Henry Farman across country on a Voisin biplane, from Bouy to Rheims, and the first round trip across country made by Louis Bleriot, from Toury to Artenay and return. As the two men were once in partnership, it was believed that the letter of the will was being observed by dividing the prize between them, giving $10,000 to Gabriel Voisin, originator and builder of the machine used by Farman, and an equal sum to Louis Bleriot, builder and pilot of the first successful monoplane flying machine.

The prize had to be awarded to Frenchmen, therefore the exploits of the Wright Brothers in France, last year, could not be taken into consideration.



Motor and Propellers of Curtiss' Air Conqueror

METROPOLITAN AGENCY FOR AEROPLANES

NEW YORK CITY, June 25—As indicative of the wonderful strides which the successful navigation of the air has made in the past couple of years, the taking of the local agency for an aeroplane is most significant, for this puts the final OK upon the device. The firm whose products has made this much progress along the line of reliability is the Herring-Curtiss Company, Hammondsport, N. Y., one of whose machines, with Glenn S. Curtiss at the wheel, made such a successful series of flights in this city the past week. The company which has taken on the selling of the Herring-Curtiss machines is Wyckoff, Church & Partridge. An aviation department has been established to take care of this work alone, which will be kept separate from the automobile department.

Not only was the agency secured and plans made to sell a number of the machines, but the first aeroplane was actually disposed of to A. P. Warner, general manager Warner Instrument Company. This sale, too, took place within a few hours of the clinching of the agency agreement. With this sale, attention is called to the facilites of the Curtiss factory for the first time, these being such as to enable delivery within fifty days of the placing of the order. The Wyckoff, Church & Partridge aviation department will be in charge of I. H. Manning, well known in automobile circles in the metropolis.

PROGRESSIVE ST. LOUIS PREPARES AERIALLY

ST. LOUIS, June 28—With the completion this week of the gas mains, the Aero Club will have complete aeronautical grounds, the first built exclusively for this use in the country. From the gas house a 16-in. main is being laid from which a dozen valves will lead for inflation purposes. Besides this, facility for owners of dirigible balloons, provision is made for the accommodation of 10,000 people. The latter includes a large grand stand, under which is space for balloon storage. The club owns two balloons and has three licensed pilots.

The grounds will be ready for use some time in June, and later on, October 9, a series of races for balloons and contests for aeroplanes will be held. For these contests prizes to a value of $4,300 have already been offered, and it is believed that this amount will be doubled before the races come off.

AUTO BUILDER TO ENTER AEROPLANE FIELD

BUFFALO, N. Y., June 28—Like his father, who entered the automobile business early, Edwin L. Thomas intends to be among the first into the airship construction field. With this idea in view, he has formed a company with Carl Dienselbach, of the Aero Club of America, and Dr. Francis Myers, an inventor from Columbus, Ohio. Dr. Myers has invented a machine and is now busy assembling the parts preparatory to a flight. It is expected that the first trial will be held on July 15.

The plans of the company have not been made public, but after the trial, providing that it is successful, aeroplanes will be built in large numbers. It is said that the Myers machine differs from others in kind of engine used, rudder, and size and proportions of the planes. At the test it is proposed to have a number of scientists present so that a successful flight will be appreciated or reasons formulated for an unsuccessful one.

Functions and Frailties of Motor Cylinders

By Thos. J. Fay

CYLINDERS for gasoline motors are made of gray iron castings, excepting in rare instances, as in certain classes of racing cars, when, to reduce weight, increase strength, and guard against rupture, certain grades of steel are used. The history of cylinder work, in all classes of engines, is closely coupled to castings of gray iron, and in view of the ease with which castings of this material may be moulded into intricate shapes, it would seem as if it is the ideal material to employ. There is more to be said about cast iron for cylinder work than the mere statement that, with this material, cylinders are easily made, and that the material is low priced. It is not because the pound price of cast iron is low that it is used; every automobile is in the same category in this regard, thus showing that the cost of the material is no criterion, for if it were, the very high priced examples of automobiles would have better materials for cylinders than will be found in the cheapest cars made.

From the point of view of cylinders, all automobiles are on the same basis, in that all of them use cast iron; this is not to say that every cylinder made is exactly on a par from the quality point of view; there are wide differences in details of design; all castings are not equally made, and the results in practice are not alike. That the cost of the cylinders should interfere as between the several types of cars, is not believed, on the count that inferior cylinder work is even more costly than the other kind, due to the vicissitudes attending the process. The cylinder question partakes of difficulties, not only because "wasters" are a loss, but for the reason that delays are expensive, and the machining work that has to be expended on cylinders before they are "uncovered" sufficiently to judge of their qualities, is at a cost, almost equal to the value of the work required to machine them to completion.

Superior Cylinders Follow Correct Designing—Granting that cast gray iron is a suitable material, it is at once possible to discuss peculiarities of the metal, and by so doing, learn, in what way trouble is likely to follow, and how to avoid it. Fig. 1 depicts sections of cast iron, of various shapes, and section A is circular, of some thickness, resulting in a "pipe," extending down through the core. The pipe does not always extend for the whole length of the core of such a section, but the core material is never so sound as the "skin," or the metal for some depth under the skin. Section B indicates the defective heart of a round section; if a hole is to come in such a way as to drill out the core of the section, the designing question is not so serious and a round section becomes less objectionable.

The rectangular section C performs in quite a different manner, excepting that a "pipe" will appear for a considerable distance down from the topmost part of the casting. Lack of solidity will occur through all the section, in the zones indicated by darkened lines, which occupy portions of the section diagonally disposed, tapering down towards the corners. Section D shows a modified condition that follows the same rules as laid down for section C. Abrupt changes in direction are attended by defects as shown in section E following along the path as depicted in rectangular sections, and the way to avoid this class of defects is to do away with the abrupt changes in direction, and the bunching of metal, in a manner as shown in section F.

Section G represents a modification of rectangular work, and defects are bound to follow for the same reasons. Section H shows how to avoid this class of trouble, and on the whole it is a fair inference that walls should be of a uniform thickness at every point, and fillets should be as little in area as it is possible to have them, without falling into the path of trouble, due to sharp corners. No casting should be so made that the metal will show a positive change in direction at any point; this rule demands that fillets be introduced where sections join, if they are not in the same plane, but, as before stated, it is the aim to have the fillets as light as possible, for the reason that excess metal will result in unsound castings.

Some Normal Features of Design—Following perfectly uniform shapes, in the design, attended by equal thicknesses of walls throughout, excepting at such points where necessity dictates changes, it will be in order to consider one or two such examples: Fig. 2 shows a section of a cylinder, with uniform thickness for the most part; at the bottom, approaching the flange, which is of greater thickness than the walls, the section is thickened up as it approaches the flange, with the result that most of the troubles, due to changes in section, are aborted because the change in section is not abrupt. The "oil-boss," which is shown opposite the piston-pin, on the lower dead center, is of circular section, and the core will be defective, as depicted in section A, Fig. 1, but since the core will be drilled out, as shown in section B, Fig. 1, it follows that the defect will be of no practical significance, provided the boss is as small as it can be in practice. It is of the greatest importance to avoid the use of more material in this boss than necessity dictates, and the old fashioned practice of making the boss very large, in order to have it available, even if it is shifted in the process of moulding, should not be resorted to. In cylinder work, careful moulding is one of the requirements, and the foundryman may not be permitted to do such indifferent work that the bosses will have to be much larger than the actual necessity, merely to compensate for indifferent foundry work.

Sometimes ribs are placed on cylinders, as shown in Fig. 3, the idea being to strengthen the cylinder walls to defeat the tendency of the cylinders to disrupt around the girth near the lugs used for holding purposes. This plan may result in shrink holes in the section of the cylinders, at, or near the inner surfaces of the bore of the cylinders, and the hardness of the metal will vary, due to the opening of the structure approaching the ribs. No cylinder, made with ribs, will have a uniform texture

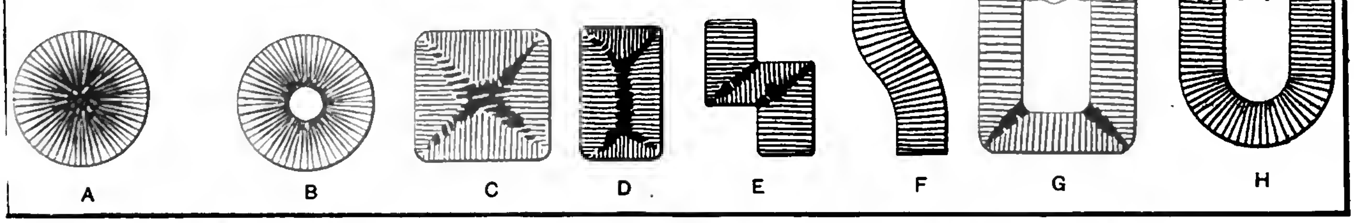


Fig. 1—Characteristic shrink imperfections due to different shapes, and sections, of cast gray iron used for cylinders

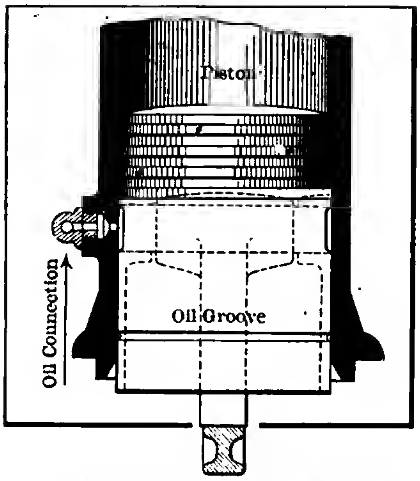


Fig. 2—Section of cylinder showing position of oil boss

throughout, nor is it necessary to risk failure in this way; many examples of cylinders are to be seen at every hand, in which the compression is high; the walls are quite thin, and ribs are absent, and the results, in service, are quite in keeping with the most exacting expectations. Cylinders so made wear evenly, and the compression is not lost, due to scoring, which always follows if the texture of the wall is of varying density, as it is likely to be with ribs or equivalent construction.

Piston rings, since they always press out, against the cylinder wall, with quite a little force, if the rings are tight against compression, will wear evenly if they are given a uniform motion, and if the walls are of equal hardness at all points; this condition does not always obtain in practice, and the rings tend, in consequence, to embed in the metal of the walls at different rates, depending upon the location. At the top of the stroke, for illustration, the rings burrow into the walls, just at the point of reversal of motion, and it has been found that the extent of the damage done will be a minimum if the top ring on the piston is allowed to overlap slightly, as shown in Fig. 4; this is accomplished by recessing the cylinder walls at the top of the stroke, in such a way that the top ring will extend above, for a short distance. This practice is common in steam engineering, but it is not so prevalent in automobile motor work, and it is contended by some designers that it is not necessary to go to so much trouble.

Since piston rings press outward all the time, they are very troublesome when the piston is being inserted into the cylinders; this difficulty is overcome, to a considerable extent, as shown in Fig. 2, by means of a beveled counter bore. As will be observed, it is possible to press the piston up against the bevel, so that the rings will be compressed, but it is not always the case that the bevel is adequate for the purpose. The bevel should be all that the design will afford, without endangering the strength of the cylinders at this point, and it is even a good idea to be a little liberal, in order to be sure that the pistons may be inserted into the cylinders without damaging the rings by pinching them.

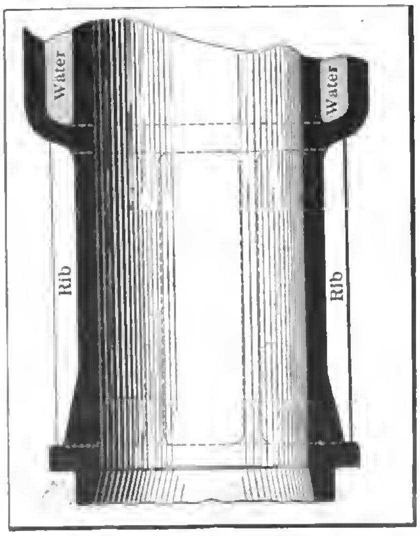


Fig. 3—Section, indicating thickening walls at flange, and ribs disposed around girth

Differences in Expansion Have to Be Considered—The piston should be a free fit in the cylinder, due to effect of heating. and the allowance to be made for differences in expansion will depend upon the design, not only of the cylinder, but the piston, as well, in every case. The piston will expand, due to heat, more than will be the amount of expansion of the cylinder, if the latter is water-cooled; of that there is ample evidence, at every hand. Were the piston designed for water-cooling, and with walls of the same thickness as the walls of the cylinder, in which the piston is intended to reciprocate, the difference in expansion would be limited to such as might be traced to differences in diameters, which would be a negligible quantity under fair conditions.

As it is, pistons are not water-cooled; they are not designed with the same thickness of walls, and they do heat in excess; the result is that they do expand more, and the difference is enough to abort good performance. Since no form of motor will escape the ills of a "neat" fit of the pistons, there is much ground for discussion when the question of the proper clearance is to be settled upon, although some designers claim that a slight clearance is all that the occasion requires. Since pistons do not heat up as much at the bottom, as they do at the head, it follows that the diameter may be slightly conical, and the average fit of such pistons will be superior to the fit in those that are parallel, if they have the same clearance as the maximum that obtains in the cases of the conical types. Noise due to slack pistons is very annoying, and that motors so designed will give very good satisfaction, is not taken for granted; as a rule, this noise is not found in new motors, even when the clearance is more than is looked upon as necessary, and for the most part, it is claimed that this noise comes in when the cylinders are worn to an elliptic approximation, as they will if the pistons are short, and if the compression is high enough to make the pressure very great on one side. When pistons are, in length, about 1½ times the bore of cylinders, they seem to work for a long time without engendering the elliptic formation, and that they should be barely long enough to serve the purpose, is indicated when account is taken of the ills of excess weight of reciprocating parts.

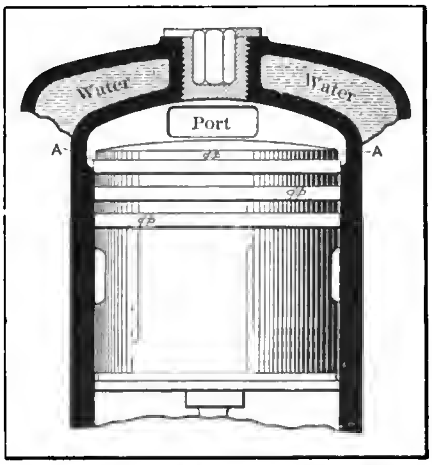


Fig. 4—Section, depicting counter-bore at top of stroke

Approximate Clearance Required—In certain of the motors to be found in cars of some reputation, it is the practice to make the clearance on a basis as follows:

Bore of Cylinder.	Diameter of Piston.
4	3.990
4½	4.485
5	4.980
5½	5.475
6	5.970

In a certain case, in order to be able to fix upon the requisite clearance, pistons and cylinders were heated up to different temperatures, and measurements were then taken, to ascertain the difference between them from the point of view of expansion; it was found that the pistons heated the most, and that the difference in expansion accorded fairly well with the values given above. In these experiments, the cylinders were of the water-cooled type, T design, and the bore was 4½ in. In air-cooled cylinders, of the same size, it was determined that the difference in expansion was less; about two-thirds, in fact, of that which obtained in the water-cooled motors. The cylinders in air-cooled work heat more than in the other class, and the difference in temperature, between pistons and cylinders, is somewhat less; it is a reasonable expectation, under the circumstances, that the difference in expansion will be diminished. It does not, of necessity, follow that the problem, in connection with air cooling, will be any less acute.

(To be continued.)

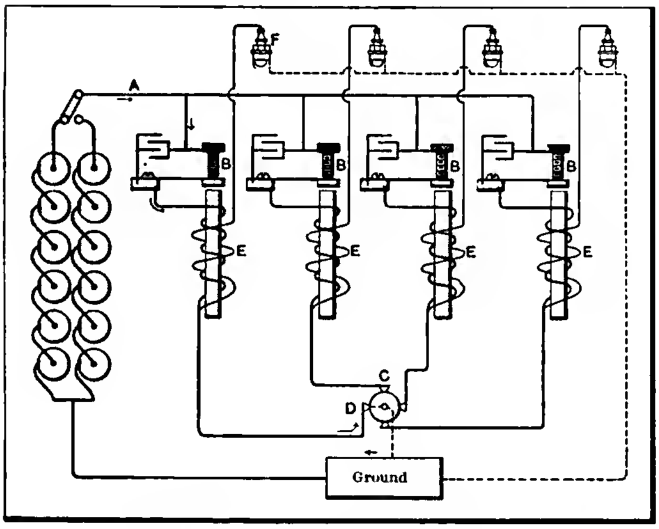
THE DEVELOPMENT OF MAGNETO IGNITION

By H. G. Deupree

PERFECTION of the high-tension magneto has answered a question which assailed the pioneers in the development of the multiple cylinder, changeable speed, internal combustion engine—namely, the production of an efficient ignition system. The high-tension magneto is probably the final word on gasoline engine ignition and has assisted materially in the perfection of the motor, the heart of the car.

It is a comparatively recent product, the result of long years of successful experiment and development by expert mechanical and electrical engineers. This progress may be marked by three successive steps and each period according to the chronological order may be named as follows: The adoption of the battery, the adoption of the low-tension magneto and the universal adoption of the high-tension magneto.

A perfect ignition system is the one which accomplishes the production of a single, hot spark, at either low, average or highest motor speed at the exact instant it is required to effect combustion and under varying conditions as to time; offers a large range for the advance and retard of the spark, a permanent supply of electricity; and withal, is a system of simple construction requiring practically no attention; one free from fine and sensitive parts, which can not be affected by jolts or strains under the stress of strenuous touring or racing conditions; and built with broad margins for the performance of its functions when the carburetor is not properly adjusted, when there is a leakage of compression, or when the spark plugs are fouled and the motor conditions are bad.

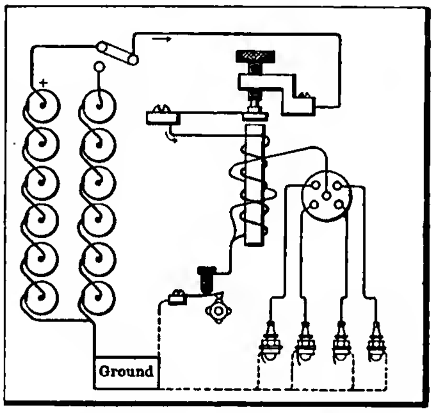


Wiring Diagram Four-Cylinder Engine with Individual Trembler Coils

Perhaps the logical order of discussion of this all important question of ignition is the one taking up the various types of ignition according to the time of their appearance, adoption and recession. This would mean the discussion of first, the battery; secondly, the low-tension magneto, and thirdly, and lastly, the high-tension magneto. The last named should be divided into the leading sub-divisions in which the commercially successsful types of magnetos, as made to-day, are naturally placed according to the principles of construction which differentiate them.

Electric ignition of explosive engines was accomplished on slow speed engines by the use of the primary coil and later by the low-tension magneto. Both of these earlier systems left something to be desired, but the attention of the men working for the development of the motor was first turned to the perfection of the battery. Then came the use of the low-tension magneto, which had worked satisfactorily upon slow speed stationary engines. We will take up the situation at the introduction of the high-speed motor and consider the forms of ignition in use at that time.

Some Earlier Attempts and How They Resulted—The earlier attempts at battery ignition for the motor resulted in the use of dry batteries, a non-vibrator induction coil and a special circuit breaker attached to the crankcase of the engine with a circuit-breaking cam attached to the camshaft. This system was later modified by putting a very high-speed vibrator on the induction coil, as the non-vibrating type drain a battery very quickly. These improvements on the battery were all made on the prevailing theory that a single, powerful hot spark was not as effective nor as sure a system of firing the compressed gas as the shower or series of sparks created by the battery. It was thought that a series of sparks must ultimately produce the explosion, even if the first spark was too weak or if the charge was not of proper mixture or was not sufficiently compressed when the earlier sparks occurred.



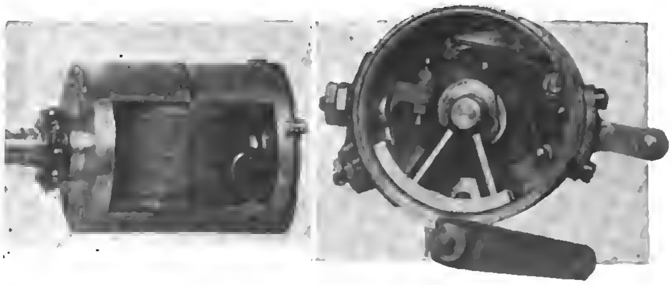
High Tension Wiring with Single Coil 5

It soon became evident, however, that the battery system with vibrators and individual unit trembler coils, or with vibrator and single coil (for jump-spark ignition) could not always be depended upon to fire the cylinders of a multiple cylinder engine with the greatest efficiency. Vibrators are operated by means of magnetic attraction resulting in a mechanical "lag" in breaking the circuit, and consequently the timing of the spark so a discrepancy in the timing occurs such that the cylinder will not fire when the pistons are in the same relative positions.

Any difference in the timing of the explosions results in a very appreciable loss of motor power, since the pistons are not in the proper position when the explosions exert the greatest force, and produce the greatest amount of "torque."

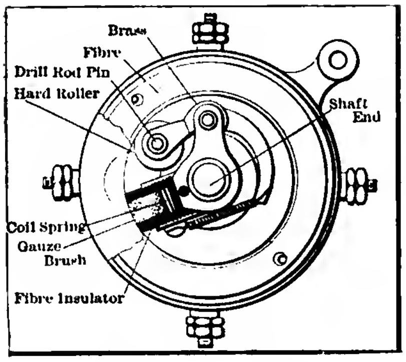
The battery system of ignition may be divided into two general classes. One system employs a commutator or timer and a vibrator coil for each cylinder of the engine. For instance, in a four-cycle, four-cylinder engine there will be one commutator, for vibrators and four spark coils. This system is the most extensively used of the battery ignition systems.

Battery ignition system is one that employs a single vibrator



(a) Primary armature winding (b) Primary circuit breaker

High Tension Magneto Parts Shown in Detail



Common Form of Timer

and single coil, and commutator and multiple distributor, regardless of the number of cylinders. Still another system which may be mentioned is the battery system employing a timing device somewhat similar to that generally found in magnetos. While this has eliminated to some extent the objectionable "lag" of the spark, the device is complicated and retains the disadvantages of the battery systems, such as the ever-present necessity for frequently recharging them.

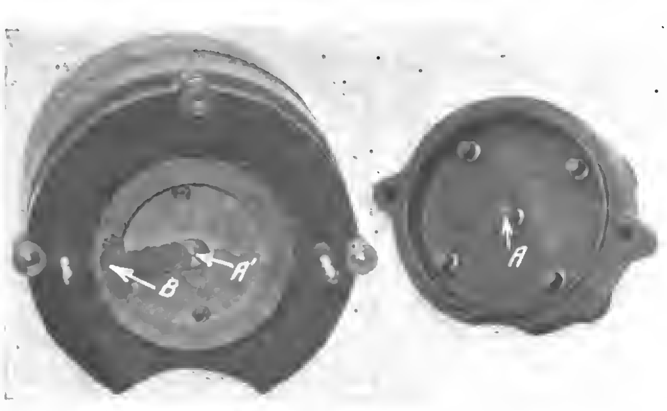
How a Four-Cylinder Timer Works—Take a four-cycle, four-cylinder engine, equipped with battery and four vibrators and four individual unit trembler coils and a commutator or timer. Inside the rim of the commutator are four insulated segments set diametrically opposite. A small bar, driven usually from the cam shaft, and carrying on its outer end a little roller, which also revolves, turns on a pivot in the center of the commutator when the motor is in action. As the metal wheel on this bar comes in contact with the metal segment, imbedded in the hard rubber perimeter of the timer, the electrical circuit is completed. Each segment works with one particular vibrator and coil for the creation of the explosion in a certain cylinder.

The coil referred to consists of a soft iron core, about which is a primary and secondary winding of copper wire. When the electrical circuit is completed through the commutator or timer the iron core becomes magnetized. This magnetized core exerts an influence on the vibrator, causing its armature to vibrate. As the vibrator is pulled toward the magnetized core it breaks the electrical circuit, and it is at this moment, when the circuit is broken, that the spark occurs.

It is well to remember that the spark is caused when the circuit is broken or interrupted. The contact points on each vibrator must be in the best condition, the wiring must be perfect, and the insulation must be in perfect shape—in fact, to get the battery's best efforts everything must be perfect.

Theoretically, the instant the little roller on the end of the bar comes in contact with the segment on the rim of the commutator the circuit is completed, and the core is magnetized, the vibrator is attracted towards the core, the circuit is broken, and the spark occurs. But let the vibrator be put into operation and then the "lag" or variation in the timing happens.

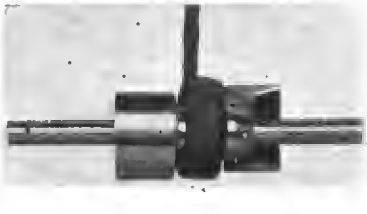
Vibrators Work and Work Continuously—When the engine is running at a reasonable speed the vibrators are in motion continuously. Instead of stopping before they are to be used again they will keep on vibrating and the circuit will be complete when the vibrators are not even in the circuit. The commutator closes with the vibrators in many different positions and



Earlier Form of Moving Contact or Distributor

the spark cannot occur in any one cylinder until the vibrator comes to its position with the circuit closed, the magnetic action of the iron core of the coil attracts it again, opening the circuit, and by this time the spark occurs too late for the best results.

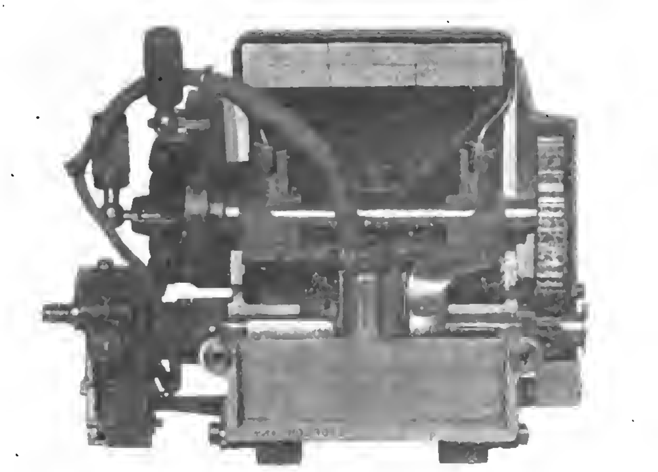
Even when the vibrators are working perfectly therefore, the timing varies an infinitesimal amount of time less than the periodicity of the vibrator. That is the substance of the law deduced from the operation of the vibrator, and it was that small imperfection of the battery system, combined with the expense and trouble of the recharging, which caused engineers to look for a more perfect device.



Inductor Magneto Shaft

The attempt to adopt the low-tension or make-and-break magneto, which had proven satisfactory on low-speed, stationary engines, was the logical step. Faraday had long since discovered that a revolving winding of copper wire in the magnetic field between the pole pieces of "U" magnets would generate an electrical current in that winding or coil.

The low-tension magneto creates a make-and-break, or wipe spark only, as its current is of low voltage and not capable of



Longitudinal Section Through Inductor Type of Magneto

overcoming the resistance furnished by the gap in the spark plug. This is a very simple magneto, however, and easy to manufacture, as it is probably the simplest current generator known. The complication with this system is mechanical, not electrical, and comes in the construction of the make-and-break mechanism, which must be operated mechanically.

This creation of the spark is accomplished by igniters or electrodes which project into the combustion chamber of the engine cylinder. As these points separate the spark is made. These electrodes are naturally very complicated and delicate. They quite frequently wear down rapidly and their presence in the combustion chamber makes it impossible to build the cylinder proof against the leakage of compression.

America Adopted the High-Tension Magneto First—The fact that the Eurpeans first adopted this system and manufactured this low-tension, make-and-break magneto in quantities, gave them a reputation for success in magneto construction which does not belong to them as far as the high-tension magneto is concerned. The high-tension magneto was first an American idea.

As early as 1893 certain American engineers were experimenting and developing a high-tension magneto. It was of the inductor type, however, and when it had been perfected to a point of practical usage on the engine it was found that there was no market for this epochal mechanical ignition system.

Americans mostly were content to see whether success attended the efforts of the Europeans in the development of the self-propelled vehicle, and the few engineers on this side of the Atlantic who brought out motor appliances were forced to wait until the foreigners had proven the automobile a practical working vehicle, designed to revolutionize modern transportation methods.

Distributor for Inductor Type

When success did crown the efforts of the European pioneers in the manufacture of the motor, far-sighted American experts, who were perfecting accessories, had to wait until the Europeans had attained some success in these particular departments before an American market for them was created. Because of this fact the European engineers get credit for a number of important motor improvements which were really produced and perfected on this side of the Atlantic before they even received the attention of the foreigners, who got the credit for all improvements.

So it was with the magneto. It is hardly necessary to discuss the evolution of the high-tension magneto in detail, so this article will deal only with the high-tension magneto as found to-day. High-tension magnetos may be divided into two general classes, the nomenclature in this case being based upon the nativity of their earlier propagators. One may be called the American high-tension and the other the foreign magneto. The American type of high-tension magneto is now used on a majority of cars.

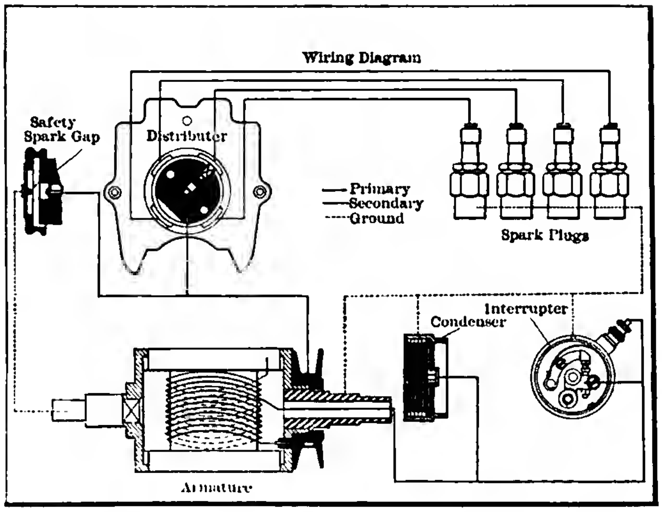
Revolving Winding Marked the Early Types—In the earlier types of magnetos exploited in America the principal of a revolving winding in the magnetic field inducing a current in that winding was retained, but a single breaking device was added to interrupt this primary current and a high-tension current was induced in an induction coil, which was in reality a non-vibrating transformer coil. This system, however, involved the use of carbon or wire brushes, and collector rings to collect the current from the revolving primary winding before it could be taken through the circuit-breaking mechanism.

These moving contacts complicated the construction to a degree past the understanding of the average motorist. However, the use of the induction coil made it possible to insulate properly the wire used and also permitted of a dual ignition on one set of spark plugs, as dry batteries could be wired through the same transformer coil without additional trouble.

In 1907 a new type of magneto was brought out. It was the inductor type, now used so extensively. By revolving a solid steel shaft, on which are two drop-forged steel inductor wings, the magnetic field was reversed twice during each revolution and created two electrical current waves or impulses per revolution. The direction of the flow of magnetism was changed at each impulse, thereby making an alternating current.

By imbedding a circular-shaped stationary winding of magnet wire between the poles of the magnets and around the inductor shaft, it was possible to reverse quickly the magnetism through the winding, consequently generating a powerful current in it. This system made it possible to carry the current directly through the circuit-breaking device by means of heavy lead wires without the use of carbon brushes or collector rings. It also eliminated revolving windings and all moving contacts, and consequently many sources of trouble.

The current is carried to the transformer coil, located on the dash-board, where it is jumped up to the high potential necessary for creating the hot jump spark. From the transformer coil the current is conducted back to a hard rubber distributor on the face of the magneto, and from there is carried to the spark plug. The distributor shaft, which is located immediately above the inductor, revolves a metallic segment past the terminals of the wires leading to the spark plugs. The high-tension current is carried to this segment and transmitted to the spark plug.

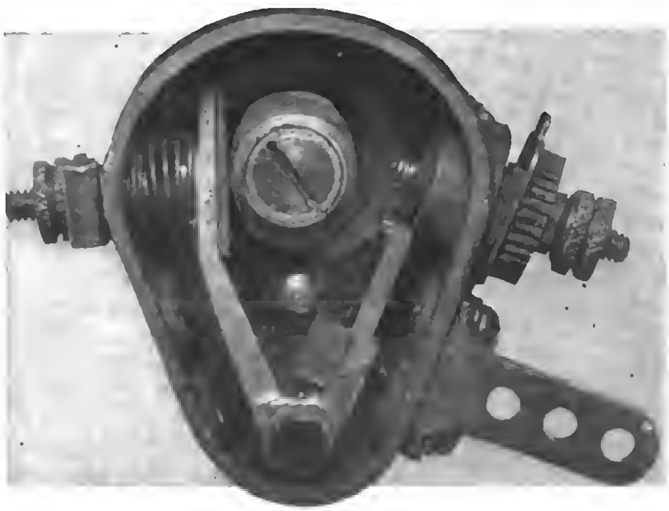


Wiring Diagram Compound-Wound High Tension Magneto

Foreign Practice Differs in the Location of Winding—The European type of magneto has both its primary and secondary windings of wire inside the magneto. The wire varies in length from three to five miles and requires the greatest care in winding to get it into the allotted space. Condensers are also crowded in the space between the pole pieces of the "U" magnets. Brushes are used to transmit the current from the moving windings to the distributor and collector rings.

A magneto of the latest type, and gear-driven, guarantees what may properly be called perfect timing. A hot spark is delivered in the cylinder under compression at the exact instant desired. The inductor type of magneto also offers a reliable system of starting from the seat without cranking. The motor always stops with the magneto in such a position that the first spark will occur in the cylinder under compression. Where batteries are used a push-button is provided and by merely touching it a spark will be made in the cylinder which is under compression.

The battery was improved to its highest point of perfection; the low-tension, make-and-break magneto with its electrodes was then adopted, and then came the high-tension magneto, the crowning effort of expert mechanical and electrical engineers in the effort to produce an ignition system capable of performing its function in a manner to assist most in getting the maximum power out of the motor with the least complication and trouble after the original outlay.



Inductor Magneto Double Cam Circuit-Breaking Device

METHODS OF VALVE GRINDING

By D. R. Hobart

VALVE leakage has its origin in a variety of causes, some of which are due to features of construction, as warping, following the use of inferior material; defective design; lack of even distribution of the cooling medium, and when the water-jacket is shut off for a part of the way around the seat. A second and prolific cause of leakage is due to grinding in the valve, thus reducing the clearance between the valve-stem and the lift; the valve cannot seat after the interference, and it will be necessary to adjust the lift enough to allow the cam to rotate for a complete revolution, without disturbing the valve, on its seat; the usual practice is to allow a clearance between the valve-stem and the lift, the amount of the clearance being a variable, depending upon the diameter of the roller, and the shape of the cam; which clearance will not be the same for the respective designs of motors. Sullage, in the process of casting, is prone to float to the region of the valve-seat, because it is near the top, in vertical casting work, and in this case, the seat is defective, and leakage is a natural sequence; in a case of this sort, it is a new cylinder that will cure the difficulty. Then, there is the question of weak springs to contend with, and in such cases, deposits of carbon are likely to settle on the seat, and prevent the valve from coming down tight; new, strong springs will cure this trouble.

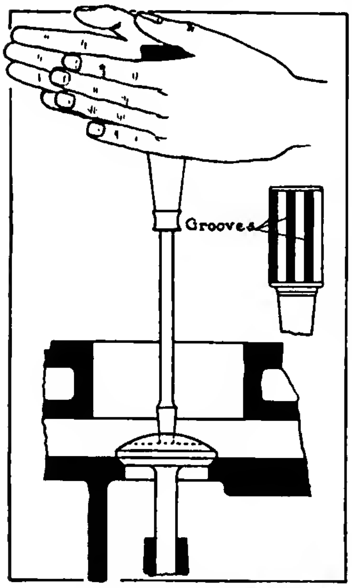


Fig. 1—Method of using screw-driver for grinding valve

Tools Used in Grinding—Shops vary in the tools or apparatus used in valve grinding. Some adhere to the screwdriver, the Swiss file for dressing the faces, and the rose-reamer for truing the valve seat. Others employ special apparatus or drill stocks for the actual grinding and do not true either the seat or the valve face. A third class true the faces in a special tool and either do or do not ream the seats, according to the amount of wear on the latter. It is probable that each shop has excellent reasons for using its own particular apparatus and manner of grinding, from motives of economy of time and labor or by reason of special conditions in the motors. Grinding compounds consisting of two or more grades of emery and rouge paste are universally used, being either made up in the shop or bought ready mixed. The writer inclines to the use of either the screwdriver or grinding machine, truing the valve face in a truing tool and finishing the operation by grinding with emery and oil, using the reamer only when the seat is badly scored or pitted.

Grinding Automatic Valves—Automatic valves and those operating in cages are ground in a similar manner to other valves, and in fact with greater ease, as the valve and its cage can be removed from the motor and the work done in a vise. The test for tightness with gasoline can be better observed, and both seat and face can be examined at any time; whereas, when the seat is part of the motor casting, an electric light is needed for any accurate inspection. It should always be remembered that after a valve has been ground, the stem has to all intent practically elongated, and a readjustment of the spring on an automatic as regards strength and the nut on a mechanical valve for proper clearance will be necessary.

Grinding in with a Screwdriver—Probably the screwdriver is used to a greater extent in valve grinding than either the drill-stock or any one of the excellent grinding apparatus now on the market. The valve is usually given a preliminary examination for scores or deep pits, and if any such are found on the face the latter is dressed with a Swiss file or coarse emery cloth. A handful of waste or a cloth is now put in the valve port to prevent particles of metal or the grinding material from getting into the cylinder, and the valve face coated with a paste of fine emery powder and oil. The valve is now put in place and the blade of the screwdriver inserted in the slot in the head of the valve. The handle of the screwdriver is now held between the palms of the hands, as in the sketch, and a series of oscillations through a small arc given to the valve by moving the palms in opposite directions. After about thirty of these oscillations have been given, the valve is lifted from its seat, given a half turn, and reseated for further grinding in the same manner. This operation should be continued, with occasional additions of oil and emery, until the valve face and the seat appear to be bright for their full width around the circle. Both seat and face should then be washed with gasoline, and care should be taken that no particles of emery are allowed to remain thereon when the valve is put in place. The valve is now seated and tested for tightness by pouring gasoline into the chamber. If there is any leakage past the valve, it should be reground, and again tested until found to be tight. A continuous rotary motion should never be used in grinding, as this will cause the emery to "ball up" and cut a groove in either the valve face or the seat, nullifying the operation and producing a leaky valve. The waste or cloth should be removed from the port as soon as the valve is properly ground, as, should it be allowed to remain, it will be sucked into the cylinder and burned, dirtying the valves, or, if not thoroughly consumed, preventing the exhaust valve from operating. Waste usually contains small bits of metal or emery, and these will score the cylinder or piston, hence the need of removing the waste as soon as the grinding is finished.

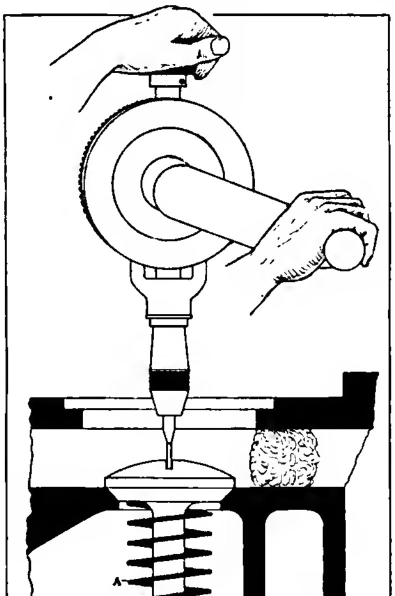


Fig. 2—Grinding with drill stock, showing lifting spring A

Light Pressure to Be Used—For the best results, light pressure should be applied and the operation performed slowly. If the stem is a loose fit in the guide, care must be taken not to allow the valve to wobble on its seat while being ground, or the surfaces produced will be more or less convex, instead of being flat, and will leak. The method of operating the screwdriver has been found to be one in which a light, but firm, pressure can be constantly maintained on the valve without tiring the operator, whereas the usual way, where the handle is held in the palm of the hand and the grinding done by a motion of the wrist, is tiresome and puts too much pressure on the valve. Certain screwdriver handles lend themselves better to grinding than others, an excellent handle being shown in Fig. 1, which illustrates this method of operating the screwdriver. In unseating the valve to give it the half turn, it can be easily lifted by the thumb and finger on the stem below the guide.

Using the Drill-Stock—The drill-stock or rotary drill is employed to a considerable extent where a quantity of grinding is to be done, or where rapidity is desirable. A screwdriver bit is inserted in the chuck and the operation conducted as in the case where a screwdriver is used. Owing to the multiplication between the driving and the driven bevels, the crank should be rocked through a small arc, instead of being rotated. A spring should be fitted within the valve chamber to unseat the valve when it is desired to examine it or when a half turn is to be given the valve on its seat. The spring, which is shown at *A*, Fig. 2, operates as soon as the pressure on the drill stock is released and is of just sufficient strength to overcome the weight of the stock and bit. A plug of waste is shown in position to prevent emery or metal particles from getting into the cylinder.

Valve Grinding Machines—To facilitate the operation of

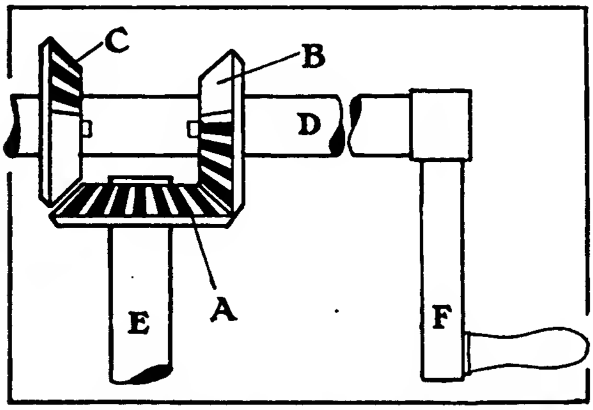


Fig. 3—Mechanism of a typical machine for grinding

grinding, a number of special machines have been brought out to take the place of the screwdriver and drill-stock. For the most part, such machines are constructed to give a limited partial rotation to the valve, whether the handle is rotated or moved to and fro. One well-known model, which is shown diagrammatically in Fig. 3, has three bevels, *A*, *B* and *C*, the first being fastened to a vertical shaft, *E*, to which is attached the screwdriver bit, and the others fastened to a horizontal driving shaft, *D*, operated by a crank *F*. Bevel *A* has its full number of teeth, but *B* and *C* are "mutilated" and are so arranged the teeth of one bevel at a time act on those of bevel *A*. A casing fitted with a handle encloses the mechanism. It will be readily seen that as crank *F* is rotated, a rotating motion, first in one direction and then in the opposite one, is imparted to shaft *E* as the teeth on bevels *C* and *B* come successively into mesh with *A*. Consequently, when grinding a valve, all that is necessary to do is to rotate crank *F* while supporting the machine by the handle, stopping occasionally to allow the unseating spring to lift the valve, and, after giving it a half turn, continuing the rotation.

Where Turning the Valve Is Economical—In cases where a new valve is to be ground in on a well-worn seat or where the valve is heavily scored or carbonized, it will be more economical to turn the face of the valve, either in a lathe or in a special tool, such as is shown in Fig. 4. This tool consists of ing fenders, etc., is illustrated in Fig. 5. A block of steel, *B*, is held against the head of the valve, *V*, and the latter rotated on its seat by means of a screwdriver blade, *S*, inserted in the slot in the stem. The face having been previously trued in a tool like that shown in Fig. 4, it is surprising the short time needed a stock, *H*, to which is attached a head, *J*, and on which are

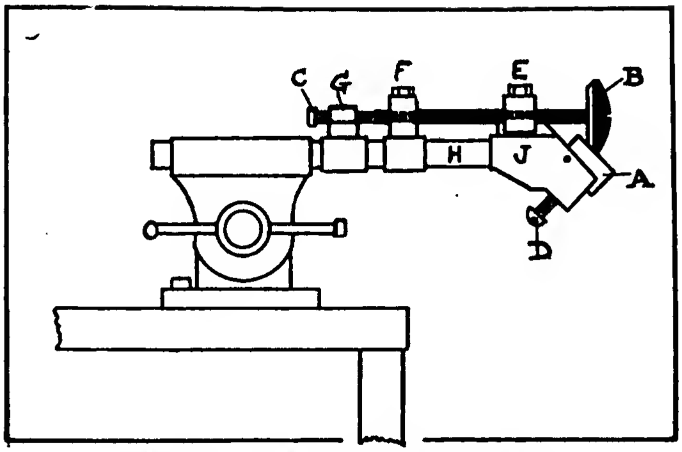


Fig. 4—Valve-truing tool with valve in position

slidable a supporting rest, *F*, and a tail stock, *G*. The head carries a supporting rest, *E*, and a pin on which is pivoted a cutter, *A*, whose angle with regard to the axis of *H* can be varied by means of a screw, *D*. The tail stock carries a screw, *C*, to regulate the depth of cut of the cutter, *A*, when the valve is in place. To true the valve face, cutter *A* is adjusted to the required angle —usually 45 degrees—and the valve put in place, as at *B*. The caps of the rests, *E* and *F*, are screwed down until the valve can be revolved but cannot move sideways nor wobble. Screw *C* is then set up for the required depth of cut and the valve revolved by means of a screwdriver or brace and bit. While this operation sounds complicated, it takes considerably less time than when the valve is ground in on its seat. Any carbon deposit is quickly removed and the face kept true at the same time, whereas, when the Swiss file is used, the result is too often a series of irregular surfaces, which must be trued in grinding on the seat. Having trued the face of the valve, it will take but a short time to grind the seat to correspond. Where the seat is not too badly worn, this preliminary truing of the valve face will often obviate the use of the rose reamer or other seating tool. It will be evident from the above that time is saved over the usual process, in eliminating at least one step therein and in doing away with considerable halts for examination of the work, reapplications of the grinding medium, etc.

A Wrinkle in Grinding Valves on Opposed Motors—The arrangement of opposed motors in the chassis often necessitates the removal of the fenders for ease in grinding with the screwdriver or machine, and considerable time is consumed in what would be done comparatively quickly on a vertical motor. A wrinkle whereby such valves may be ground, without removing fenders, etc., is illustrated in Fig. 5. A block of steel *B* is held against the head of the valve *V* and the latter rotated on its seat by means of a screwdriver blade *S* inserted in the slot in the stem, the face having been previously trued in a truing tool. In cases where the stem of the valve has no slot, a pair of gas pliers can be used to grip it, being careful not to mutilate the threads thereon in so doing.

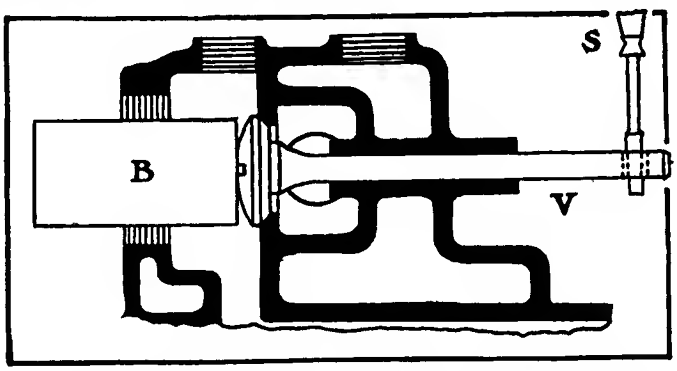


Fig. 5—Block used in grinding valves in horizontal cylinders

LETTERS INTERESTING AND INSTRUCTIVE

PROLIFIC CAUSE OF NOISE

Editor THE AUTOMOBILE:

[1,926]—Will you kindly suggest through "Letters Interesting and Instructive" the cause of and a remedy for a light clanking noise occasionally coming from the left rear axle or emergency brake of a Buick Model 10. The brake spring is sound, nothing is loose, and the manipulation or movement of the car is not affected in the least. Are those bars too long? Or could the differential gearing have anything to do with it?

Welser, Idaho. DON S. NUMBERS.

If your trouble was more fully explained there would be more possibility of our helping you, but "a light clanking noise from the rear axle" is rather indefinite. It is possible that part of your trouble proceeds from lost motion in the parts of the brake other than the spring and lever, of which you speak. Thus the toggle or cam which operates the brakes may be at fault. The fact that this noise is only heard at times and is not continuous, would make a person think that it is something which is only produced under certain conditions, which either throw an unusual strain upon some hitherto unsuspected part or so bring two parts into relations that they mutually interfere with one another.

If the rear axle, itself, were bent or otherwise altered from a perfectly round and true shaft, this resulting condition might cause a noise such as you describe. You have looked up the large things, possibly it would be well to now investigate every little part, no matter how small nor apparently far related. Invariably a source of trouble like this proceeds from the little and unsuspected things.

CHARGING STORAGE BATTERIES

Editor THE AUTOMOBILE:

[1,927]—Having recently removed to a point where it is impossible for me to have my storage batteries recharged, I would like to be informed through "Letters Interesting and Instructive" as to what precautions should be observed in putting the batteries away, out of service for several months, so as to prevent deterioration during that time. Should the batteries be thoroughly discharged and then carefully washed out to remove all of the acid?

W. A. BUTCHART.

Culiacan, Sinaloa, Mexico.

When it is necessary to put away storage batteries, the usual method advocated is to charge the cells fully and then let them stand this way. In your case, however, this is impossible; so the next best way will be to discharge them, remove all electrolyte, and clean out thoroughly. The reason for letting the cells stand fully charged is to gain the added current which results from standing.

This additional current or building up effect was discussed very fully in the issue of May 27, under the title of "Some Further Ignition Hints," by Morris A. Hall.. The title probably led you to think that it was devoted exclusively to ignition, which was anything but the case.

An excellent article on the same general subject appeared in a later issue of THE AUTOMOBILE, that of May 20, headed "Pointers on the Care of Vehicle Batteries." In that you will find the advice given to have cells fully charged before cutting them out.

If you do not desire to waste current from the batteries it would be just as good a scheme in the present case to fill up with pure distilled water to the proper level, and then let the cells stand in some well-covered place, thus partly charged. The cell would thus build up, as in the case of the fully charged ones, although the gain would not be as noticeable in the former case. This method has the additional advantage that when you decide to use the batteries again they will be ready for use, while if they are discharged and cleaned then when you want to use them it will be necessary to carry them to a place where both acid and a charging station are obtainable. As you have stated, this is impossible, so discharging means much future work. In fact, under the circumstances you might just as well "scrap" the batteries as to discharge them.

ON CARBON DEPOSITS

Editor THE AUTOMOBILE:

[1,928]—Will you please give me some idea of the best method of removing carbon deposits from cylinder heads, piston tops and valves? G. J. O'HARA.

Belleville, N. J.

There are two methods, the mechanical and the chemical. The former means taking the engine apart and scraping. The action of chemical decarbonizers is different, and it is said that they act to dissolve the carbon deposits, which are then blown out through the exhaust pipes in the regular action of the motor.

The best method of all is the preventative method. By this is meant the prevention of the formation of carbon within the cylinders. This can be effected by proper care in selecting the oil used for lubricating the cylinders and the method and amount fed in. Also, care must be exercised in the selection and use of the fuel, particularly the latter, as this may, in extreme cases, be such as to deposit particles of carbon in the cylinders. Care in this direction is well invested, however, as any autoist who has ever dismantled his engine for cleaning purposes can testify.

An excellent plan, very much used in England, is brought into use after the engine has been scraped free of carbon deposits. The parts are then coated thoroughly with a very thin coat of liquid paraffin, which can be obtained very cheaply at any store. This is melted and applied to the parts with a brush.

DIFFERENTIAL ELIMINATIO

Editor THE AUTOMOBILE:

[1,929]—I notice that in the June 10 is of "The Automobile" you publish a cut my recently patented compensating gear make favorable comment of the same. T courtesy is appreciated. This late pat was a very slight improvement on my ot patent and the enclosed folder will give a better idea of the working of the proved device, and why it gives a m positive drive than the usual balance g practically eliminating skidding. I across an article in your paper, issue of A 4, 1907, which showed that you underst the deficiencies of the differential and rec nize the need for an improved device for purpose. Should you wish to publish further information about the gear, I send you a working model in wood wh clearly shows the principle.

Boulder, Col. EDWIN J. GOULD

Not only was this substitute for the c ferential shown and commented upon, others which appeared to possess merit w also shown and commented upon. Th in the description of the Ampere car, A 29 issue of THE AUTOMOBILE, pages 703-7 a device for eliminating this troubleso part was called to the attention of th interested. That they were many was sho by the fact that they came back for m information, as per the Letters in May 27 issue, page 865, and June 3 iss page 906.

The article in the April 4, 1907, iss to which Mr. Gould refers, seems to s up the situation with reference to the ba troubles of the differential so well that are reproducing it herewith, completely. was in answer to a letter, and follows:

The fundamental fault with the bala gear, which is the type of differential u on practically all modern cars, is that it d ferentiates for resistances instead of distances, whereas an ideal mechanism its place would differentiate solely for d tance. The effort to drive both wheels, ho ever, while at the same time permitting to rotate faster than the other, inevita involves the trouble referred to. Con quently, only when the difference in resi ance is proportional to the difference in d tance can the differentiating be corre Fortunately, this is the usual case wh both driving wheels are on road surface uniform character, but if one strikes a sl pery spot, while the other is on a dry o the latter may constitute a non-rotating p otal point from which a doubly rapid forw rotation of the other may be executed. In a less extreme case, the wheel on t drier surface may continue to rotate, but a rate much slower than that of the wh on the slippery surface. In either case, serious skid may be produced. Moreover, turning a curve, the action is not to ap the power equally through both wheels un any circumstances. Either one or both the wheels must slip on the road surface a degree sufficient to equalize their spee or more power must be applied through t outer wheel, because its rate of rotation b comes greater while the tractive stress i parted through it remains the same. growing realization of these deficiencies the balance gear seems to be bringing number of leading European engineers the belief that it can be discarded with a vantage in favor of ratchet and clutch d vices. With a ratchet, for instance, t equalizing for varying distance always is p fect, but the drive is definitely appli through the inner wheel on curves. A that this may not be as bad as it appears suggested in the fact that ordinary runni is straight ahead, while curves, when e countered, are in one direction as often they are in the other. In making one co plete turn, no matter of what size, the c cumference of the circle traversed by t outer wheel always is greater than the cir traversed by the inner wheel by an amount equal to double the tread, multiplied by 3.1416. This, in the case of a 56-inch tread, is about thirty feet further for the outer wheel to travel. In the case of a car without differential or any equivalent, this means (if the slip be divided equally) that each rear wheel (if thirty-six inches in diameter) must slip one and one-half revolutions in making a complete circle, three-eighths of a revolution in making the more usual quarter turn, and so on. A further advantage of the ratchet is that it permits use of an undivided rear axle or countershaft. The elimination of all differentiating means gives, of course, a still more substantial rotating construction, which is in a degree retained if a clutch in each hub is used, sufficiently tight to drive ordinarily, yet sufficiently loose to slip before the resistance rises high enough to abrade the tire seriously.

UNIVERSAL JOINTS

Editor THE AUTOMOBILE:

[1,930]—I desire to call your attention to an error which you made in your answer, printed in "The Automobile" of June 17, to letter No. 1915, on the subject of the varying angular velocity in the Universal Joint, in which you misquote from an article by me on this subject, to the effect that changing the relative angular positon of a pair of universal joints 90 degrees does not affect the angular velocity ratio of the driving and driven members.

That part of the original text which relates to this phase of the subject reads as follows: "The conditions, however, which must be met in order to give this result (i. e. a constant angular velocity ratio between driving and driven shafts) are: that the fork axes of the intermediate shaft B, must lie in the same plane, and that the angle between both extreme shafts and the intermediate shaft shall be the same."

In your answer to your correspondent you have entirely disregarded the first condition, namely, that the axes of the forks on the intermediate shaft must lie in the same plane, which is really the most important condition, since a misplacement of these parts to an amount of 90 degrees would not only destroy the equalizing effect of the two joints, but would add the variation of one joint to that of the other, making the total angular variation twice that due to a single joint.

It is to be regretted that some constructions permit of this error in assembling, and although it is doubtful if the effect would be apparent in an actual surging of the car, it would probably develop pounding or rattle in the propeller shaft and increase the rate of wear in these parts.

Bridgeport, Conn. H. VANDERBEEK.

It is to be regretted that an engineer, accustomed to be thorough in everything, is not so in his reading. So, it is that the above criticism is not only ill-founded but actually incorrect, for the letter stated just what Mr. Vanderbeek says it did not state. More than this, the figures given therewith showed just exactly the point, so that, even if the statement had been omitted, the inference would have been the same. But the statement as to the plane of the axes was actually made, as anyone may find by re-reading the letter in question. The first four lines below the second cut, in part, read as follows: "The point not brought out above but assumed is that the three shafts are in the *same vertical plane*. If this is not true, *none* of the above *holds good*."

If our correspondent meant that the vertical axis of his slip joint was turned into a horizontal plane, while the universal joint axis was left in the vertical plane, it is true that, as Mr. Vanderbeek has brought out in his letter, the variations of the two joints will not only not equalize, but will be added, thus doubling the effect, and producing the surging to which our correspondent refers. It was not our understanding that this was meant.

MORE UNIVERSAL JOINTS

Editor THE AUTOMOBILE:

[1,931]—Referring to letter 1916 in the June 17 issue of "The Automobile," are you quite correct in your reply?

If B. S. H.'s car has two universal joints and if they are properly set, would not one of them correct the errors of the other, while, if, as he says, in reassembling he gave the slip joint a quarter turn, then if the slip joint is between the two universals, would not the second universal simply double the errors of the first and give him the surging effect he speaks of? I think so.

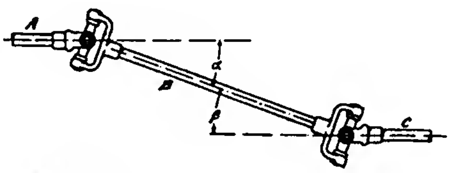
Should not the two joints be like this—as shown in your diagram and not like this—which would be the position were one of them given a quarter turn relative to the other? SIX CYLINDER SAL.

Brooklyn, N. Y.

The figures sent in with this letter were so poor that they could not be reproduced, and the idea intended was not clear, so the original diagram is reproduced with a top view to aid in making it clear. These two figures are intended to bring out the idea of the axes-in-one-plane, which seems to have been misunderstood.

As to the letter above, it appears as if the writer has also misunderstood the original letter of B. S. H. As we have read it and re-read it, there is nothing in it

Top View of Universal Joint



Arrangement of Two Universal Joints

about two universals and a slip joint, or three in all. The writer spoke of but two joints, one of which acted as a slip joint, in addition to being a full universal.

In both of the questions asked, however, the writer has the right idea. The placing of one joint with the plane of its axis at 90 degrees to the plane of the axis of the other joint would result in doubling the errors and giving the noticed surging effect. As to Sal's diagrams, we think they were right, but, as remarked before, they were so poor that it was hard to be sure of the exact idea. The part in which "she" says that the two joints should be as shown in our diagram, reproduced on this page, is certainly correct.

ACTUAL HORSEPOWER

Editor THE AUTOMOBILE:

[1,932]—Will you please publish in "Letters Interesting and Instructive" how the actual horsepower of a motor car engine can be determined when you have given the bore, stroke and number of revolutions per minute. F. M. D.

Anderson, Ind.

There is but one way in which the actual horsepower of an engine can be determined, and that is by testing it. In this test it will be necessary to measure the pull of the motor in pounds at a measured radius of brake arm. This brake arm measured in feet, when multiplied by 2π, will give the circumference of an imaginary circle in which the motor is exerting the force measured. This force is exerted each revolution, so to reduce it to force per minute you must multiply by the number of revolutions per minute. Feet circumference times pounds exerted per minute will give foot pounds per minute. As one horsepower is defined as the power which will do work equal to 33,000 foot pounds per minute, the above result must be divided by 33,000. This will give the horsepower of the engine at the speed measured.

To test your engine accurately, the best way is to measure the power successively from the lowest to the highest speed possible, in intervals of say 100 revolutions. That is, measure the power output at 300, 400, 500, and so on up to 1,500 or whatever is the maximum speed of your engine. Taking these results, the power curve of the engine may be plotted, and from it, the power, at any speed read off.

As this process of measuring power is rather a lengthy one for the amateur owner, and somewhat expensive as well, it is advisable to have it done at some place where testing facilities are available. Thus, nearly all universities and most colleges are in a position to do this testing for you more readily than you could do it yourself. In your particular case, the distance to Lafayette, Ind., is not great, and at Purdue University you can have your engine tested.

ON WIRE WHEELS

Editor THE AUTOMOBILE:

[1,933]—We have read with much satisfaction your editorial note in issue of June 17 on the interesting subject of wire wheels. It is really hard to explain why the public will take such slight heed when approached on the subject of wire wheel equipment. We have regularly listed one of our models this season with wire wheels, and as any opportunity presents itself we try to explain their advantages—but to scarcely any purpose, as with but eight or ten exceptions our purchasers of this model have all insisted on artillery wheel equipment. Not only is the wire wheel stronger under all conditions, and a tire saver because of its resiliency, but it adds fully 25 per cent. to the riding qualities of the car. The writer recently made a trip of 220 miles in one of our "Featherweight Flyer" models, equipped with wire wheels, and a few days later went over practically the same ground with one of these models equipped with artillery wheels, and the difference in the riding of the two cars was simply astonishing. The wire wheel is considerably more expensive to build, but if the public would only accept them we would so equip every car turned out, as the saving to the user on tires and on all parts of the mechanism of the car equipped with wire wheels would be hard to estimate fully.

The writer calls to mind an occurrence in the early days of the industry which demonstrated the effect on tires most conclusively. (I may be wrong as to absolute dates and figures, but the substance is correct.) About 1902 the Oldsmobile Company, in response to public demand, changed over from wire to artillery wheels on their small curved dash runabouts. As I remember, they were using a 28x2 1-2 single tube tire. These tires gave good satisfaction on the wire wheels, but when placed on artillery wheels I know of cases where they absolutely went to pieces in six or eight weeks' time, and the company was obliged to increase the tire size in order to give any kind of satisfactory service. We are using every endeavor to induce our customers to specify them, and firmly believe that they will again come into general use within the next two years.

CAMERON CAR COMPANY.

Beverly, Mass. H. W. DOHERTY.

Where Taft will Summer

By W. H. Doherty

At Beverly Mass.

BEVERLY, MASS., June 28—The summer home of President Taft is located eighteen miles east of Boston on the famous "North Shore" of Massachusetts, in Beverly, which is one of the most beautiful of the smaller New England cities. Mr. Taft, who enjoys keenly automobiling, could not have picked out a more propitious location. The "North Shore Drive," extending easterly from Beverly through Manchester-by-the-Sea, Magnolia, and old Gloucester to Cape Ann; and in the other direction through Salem, Swampscott, and Lynn, where it joins Boston's wonderful park system, is almost beyond description. Miles of its course are bordered with grand old woodland and other miles follow closely the shore of Massachusetts bay. This great highway is the nucleus of scores of others which extend inland for miles and miles, all of finest macadam, over a wonderful rolling country, dotted with beautiful lakes, through quaint villages replete with Revolutionary history; everywhere an atmosphere of calm tranquil existence, where a car glides along, twisting, turning, up and down, over hill and dale with seldom more than a half mile straightaway. Those who have never toured in Eastern New England have something in store for them that they could well afford to drive clear across the continent to find out about.

The President can leave his home in Beverly and drive to the White Mountains over roads which would make even a Frenchman gaze in open-eyed amazement; or he can skirt the shore from Salisbury Beach, across the southeastern corner of New Hampshire, and go on into Maine within a stone's throw of the Atlantic for almost the entire distance. The diversity of scenery to be found everywhere within a radius of 100 to 150 miles in all directions from Beverly cannot be equaled in the United States, combined with such perfect conditions for automobiling. The Massachusetts Highway Commission protects the user of the roads, for on all of the principal highways signs appear at sharp corners or intersections of important roads, and also many other notices of a similar character to acquaint the autoist with what kind of a road is ahead of him.

What a country this would be if these conditions existed in every State! May we hope that Mr. Taft, who has been in every State in the Union and almost every country on earth, will be so impressed with the highways of Massachusetts, and the general development which good roads carry with them, that he will lend noticeable assistance to the efforts which are being put forth all over the country to improve the conditions of the highways! Perhaps we can look forward to some great national highways in the near future. Surely we can if our President can become sufficiently interested, and his sojourn in this section for the four Summers of his term should keep this subject in his mind with a little energy put forth directly to him by those who are actively associated with the movement for national highways.

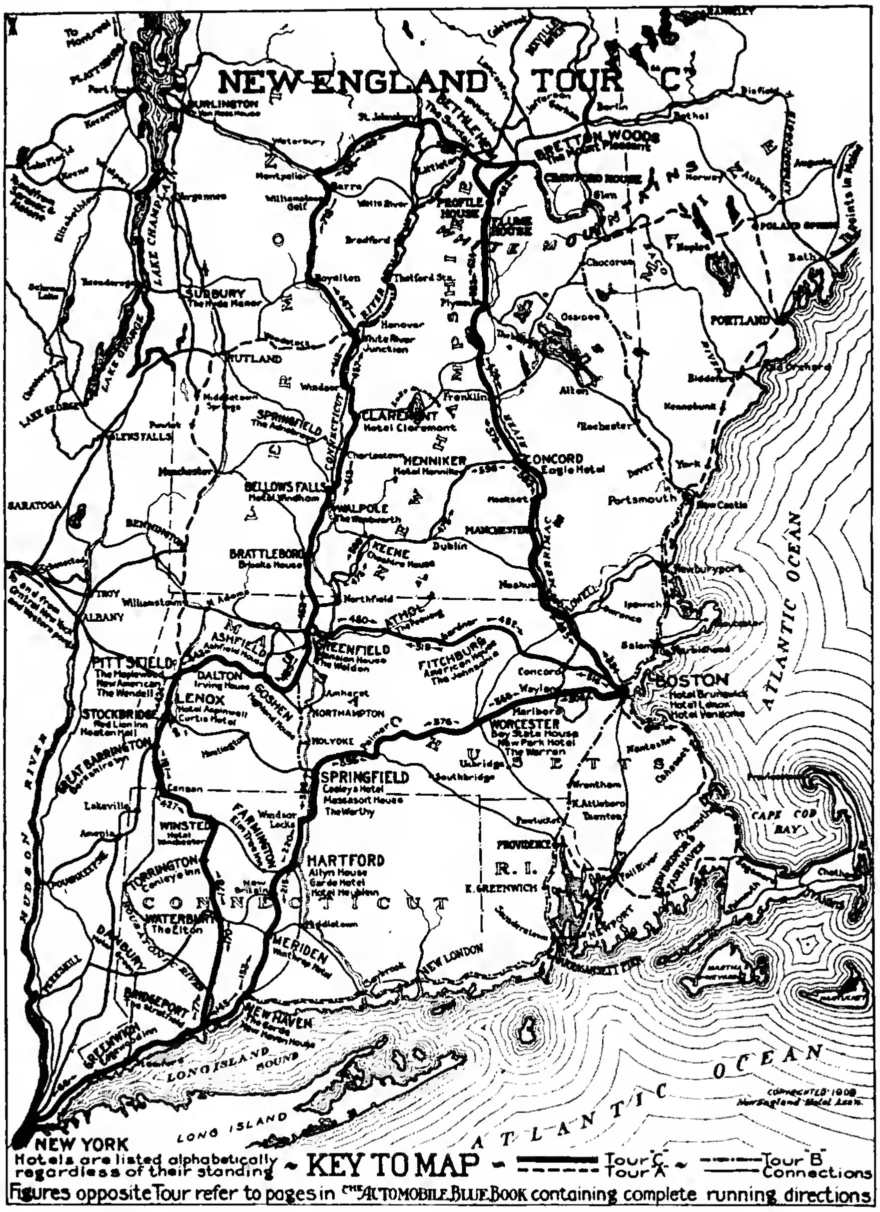
TAFT ENTERTAINS ATLANTA PATHFINDERS

WASHINGTON, June 25—The White steamer and Oldsmobile cars, representing the New York *Herald* and the Atlanta *Journal*, which are blazing a route for the proposed endurance contest from New York to Atlanta next Fall, arrived in Washington on Wednesday and met with a most cordial reception. Several cars went down into Virginia to meet and escort them into the national capital. Afterwards the scouting parties were taken to the White House, where they were received by President Taft, who was most cordial in his greetings. He commended their project and wished them good luck. After that they were tendered a luncheon by the Washington Automobile Club.

Shore Road

VARIED PANORAMAS IN NEW ENGLAND TOURS

MOUNTAINS, lakes, rivers and a touch of the sea in New England combine to give tourists a diversity of scenery not possible in any other part of America, in a locality where nature has lavished her choicest gifts, all within a figurative "stone's throw" of each other. Such is the characterization given by the New England Hotel Association to the route chosen as "C" of its series of trips through the wonderful land of the Berkshires, White Mountains, Connecticut and Merrimac River valleys. Roads whose construction has been adopted as a model in other parts of this great nation have been selected over which to send the automobilists in search of the beauties of the region, while at the same time keeping them in touch with splendidly equipped hostelries. Such an arrangement has been conducive to extended traveling in automobiles, large and small, until the New England States are probably more toured than any others in the country, and the leaflets issued by the hotel men, assisted by the "Official A.A.A. Automobile Blue Book" have been warmly welcomed by all who have come into touch with them. There are so many possible directions which might be taken in outlining a vacation that frequently the mass of data confuses those who attempt to plan their travels aforetime, and to obviate this possibility the three tours, which embody the most popular features of the section, have been compiled. These show routes which can be taken with the knowledge that the fascinating scenery on one cannot be surpassed upon any of the others and perhaps not in the States north of Long Island Sound.



Tour "A," as described in THE AUTOMOBILE of May 6, consists of a trip of about 1,000 miles through the western portions of Connecticut, Massachusetts and Vermont, then crossing through New Hampshire and Maine to the coast at Portland, following the sea from that city through Boston to Cape Cod and finally westward along the shores of the sound for the run into New York. Tour "B" was explained in THE AUTOMOBILE of May 20, giving a story of a route of about 790 miles in which the Connecticut Valley is followed from Hartford directly north to the mountains, then taking the tourist to the coast at Portsmouth, down to Boston, cutting across to Providence and Narragansett Pier and to the metropolis. All three start from New York City, as the general gateway for parties from other parts of the East and South, and the beginning of a great many tours by New York people. They are so laid out that they can be taken in either direction and between all important cities on these maps are figures which indicate pages in the "Blue Book" where the detailed running directions may be found. The arrangement is further perfected by having the main routes touch each other at various points, sometimes even using the same roads for distances, and this is a feature appreciated by those who know the pleasure of meeting fellow tourists en route.

Tour "C" is planned for those who desire a trip of about 830 miles, including a run through the Berkshire Hills, then up the Connecticut Valley, through the White Mountains, down the shortest, but none the less fascinating, route to Boston, and by the most direct roads to the finish. Great Barrington, Stockbridge, Lenox, and Pittsfield are names of cities so closely allied to the wonderlands of western Massachusetts that the mention of them suffices to picture the delight of a trip through that part of the State. The broad Connecticut is touched at Greenfield, and its famous agrarian vistas surround the tourist as far as White River Junction, when the route makes a detour to Montpelier. After visiting the capital the tour continues to St. Johnsbury and into the mountains. From Bretton Woods Tour "C" travels to Boston, passing the Profile House, the Old Man of the Mountain, through the Franconia Notch and the Flume, Plymouth and Concord. For a long distance the road winds along the Pemigewasset river and fascinating views. At Plymouth a side trip may be made to Lakes Winnipisaukee and Winnesquam, joining the main route again at Franklin, and running along the Merrimac river. The route to New York via Worcester, Springfield, Hartford, and New Haven is well known.

LATE INFORMATION FOR THOSE WHO TOUR

CORRECTION ON ROUTE THROUGH CANADA

There are probably many automobilists who are planning tours for this summer through Canada, and the following letter received from H. E. Newcomet, engineer of maintenance of way of the Pennsylvania Lines West of Pittsburg, bears special interest. Mr. Newcomet says:

"In reading over your 1909 Official Automobile Blue Book, section 1, I noticed on page 681 that you state that during navigation boats connect Ottawa with Montreal and many tourists ship their automobiles that way. I made this trip last summer and I would strongly advise any one in making this trip not to use the Ottawa river boats, as it is necessary to transfer from Grenville to Carillon overland, as the boats do not run through. This transfer is made on a railroad which is very old and primitive and cannot handle automobiles for transfer. Furthermore, the design of the concrete docks at Grenville is such that after unloading the car it is necessary either to build some form of turntable to turn the car and run it up a ramp, as the unloading platform is not more than 15 x 20 feet and you unload at right angles to the ramp. It took us four hours to take a small runabout and a touring car off the boats and get them onto the highway. The distance is about 14 miles and the road so poor that a transfer could not be made in time to catch the boat.

"If the weather in this territory has been good there is no reason why a trip on the north shore of the Ottawa river cannot easily be made in good time, and it is quite an interesting trip, mostly through the French country. If the weather is at all wet, however, or has been wet, I would strongly advise running from Ottawa to Prescott and putting the car on the St. Lawrence River boats for Montreal. The road between Prescott and Ottawa can generally be depended upon, although it is not in any manner a first-class road. We made the trip from Prescott to Ottawa, and Ottawa to Montreal."

NEW PARIS QUARTERS FOR PIERCE

Paris, June 23—American owners of Pierce cars touring Europe have now at their disposition handsome central offices in the Avenue de la Grande Armee, Paris, where spare parts and all information concerning routes, touring regulations, etc., can be obtained at any time. The Pierce Motor Car Company's Paris touring office has been in operation for more than a year, but up to the present has shared office room with a French firm. Owing to the increased number of owners of Pierce cars touring Europe it has been decided to move into larger and self contained offices, and the change took place this week, Manager N. F. Goodsill opening handsome showrooms at the corner of the Avenue de la Grande Armee and the Avenue de la Forge. This is the first time that an American firm has been directly represented on the Paris Automobile Row, and the Pierce company have obtained showrooms in keeping with the importance of the firm. N. F. Goodsill declares that present indications point to a larger number of Pierce tourists than on any previous year, the number up to the present having reported at the Paris offices being about fifty, although the touring season has hardly commenced. Most of the tourists this year are travelling on either the large six or the most powerful four-cylinder model.

CLEVELANDERS PLAN JULY 4 TOUR

Cleveland, June 28—One of the most enjoyable runs of the past few years will be taken by Cleveland Automobile Club members, July 3-4-5, when a three days' trip will be made to Jamestown, N. Y., to spend the Fourth of July. It is expected that at least thirty machines will make the trip. The party will leave Cleveland Saturday morning, July 3. Lunch will be served at the Hotel Cleveland in Conneaut, O., and the cars will reach the Peacock, Mayville, N. Y., for a stop over night. On July 4 the party will proceed around Lake Chautauqua to Jamestown, and it is probable that the night will be spent either in Cambridge Springs or Saegertown. Monday the stop will be at Conneaut Lake, and the cars will return to this city in the afternoon.

FERRY ON SOUND SHORTENS AUTO RUNS

New York, June 28—Automobilists who have hitherto lamented the inaccessibility of Long Island to Westchester county, and vice versa, now have a route which saves many a long run through this city. A frequent ferry service has been established between Oakland Beach, at Rye, and Seacliff in Hempstead harbor, by the Oakland Steamboat Company, which has chartered the large ferryboat Englewood of the Fort Lee line for the season, and it has begun its trips, leaving Rye every even hour, and Seacliff every odd hour between 9 a. m. and 8 p. m. The Englewood will accommodate 25 automobiles at a time without crowding and makes the run across the sound in about 40 minutes. Its pier at Rye is but a half mile down Rye Beach avenue from the Boston Post road. This method of getting from New England points to Long Island, for either the north or south shore, has already proven popular; as well as have certain routes around the city, such as by going up the Hudson to Tarrytown, then across through Westchester county to Rye, crossing the Sound and returning on Long Island. The roads are all fine.

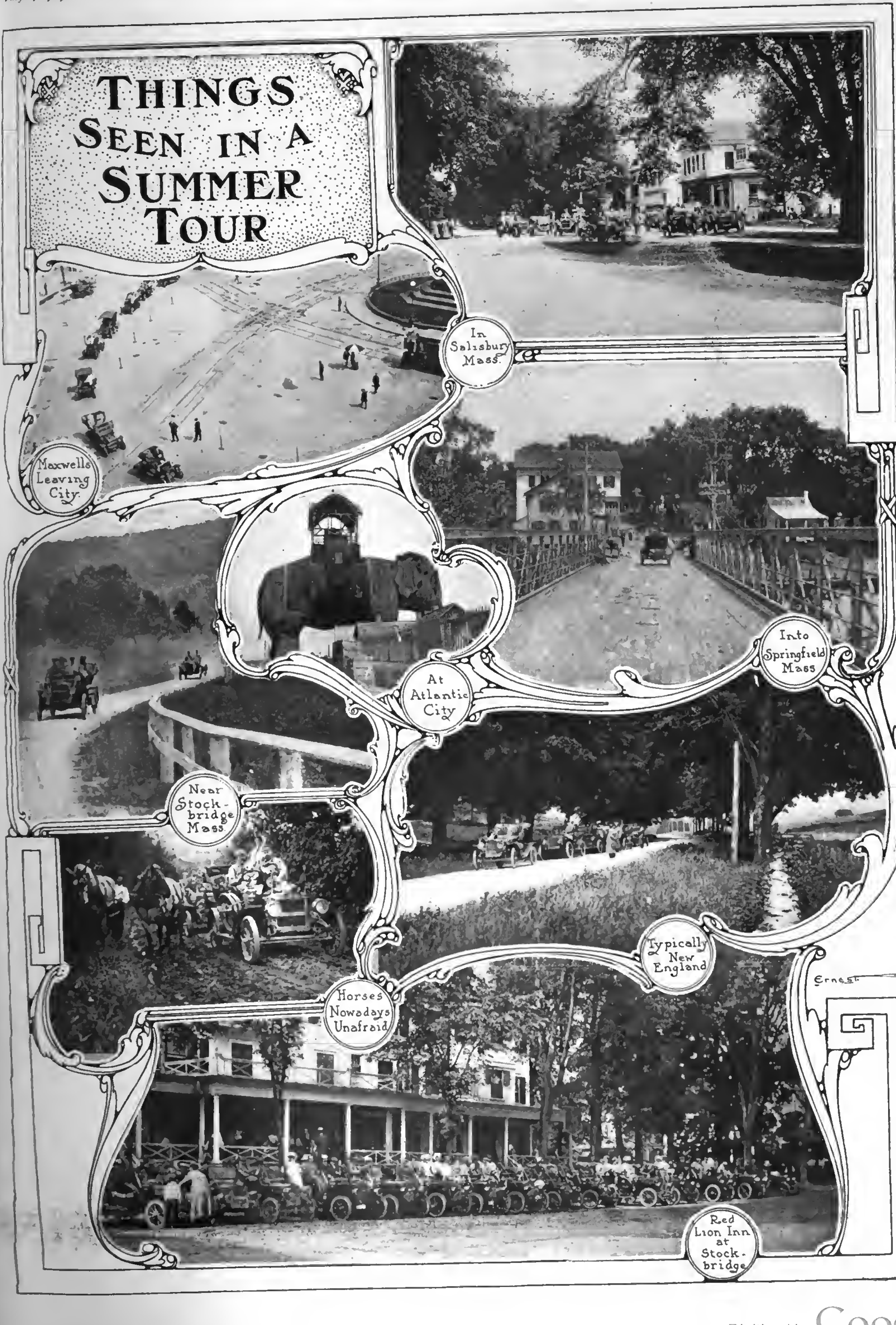
FRENCH COMMISSION TO MAKE NEW ROAD LAWS

Paris, June 23—The growth of the automobile has made necessary a new set of laws governing the use of the highway. This is felt more strongly in France than elsewhere, for, having inherited a magnificent set of highways touring has here grown to an extent unknown in less favored lands. Minister of Public Works Barthoux frankly recognizes that laws drawn up one hundred years ago, when the mail coach was the fastest thing on wheels, and when intercommunication was slight, are altogether inefficient in these days of rapid and frequent travel. "For the new conditions we need new regulations," he declares in an official publication, and to obtain these new regulations he has dedcided on the formation of a temporary commission of experts.

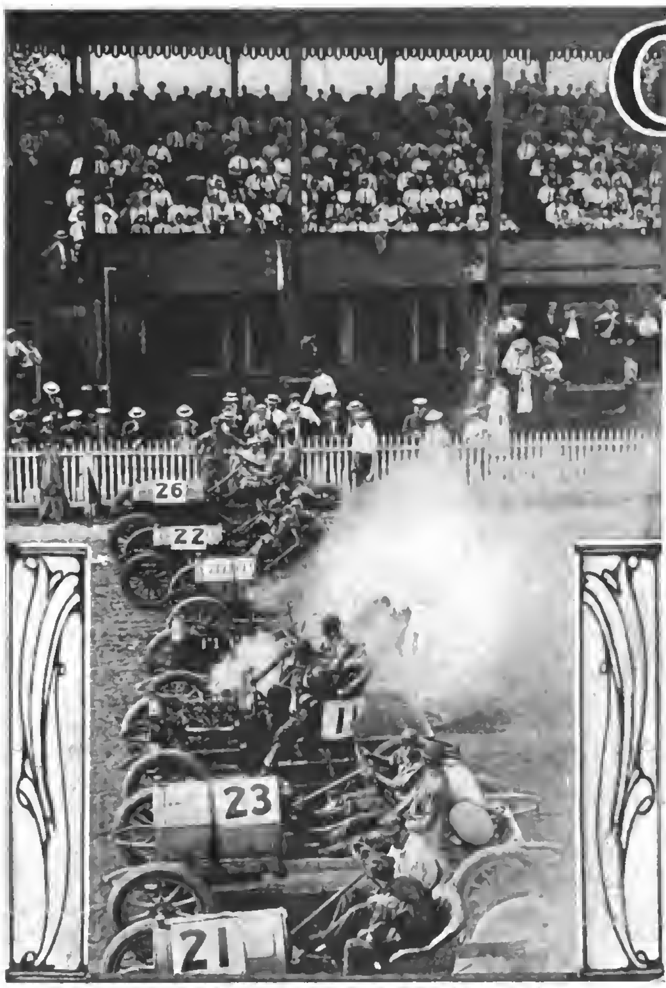
The first meeting of the road laws commission took place in Paris this week at the offices of the Minister of Public Works, under the presidency of M. Leuthier, the general inspector of the department of roads and bridges. The commission comprises high officials in the Government roads department, the chief secretary of the Minister of Justice, Messrs. Max Vincent and Chaix as representatives of the Automobile Club of France; Senator Humbert of the U. V. F., represents cycling interests; while the technical press has as its spokesmen Baudry de Saunier, of *Omnia*, Henry Desgrange, of *L'Auto*, and Georges Prade of *Les Sports*. The recommendation of this special commission will serve as the basis for the elaboration of a modern set of laws and regulations governing traffic on the main highways and busy city streets.

MONTREAL AUTOISTS WORK FOR GOOD ROADS

Montreal, June 28—The directors of the Automobile Club of Canada have gone over the main highway to Rouse's Point, via Chambly, St. John's and Lacolle, and guide boards will be erected without delay. This should not only prove of great service to all kinds of vehicles traversing this mportant and picturesque route, but also should be an inducement to tourists across the border to visit this section of the country. Several pieces of road are in very bad state of repair at present, but it is the purpose of the club to petition the Government, asking that the roads be put in proper order. A map of the above route with detailed information will be ready for distribution shortly. The Automobile Club of Canada is doing excellent work in connection with the good roads movement in and around Montreal, and a large number of stretches of roadways have been repaired and coated with a composition of oil and coal tar at the expense of the club. Although somewhat of an experiment, this has proven successful.


THINGS SEEN IN A SUMMER TOUR
In Salisbury Mass.
Maxwells Leaving City
At Atlantic City
Into Springfield Mass.
Near Stockbridge Mass.
Typically New England
Horses Nowadays Unafraid
Red Lion Inn at Stockbridge
Ernest

Chalmers Scores in Quakertown's Hundred



Start of the 100-Mile Special Race

PHILADELPHIA, June 28—The recrudescence of automobile track racing in this city, last Saturday afternoon, when the Quaker City Motor Club held its third annual spring meet, at the Point Breeze track, had as its star feature a contest of 100 times around the mile track, in which Harry Lorimer, in a 40-horsepower Chalmers-Detroit Bluebird was an easy winner. In this, as in the other events scheduled, the fields were extremely ordinary and poorly entered, so that Lorimer and Ralph De Palma had matters their own way and about evenly divided the plunder. The work of the little S. P. O., driven by Laurent, and that of the Stearns, driven by Amateur Harry Goodin, helped materially as runners-up, with the Mitchell, Autocar and new Bergdoll as the other makes represented on the course. The one-afternoon program with the 100 and 50 mile races leading figures, had been arranged hurriedly when it was decided to postpone the 24-hour contest first proposed. Lack of interest and entries made the substitution necessary.

There were eight starters in the 100-mile race—the Chalmers-Detroit, two Autocars, a Stearns, the S. P. O., a Buick and two Bergdolls. Lorimer, in the Bluebird, took the lead at the start and was never headed, in fact, making the entire circuit without stopping, and at the finish he was about 11 miles ahead of the second car. The Stearns and the S. P. O. were the important competitors, though for a time the stripped Buick, driven by Jimmy Ryall, figured until it broke a bolt in its crankcase and had to pull out. The Stearns had carbureter trouble, and could not seem to get enough gasoline, and the S. P. O. broke its steering knuckle on the eighty-second mile, when it was in second position. The new Bergdoll cars averaged about 30 miles an hour. With the Chalmers having a good hold on first, the second and third places went to the two Autocars, which had been running very consistently at a good fast pace, driven by Joe Brown and J. A. Archfield. They were so far behind the winner, however, that their times were not taken. Lorimer's 2:02:06 4-5 gave an average speed of about 44 miles per hour. That the going was not faster came through the fact that the winner did not have to push his car, and because the track had been badly cut up by previous short-distance events.

Some Features of the Meet That Were Noteworthy

Some spirited racing took place in the 50-mile race between De Palma in a Fiat, Lorimer in the Chalmers-Detroit, and Laurent in the S. P. O. There were eleven starters, and the Fiat and the Chalmers-Detroit jumped away from the others at the gun, the latter hanging on to the foreigner like a leech. For 25 miles the proverbial 5-A could have covered the pair, especially when Lorimer was attempting to pass. In these numerous attempts De Palma always stalled him off, and just at the conclusion of the twenty-sixth mile, when Lorimer took a short cut to the inside in an effort to secure the lead, his right tire went a-flying across the track. De Palma had garnered a 2½-mile lead when the Chalmers-Detroit left the infield in pursuit. Two laps later the same tire went bad, and De Palma added another mile and a half to his lead before Lorimer could get going again. Meanwhile Laurent, in the S. P. O., had closed the gap and was in second place with a lead of about a mile on the Chalmers-Detroit. Interest then centered in the race for second honors, and although Lorimer took all sorts of risks he could not quite overcome the advantage gained by Laurent during his lay-off, the latter capturing the place by about 200 yards. De Palma's time was 57:43, and he had a lead of 3½ miles over the S. P. O. at the finish. He also registered the fastest five and ten mile times of the day—5:48 1-5 and 11:26 3-5, respectively.

De Palma later added to his worldly pelf when, in an attempt on the mile track record of 1:02 4-5, held by the Peerless *Green Dragon*, Barney Oldfield up, he clipped off an even second with the *Cyclone*, and incidentally captured a cool hundred with the record. He broke into the limelight on his first appearance by capturing the 10-mile event for stock chassis selling for $3,001 and over, covering the distance in 11:46 1-5, holding his nearest competitor safe. Lorimer, in the previous event, $2,001 to $3,000 chassis class, covered the same distance in 11:34 1-5.

In the preliminaries, Cherie Borie, in a Mitchell "20," beat H. H. Crowell in a 5-mile race for equipped cars, $1,250 and less, in 8:16-4-5. In a race of the same distance for equipped cars catalogued at from $1,251 to $2,000, J. B. Ryall, in a Buick "30," pulled away from Archfield's 25.6-horsepower Autocar, and Lorimer's Chalmers-Detroit "30," in 6:44 1-5, winning by nearly half a mile.

Meet Well Conducted and Attendance Fairly Good

The attendance of upward of 5,000 spectators demonstrated that this branch of sport, properly conducted, still has a strong attraction, and despite the intense heat, and not first-class racing, the people many times were brought to their feet in roaring acclaim of some particularly pretty bit of driving. It was the general opinion that there was a great deal of credit due to the officials of the club for the manner in which the meet was conducted, witness the fact that it was just 1:30 p. m. when the first event was started, as had been advertised. The crowds and newspaper men, however, were a trifle sore over the unwillingness or inability of the clockers—the New York Timing Club—

to hand out the intermediate times in the long-distance races. It has been the custom here to announce the time at each five miles. It is a good scheme, too, as it tends to keep the crowds busy with their pencils and adds to the interest. With no intermediate announcements, the 50 and 100 mile events became rather dismal, especially as the winners in both instances finished miles ahead. When, finally, the 5-mile times were handed privately to the pressmen in the judges' stand, they were so suspiciously "flat" as to raise a doubt as to their accuracy, many of them being on the even minute. Following is the summary:

100-MILE SPECIAL, CASH PRIZE $200

No.	Car	H.P.	Driver	Time
1	Chalmers-Detroit	40	Harry Lorimer	2:02:06 4-5
2	Autocar	25.6	J. F. Brown	
3	Autocar	25.6	J. A. Archfield	

50 MILES, CHASSIS, FREE-FOR-ALL

1	Fiat	60	R. DePalma	:57:43
2	S. P. O.	18-24	Laurent	1:01:05 3-5
3	Chalmers-Detroit	40	Harry Lorimer	1:01:09 4-5

10 MILES, CHASSIS, $3,001 AND OVER

1	Fiat	60	R. DePalma	11:46 1-5
2	Stearns	30	Harry Goodin	12:23 4-5
3	American	50-60	Harry Willis	12:27 3-5

10 MILES, CHASSIS, $2,001 TO $3,000

1	Chalmers-Detroit	40	Harry Lorimer	11:34 1-5
2	S. P. O.	18-24	Laurent	13:10

5 MILES, EQUIPPED, $1,251 TO $2,000

1	Buick	30	J. B. Ryall	6:44 1-5
2	Autocar	25.6	J. A. Archfield	7:22 2-5
3	Chalmers-Detroit	30	Harry Lorimer	7:23 3-5

5 MILES, EQUIPPED, $1,250 AND LESS

1	Mitchell	20	Cherle Borle	8:16 4-5
2	Mitchell	20	H. H. Crowell	8:45 3-5

1 MILE TIME TRIAL, TO BEAT TRACK RECORD (1:02 4-5) CASH PRIZE $100

1	Fiat Cyclone	60	R. DePalma	1:01 4-5

CLIMBED SUNSET HILL IN WESTCHESTER

Ossining, N. Y., June 28—The Upper Westchester Automobile Club had its first climb, Saturday, on Sunset Hill, near here, with a good field and some fast time in the six classes. Over a course seven-tenths of a mile long, with a grade varying from 6 to 12 per cent., an Atlas, driven by E. H. Sherwood, carried off the real honors for making the fastest time in the stripped stock chassis event. Atlas, Renault, Stoddard-Dayton, Chalmers-Detroit "30" and Maxwell won in their respective classes, while the free-for-all was taken by a steam car. There was one sharp turn in the hill, and it caused considerable skidding. The winner in each class received a silver cup. Summary:

STRIPPED STOCK CARS

Pos.	Car	Driver	Time
1	Atlas	E. H. Sherwood	1:02 3-5
2	Maxwell	William Sickinger	1:06 2-5
3	Renault	E. H. Ennis	1:15 4-5
4	Ford	T. E. Wilson	1:18

CARS COSTING $3,000 AND OVER

1	Renault	E. H. Ennis	1:06 4-5
2	Howard	Burrows McNeir	1:23 4-5

CARS COSTING $2,000 TO AND INCLUDING $3,000

1	Stoddard-Dayton	F. Crowther	1:14 3-5
2	Chalmers "40"	A. L. Washburne	1:33 1-5
3	Atlas	E. H. Sherwood	1:42

CARS COSTING $999 TO AND INCLUDING $1,500

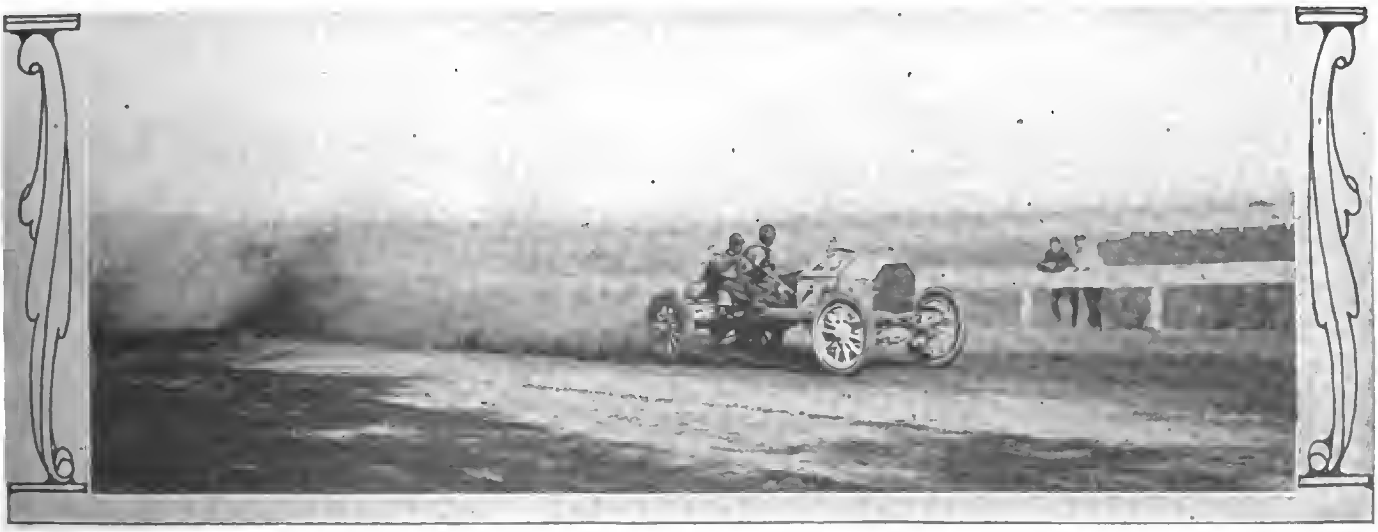
1	Chalmers "30"	A. L. Washburne	1:21 3-5
2	E-M-F	W. S. Smith	1:29
3	E-M-F	Almery and Paul	1:30
4	Buick	Walter Horton	1:32 2-5

CARS COSTING $999 AND UNDER

1	Maxwell	William Sickinger	1:13 4-5
2	Maxwell	Arthur Lee	1:24 1-2
3	Ford	F. E. Foshay	1:34 2-5

FREE-FOR-ALL

1	Stanley Steamer	Harvey W. Bell	:58
2	Atlas	E. H. Sherwood	1:02 3-5
3	Peerless	Ray Gilhooley	1:13
4	Howard	Burrows McNeir	1:19 1-5



Winning Chalmers with Lorimer at the Wheel, Rounding the Turns at Point Breeze in the 100-Mile Special Race

Cars Taking Ferry at Nyack En Route to Newburg

BINGHAMTON'S RUN EMPHASIZES "SIXES"

BINGHAMTON, N. Y., June 26—Four, and perhaps five, perfect scores are the result of the fourth annual endurance contest of the Binghamton Automobile Club, which finished a trip of about eight hundred miles this evening. Two new six-cylinder Mathesons, a six-cylinder Thomas and a four-cylinder Cadillac have clean titles, and it is likely that a six-cylinder Pierce-Arrow which dropped the lid of a battery box may also be put among those in the deadlock for premier honors. For five days of the past week these automobiles, four other contestants, and one official car have been driven over the roads of four States, visiting the capital of each, and spending one day of rest in the "Hub." Rules had been framed which gave the event the interest of a competition without drudgery.

Monday morning last the caravan, consisting of ten autos, left Binghamton for Albany, a distance of 142 miles, with an intermediate stop for luncheon at Worcester, N. Y.; Tuesday they journeyed to Boston, 187 miles, with the noon control at Springfield; Wednesday was taken for sightseeing, under the guidance of a regular "Seeing Boston speiler," who informed the autoists that Boston streets are paved every 50 years, and that they are now in their forty-ninth. Answering the call of the road on Thursday, the route to Hartford was taken, a run of 116 miles, a midday stop being made at Providence; Friday led to Newburg, through Tarrytown, 144 miles, and the home stretch was 169 miles long, from Newburg to this city, lunching in Delhi.

George F. Johnson, the donor of the trophy, led the way as pilot in his six-cylinder Stevens-Duryea, and he kept right ahead through the tour, except once, when another car took a short cut. The others in the party were:

William G. Faatz, Thomas; C. Fred Johnson, Matheson; Charles F. Sisson, Jr., Pierce-Arrow; G. Somers White, Matheson; Harry T. Conant, Packard; Dr. Jeremiah McDonald, Cadillac; R. E. Mix, Thomas; G. Tracy Rogers, Locomobile, and Hiram Goldsmith.

Six-Cylinder Stevens-Duryea Pilot Car
Baldwin at the Wheel, and George F. Johnson, T. W. Whipple and J. M. Kennedy other occupants of the car

Of these the Faatz Thomas, the two Mathesons, and McDonald's Cadillac made the entire run on time, never having to stop for mechanical and other trouble, except tires once in a while, and their records were clean in every way. On the last day the battery box lid of the Pierce fell off, necessitating a stop to go back for it, and the observer's record of an adjustment. The Packard was penalized for an adjustment to a small forging which gave way, and the Locomobile withdrew because tire trouble had made it very late on the first day and had increased penalties on the second. Because he refused to change observers, as required by the rules, the Mix Thomas was dropped from the contest, but completed the run as a non-contestant. The Goldsmith party refused to run faster than fifteen miles per hour and averaged lateness by the hour on each day, reaching the finish about five hours behind.

A great deal of credit has been given the cars which made this trip, for there were many places where they were well tested, on muddy or rough roads, in climbing mountains, or in making detours around road-building operations. The Matheson Sixes made their first appearance in road endurance contests and showed up exceptionally well.

George Somers White in Six-Cylinder Matheson

The committee will meet to decide upon some method of breaking the tie, and also as to whether it shall be four or five-cornered. Two proposals have been made, one to have a further test and the other to allow the owners of the perfect machines to vote the trophy to one of their number.

FORD NO. 2 WINS RACE TO SEATTLE

SEATTLE, WASH., June 29—Ford runabout No. 2, driven by B. W. Scott and C. J. Smith, has won the ocean-to-ocean run. For 22 days 55 minutes this little car was on the road from New York, and reached this city on last Wednesday, well ahead of any of its competitors. The Shawmut, driven by T. A. Pettingill, Earl Chapin, and Robert Messer, was second, about eight hours later; and the Ford No. 1, piloted by Frank Kulick and H. B. Harper, arrived third, on Friday morning. The Acme, handled by George Salzman, F. R. Sheets, Jerry Price, and J. A. Hemstreet, arrived this afternoon.

Decided uncertainty as to the exact winner has prevailed since the first cars came in. The Shawmut crew protested the leading Ford on three scores—first, for crossing a bridge where the Shawmut was delayed 16 hours, because the latter did not have permission; second, for allowing an outsider to take the wheel in Snoqualamie Pass; and third, for changing a rear axle. Referee Robert Guggenheim investigated the charges and did not sustain them, making known his decision to-day. Therefore the Guggenheim trophy with $2,000 will go to the Ford crew, and $1,500 to the Shawmut.

Summit of Ives' Hill, Near Meriden, Conn., Scene of the Recent Hill Climbing Contest

CORBIN WINS CLIMBING HONORS NEAR HOME

MERIDEN, CONN., June 26—Twice during the afternoon a Corbin piloted by B. C. Rogers excelled its rivals in climbing Ives Hill. Though it captured the free-for-all in .45¾, its best ascent was accomplished in its class event with figures of .45¼. Although open only to local owners, the event was exceptionally well managed, and the half mlie course was guarded by State militia, the guardsmen being from Company I of the Second regiment. That this kind of sport is popular in Connecticut, the third climb within a short while, was shown by the presence of several thousand spectators, some from New Haven, New Britain, Hartford, and other cities. The cars, many of them stripped and tuned, were divided into classes by piston displacement.

For the big car class, those between 301 and 400 cubic inches, a Thomas-Detroit was the victor, driven by Percy Callington, in .47½, and another of the same make took second, Albert Eichorn at the wheel. It was in the section for cars of from 231 to 300 cubic inches that Rogers scored first, and it developed, the fastest of the afternoon, in .45¼, with C. A. Terrell in a Pope-Hartford, the runner-up. Four cylinders won over the two-cylinder variety in an event for autos whose displacement rated between 161 and 230, for a four-cylinder Ford, driven by Adam Englehardt, made the ascent in 1.10½, defeating a double-opposed Reo handled by Arthur E. Cook.

Two Maxwells had the little-car section to themselves, that with less than 160 cubic inches in their motors, and Harry Smart ranked the better in 1:13, his competitor being R. J. Merriam.

As a climax came the free-for-all, which, as usual, furnished a surprise. It was not that of a record-breaking rush, however, for Rogers' Corbin dropped one-half a second somewhere on the route over its best previous time. Thus the record for the open event stands at .45¾, but not the record for the hill. A twin-cylinder Indian, handled by Joseph Allaire, negotiated the distance in .40½, carrying off the palm for the two-wheelers.

So pleased were the officials and the club members that already plans are being formulated for a repetition later in the season. The officials were: Referee, Charles Cuno; starter, B. L. Lawton; judges, J. H. White, E. J. Doolittle, C. B. Rogers, George M. Curtiss, John S. Lane.

FIRST HILL CLIMB FOR RICHFIELD SPRINGS

RICHFIELD SPRINGS, N. Y., June 28—Under the auspices of the "Earlington," a first annual hill climbing contest will be held here on July 31. A course 5,000 feet long has been selected, and will be adequately policed. There are nine events, with a valuable trophy presented by Gasherie DeWitt for the free-for-all. The event has an A.A.A. sanction.

Troops That Guarded the Course

Winning Corbin Starting Up Hill

Crowd Seeking Points of Vantage

THE AUTOMOBILE

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ARE THE PARKS FOR THE PEOPLE OR NOT?

Incredible as it may seem, it is a fact that the great Yellowstone Park, purchased and kept out of the public moneys, and offering without a doubt the greatest trip in the country, is actually impassable to one great division of the people, and that division is the automobile driving and riding public. What possible harm or damage these machines or their occupants could do to the natural wonders of the Park, which horseback riders or other travelers could not do, is hard to imagine.

The automobile is essentially a vehicle for covering long distances in a comparatively short time, and with comfort to its occupants. On a trip through this immense reserve of natural wonders, what is more natural than such a means of conveyance?

Moreover, this swift means of locomotion would materially decrease the running time between the usual stops, and in this way render the use of the Park more safe. If motor cars had been permitted at the time of the recent holdup in the park, it is a fair assumption that the robber would never have escaped, or the robbery would never have taken place. As a preventive of crime alone, then, the machines should be allowed the freedom of the Park.

But, more to the point, the common people to whom the Park, in the last analysis, belongs, should have the use of it, whatever the means of conveyance employed by them. It would appear as if some very strong element, directly or indirectly interested in the transportation companies, was using all of its power to keep out any form of transportation which would reduce their monopoly and consequently their revenue.

It seems a shame that the property of all the people should thus be made a source of revenue for a few favored ones. Every automobile association and club, as well as influential owners and drivers not members of any club or association, should use every endeavor to have this matter brought up and remedied at once through their representatives in Congress. This discrimination should be stopped, and quickly, as it is rank class discrimination and has no basis of sound common sense.

* * *

STATISTICS THAT CAUSE REFLECTION

Some 200,000 automobiles is the estimated output for the so-called "1910" product. These figures are somewhat staggering, but from present indications it would appear that the total is based on a substantial optimism resulting from the excellent "1909" selling season.

There isn't any question but that this great country is going to absorb thousands of automobiles in the next few years, for thousands of users of horse-drawn vehicles are yet to be supplied with the inevitable motor-driven successors.

But one cannot resist the inclination to utter a word of caution in safeguarding against any such calamity as an over-production, for 'tis better to have the supply fall below the demand than that the output should flood the natural sources for absorption of the product. True, the equilibrium would quickly be regained, but the damage accomplished in the interval would be ultimately at the cost of the many.

* * *

WE WILL PAY IF YOU'LL PAY

Why shouldn't horse-drawn vehicles be taxed as well as motor-driven ones? This question has been argued pro and con among autoists, and has even reached the stage where it can be taken up by country debating societies. The Automobile Club of Maryland has taken a determined stand in the matter; so determined, in fact, that a proposed automobile law may hang fire for some time. In that state a commission was appointed to confer with the automobile interests, and the commission and the club have outlined their views in different channels; the former along the cut-and-dried ways of fees on power and the latter agreeing provided a wheel tax is imposed upon the other users of the highways.

Naturally the agricultural interests do not wish a wheel tax when the farmers have to pay road and other taxes. But a new era is establishing itself, and the majority are realizing that automobiles are not half bad, after all. Now comes the stand of the autoists who agree to pay a license fee, graded according to horsepower, from six to fifteen dollars, provided that a "wheel tax is imposed upon all other vehicles within the State at a rate of 25 cents per wheel for one-horse pleasure vehicles, 50 cents a wheel for two-horse vehicles and one dollar a wheel for vehicles with four or more horses; and further, that all vehicles must carry lights at night."

WHAT NEW MASSACHUSETTS LAW CONTAINS

BOSTON, June 28—Massachusetts' new automobile law, prepared by the Highway commission and passed by the legislature after long hearings and numerous conferences with autoists and others interested, has been signed by Governor Draper and a part of it will go into effect the first of next month. The main part of the law, including the sliding scale of fees based on horsepower, will become operative January 1, 1911.

Four sections go into effect the first of July, namely, sections 7, 14, 16, and 17. Section seven makes it incumbent for owners to look after the equipment of their cars, requires that every motor vehicle of more than 10-horsepower shall be provided with at least two brakes, powerful in action and separated from each other, one brake to act directly on the driving wheels or on parts connected with the wheels. Each of the brakes must be strong enough to stop the vehicle within a proper distance, and one must be operated by foot. One brake is required for motor vehices not exceeding 10-horsepower, and for motorcycles. The section has the usual requirements as to the muffler and signaling apparatus, and in addition requires that every car shall have a lock or rachet brake to prevent its being started by unauthorized persons.

Some General Provisions of the New Code

This section makes a change in the matter of lighting. Under the present law lights must be displayed from an hour after sunset to an hour before sunrise; the new law makes the time allowance one half-hour. Every automobile must show two forward lights, but they need not carry the register numbers as is now required. The rear register number, however, must be illuminated and a red light must be shown behind. Every motorcycle must show a white light and it is stipulated that the white lights must be visible two hundred feet. Section 14 of the new law puts upon the operator a new responsibility in regard to other users of the highways. It provides that an operator must stop his vehicle and the engine immediately when approaching a horse or other draft animal if the animal appears to be frightened and if the preson in charge signals. A new clause requires that an operator in approaching or passing a street car which has been stopped to allow passengers to alight or embark, shall slow down and, if necessary, stop. Upon approaching a pedestrian who is not upon a sidewalk, and upon approaching an intersecting way, a curve, or corner where the operator's view is obstructed he must slow down and signal with a bell, horn or other device. This part of the law also requires operators to make square corners. Observance of this section, especially that part which requires signaling upon approaching a pedestrian is expected to prevent many accidents, but if strictly followed will create considerable din in the city streets.

Speed Limit Section Not Materially Changed

The speed limit section, number 16, goes into effect July first, but this is not greatly different from the existing law. The maximum limit remains at twenty miles an hour. The limit for the thickly settled or business sections, however, has been increased from twelve to fifteen miles an hour and the limit at crossings of way, corners, and curves, remains at eight miles. One of the most important parts of the law from the autoist's point of view, and also to the cities and towns, is section 17. Under this section, after next Thursday, every local regulation excluding automobiles from streets, or making special speed limits, except the local regulations of the island of Nantucket and those of the Metropolitan park commission, becomes null and void, and the local authorities are required to remove all signs and notices relating to the speed, operation and use of automobiles. The effect of this provision is to put the entire State, with the exceptions noted, under the State limits of 20, 15, and 8 miles an hour. If the local authorities believe that special regulations excluding automobiles or limiting their speed are still necessary, they may pass them, but they will not have any effect until they have been published in the newspapers, posted at points affected, and, most important of all, until they have been approved by the Highway commission as consistent with the public interests. No regulation will be valid which excludes automobiles from any State highway or from any main highway leading from any city or town to another. This part of the law gives the autoists the opportunity to protest against special regulations, which they consider onerous, without being under the necessity of preparing the elaborate protest required by the old law. Its effect, further, will be to bring about uniformity throughout the State in the matter of speed limits.

License Fees Are Based on the Horsepower

The Highway commission has not yet given much attention to the question of how it will determine the horsepower of motor vehicles for the purposes of registration next year, but it seems likely that it will use the A. L. A. M. formula, which seems to be the best available.

The fees for next year are $2 for a motorcycle, $5 for a truck or other commercial motor vehicle, $5 for automobiles of less than 20-horsepower, $10 for automobiles of 20- and less than 30-horsepower, $15 for automobiles of 30- and less than 40-horsepower, $20 for automobiles of 40- and less than 50-horsepower, $25 for automobiles of 50-horsepower or more; for automobiles owned by manufacturers or dealers, $25 for five cars, and $5 for each additional car; for motorcycles owned by manufacturers or dealers, $10 for ten cycles; for registration after October 1, one-half fees; for substituting the registration of an automobile for that of a vehicle previously registered $2; for substituting the registration of a motorcycle for that of a cycle previously registered $1; for original operator's or chauffeur's license $2; for renewal of license 50 cents; for examination of applicant for a license $2; for additional copy of registration certificate 50 cents; for additional number plate 75 cents; for additional motorcycle seal 50 cents. Free eertificates and licenses may be issued to members of the foreign diplomatic corps. All licenses to operate will be for one year only, as is the case with certificates of registration.

Minor Changes That Were Made in the Law

Very little change was made in the law during its passage through the two houses of the Legislature. The most important change was an addition to section 3, which allows a rebate to a person who before August first transfers the ownership of an automobile registered in his name, and who applies for the registration of another automobile of less horsepower, of one-half the difference between the fees, and if he does not apply for another registration he will be entitled to a rebate of one-half the fee originally paid. Another change is in the section relating to the record of cars entering or leaving garages. The change relieves chauffeurs of the necessity of personally entering their time of leaving and other data required to be kept in the record book. The new law will give the Highway commission much additional work, but it will mean a large increase in the receipts of the State. Probably about one-half of the automobiles in the State will pay $5 a year, as is the case under the existing law, but the other half will be required to pay from $10 to $25 each. Furthermore the annual renewal of licenses to drive is expected to bring in considerable income. After the expenses of the automobile department of the Highway commission are paid all the balance of the fees will go into the State highway maintenance fund. This fund will also be increased by the fines received for infractions of the automobile law, for the new statute provides that all these fines shall go into the State treasury, instead of the cities, towns and counties, as is the case at present.

CLARKSON SUCCEEDS CHALFANT IN A. L. A. M.

Coker F. Clarkson has been elected assistant general manager by the board of managers of the Association of Licensed Automobile Manufacturers to fill out the term of E. P. Chalfant, who recently resigned as general manager to become identified with the Packard Motor Car Company. Mr. Clarkson has been connected with the association for some time in the mechanical and publicity departments and has been in close touch with its affairs. The following members of the board were present at the meeting in New York on Friday: M. J. Budlong, Packard; Charles Clifton, Pierce-Arrow; L. H. Kittredge, Peerless; Thomas Henderson, Winton; F. B. Stearns, Stearns; E. L. Thomas, Thomas; C. C. Hildebrand, Stevens-Duryea; S. T. Davids, Jr., Locomobile; H. H. Franklin, G. H. Stilwell, Franklin; William E. Metzger, E-M-F; J. H. Becker, Elmore; W. C. Leland, Cadillac; James Joyce, A. L. Co.; Elwood Haynes, Haynes; F. C. Chandler, Lozier; E. R. Hewitt, Hewitt; George Pope, Albert Pope, Pope; R. H. Salmons, Selden; George J. Dunham, Royal Tourist; M. S. Hart, Corbin; L. J. Hart, Waltham; W. C. Durant, Buick; G. E. Mitchell, Alden Sampson; E. P. Chalfant, general manager.

Coker F. Clarkson

PROLONGED TRIAL OF WINTON SELF-STARTER

Baltimore, June 28—The Winton Motor Carriage Company reports to-day that it was compelled to break the seal that as far back as February 22 was placed on the front of the Winton Six used in this city for demonstration purposes. This was sealed by Frank W. Daring, secretary of the Automobile Club of Maryland, in the presence of i distinguished gathering of automobile enthusiasts.

It will be recalled that the engine was so sealed as to make it impossible to start except by the Winton mechanical self-starting arrangement, fitted to all Winton cars since the commencement of 1908. The car has been in continual use since it was sealed, and until to-day never failed to start by the pressure of a button. To-day, while the car was in use by the officials of the Good Roads Commission, the engine, upon being asked at Laurel, failed. B. B. Tatham kept the button pressed, the engine turned over and over and over, but did not fire. After several ineffectual efforts and after all the pressure had been usd from its starting tank, it was decided to break the seal, and while there were no tears shed, Tatham was considerably bowed down with sorrow.

Upon return to Baltimore the apparatus was examined and found to be in perfect order, the trouble being located at the battery, which had exhausted itself, owing to a piece of copper wire having short-circuited the same. It should be observed that although the Winton Six is fitted with the Eiseman Magneto, yet it has the ordinary coil and accumulators for starting purposes.

KNOX TIRE TROUBLES EXAGGERATED

Chicago, June 26—First reports of a race often get a little bit twisted when it comes to specifying the exact behavior of a car. For instance, Bourque and Denison, the Knox team, in the Cobe cup race, are learned to have had a minimum of tire troubles. Bourque finished with the original Knox tires on his front wheels and only made a change of the two rear tires on the twelfth lap, which occupied less than two minutes. Denison, during his brilliant run, only changed one tire, and this was accomplished on the road in a little over a minute. It is natural that the Fisk Rubber Company should want marked attention called to the revised findings of the tire experience of the Knox team during the race.

STATE LAW IS HELD SUPREME IN OHIO

Columbus, O., June 28—A decision far reaching in its effects has been handed down by the Supreme Court of Ohio by which the municipal ordinances providing for licensing motor cars were declared unconstitutional. The decision in effect does away with all regulative legislation on the part of municipalities, placing that power in the hands of the General Assembly through the State automobile department.

The decision is the outcome of a strong fight put up by the Columbus Automobile Club against the city law department of Columbus. City Solicitor Marshall attempted to enforce the municipal ordinance, providing for a tax of $7.50 on touring cars and $5 on runabouts. The Columbus Automobile Club in the name of William Frisbie, one of its members, started a suit, and an injunction against collecting the fees was granted. In the Court of Common Pleas and in the Circuit Court the automobile club was worsted. But, never daunted, the case was appealed to the final tribunal with the result above stated.

The decision will effectually stop all municipalities of the State from imposing licenses or taxes on motor vehicles.

NEW SMALL CAR FOR ENGLISH DAIMLER

Coventry, England, June 22—Thoroughly satisfied with the performances and public reception of the 22 and 38-horsepower slide valve engines, the English Daimler works has now brought out a small model of 15-horsepower, embodying all of the main features of Daimler design, including the Knight-Daimler slide-valve engine. This will be of 78 mm. (3 1-16) bore by 100 mm. (3 15-16) stroke. Two distinct models will be marketed, both with shaft drive, and the usual three-speed gear-box, following the 22-horsepower model very closely. One of the models will be fitted with a very raking steering post and torpedo body for those desiring a fast runabout. A large number will be produced and sold next season for £500 ($2,500), it is understood. The output of the two larger sizes will not be diminished any on account of this newer model.

FRICTION DRIVE PATENT SUIT DECIDED

Boston, June 28—Some months ago the Buckeye Manufacturing Company, Anderson, Ind., makers of the Lambert cars, brought suit against the Waltham Manufacturing Company, Waltham, Mass., for alleged infringement of the patents of the former covering friction driving. This suit has been on in the United States Circuit Court of Massachusetts, and was just decided recently. Justice Colt, in rendering a decision, held that the patent was valid, and had been infringed by the defendant. The latter was therefore enjoined from further use of this device and was required to pay $1,000 damages.

CHEVROLET USED STROMBERG CARBURETER

Chicago, June 26—Chevrolet, who evolved as the winner of the Cobe cup, employed a Stromberg carbureter on his Buick, and not one of another make, as was erroneously printed in the June 24 issue. The first information came from an official of the Buick Company, who apparently was not thoroughly informed in the premises. The Frenchman reports that the carbureter did not give a particle of trouble.

SAVANNAH GETS RENAULT TAXICABS

Savannah, Ga., June 28—This city's first taxicabs, ten Renaults, arrived Friday, and the Savannah Taxicab Company has already started them on the streets. The cars will be kept in a spacious garage on Broughton street, erected for the purpose, and the concern, in addition to the taxi business, will store and sell automobiles and sundries.

What the Clubs Are Doing These Days

BUFFALO HAS RECORD ORPHANS' DAY

BUFFALO, June 28—Last year the Automobile Club of Buffalo had an Orphans' Day celebration which broke all records, and it was thought that it would stand, but on Wednesday the previous achievement was shattered. With 275 automobiles in line, 2,289 children were given an outing, the greatest number of little folk ever gotten together on such an occasion. The plans had been well made and included a long ride through the city and parks, and an afternoon of delight at Luna Park. Not only were the private automobiles of the city out in force, but the factories donated all that they had, various labor and other organizations hired cars, and the taxicab and sightseeing companies contributed, so that the large total was made up.

John M. Satterfield, president, and Dai H. Lewis, secretary of the club, had charge of the outing, and felt well paid for all the work such a successful affair involved when they led off the procession after a parting "Godspeed" by Mayor J. N. Adam.

Mayor Adam Giving President Satterfield the Word

Every orphan had a small flag in one hand, and in the other held captive a struggling toy balloon, contributed by the Diamond Rubber Company. The ride was over Main street to the Terrace, thence past the City Hall, where the city officials reviewed the parade, then over 25 miles of asphalt-paved streets, through the various public parks and parkways, to Luna Park, where each little guest was given the freedom of the place and all its amusement resorts, besides sandwiches, bananas and milk.

On July 7 the Automobile Club will conduct a one-gallon mileage contest for pleasure cars, under an A. A. A. sanction. There will be five classes under the present rules, and in each class will be two divisions—one for private owners and the other for manufacturers and agents. Entries will close on July 5, and blanks, rules and information may be obtained from the chairman of the contest committee, Laurens Enos, 760 Main street.

SHAMOKIN'S "25" FORM AUTO CLUB

SHAMOKIN, PA., June 28—Twenty-five automobile owners of this place have formed the Shamokin Motor Club, and a charter has been applied for. It is expected that within a short time there will be at least 50 members of the organization, and the Pennsylvania Motor Federation will be joined. The following officers were elected: President, C. Q. McWilliams; first vice-president, Thomas Mullen; second vice-president, George Robertson; secretary, George W. John; treasurer, Frank P. Llewellyn. Suitable quarters for the club will be secured.

LONG ISLANDERS INCREASE MEMBERSHIP

BROOKLYN, June 30—Campaigns for increased membership in the Long Island Automobile Club, of automobilists of this city and vicinity, have been wonderfully successful during the spring and early summer. At the regular monthly meeting of the club last night, 39 new members were elected, and there are a number of applications to be posted for the required 10 days, to be acted upon at the next meeting. In answer to a number of inquiries for a route from the club house to the Queensboro bridge, the touring board has advised the following: North on Bedford avenue to the fountain, turn left around the fountain and then right into Berry street, keep straight out Berry street bearing left into Lorimer street at the end of Berry street, straight through Lorimer to Noble street, which is at the end of Lorimer street, turn right one block to Manhattan avenue, turn left on Manhattan avenue, granite block stone pavement (poor), straight across Vernon Avenue bridge, turn right first street on leaving bridge, and then left into Jackson avenue straight to the Bridge plaza.

COLUMBUS GIVES 1,600 CHILDREN OUTING

COLUMBUS, O., June 28—The Columbus Automobile Club, June 24, gave an outing to more than 1,600 children, many of whom were orphans, at the grounds of the Columbus Country Club. The affair, which has become an annual event, was a success in every particular. The start was made from the State House grounds at 8 o'clock. Each child was provided with a ticket telling the car in which it was to ride, and these were distributed by officers of the Salvation Army and the Volunteers of America. A short parade of the streets of the city was made before the pike to the Country Club was reached. The car of Governor Harmon headed the parade and that of Mayor Bond followed. Arriving at the Country Club, each child was given a lunch-box containing many dainties and sweets. The return was made in the afternoon.

PATERSON WILL HAVE SEALED-BONNET RUN

PATERSON, N. J., June 28—The North Jersey Automobile Club of Paterson has decided not to hold a hill climb, on account of the danger attending affairs of this kind, and to schedule a 100-mile sealed-bonnet contest for July 17. The run will be in four laps of 25 miles each, and part of the route will be along the main street of the city. A committee consisting of Jacob von Der Clock, chairman; Edward D. Conover, Harly B. McGinley, and James Schofield, will have charge of the run.

SOUTH BEND, IND., NOW HAS AUTO CLUB

SOUTH BEND, IND., June 28—At a recent meeting in the banquet hall of the Oliver Hotel the South Bend Automobile Club elected the following officers: President, L. P. Hardy; vice-president, Walter A. Hager; secretary, Samuel B. Robinson; treasurer, Jacob Woolverton. E. C. Witwer, H. M. Kaufman, and Dr. George V. Nienstedt were elected to serve with the officers as a board of governors. The club now has a membership of 50 and is hustling to increase to 100 or more.

ALBANY CLUB HAS FIFTH ANNUAL RUN

ALBANY, N. Y., June 28—The fifth annual tour of the Albany Automobile Club finished this afternoon. The tour was entirely a pleasure event, without any competition, and the route was a scenic one, including the Green and White mountains, the Berkshire hills, and the Atlantic shore above Boston. The cars started on June 22.

This Kentucky Product Is a Thoroughbred, Too

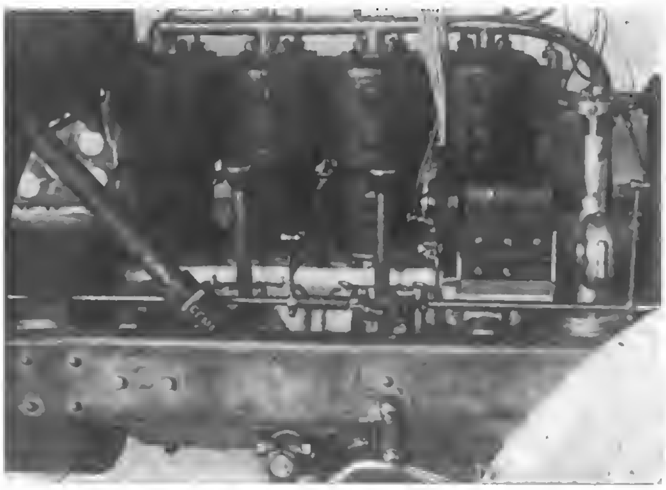
NEWCOMER FROM THE BLUEGRASS REGION

There are very few motor cars manufactured in the "Sunny South," so that the few are more noticeable than would be the case were their number larger. One of them, the most recent addition, by the way, is worthy of special attention, and its product, equally so. This is the Lexington Motor Car Company, Lexington, Ky., which is announcing the details of its Model A touring car, the output for this year being confined wholly to the one model.

Rather than use an indifferent lot of parts, as constructed in their own shop, the same having been running but a few months, the company have given prospective customers the benefit of the doubt, and will use only tried and proven parts as made by the country's best specialists in those particular lines.

So it is that Model A is seen to be powered with a 40-45 horsepower engine of the famous Rutenber make. The size of this is four cylinders, 4 1-4-inch bore and 5-inch stroke, the cylinder castings being made individual for easy and cheap replacement, if necessary. This engine is too well known to require mention of all of the details, but it may be worth while to state that it is of the standard water-cooled type, with five bearing crankshaft of large diameter, double ignition, if specified, a vertical shaft in front forming the source of power for all accessories except the fan, which is belt-driven from the extension of the crankshaft. This accessory shaft drives in succession, from the bottom up, the oil pump, magneto, and the timer. The latter is used with the battery system, which is regularly furnished, but provision is made for a magneto, and the Bosch will be fitted as an extra.

Clutch Merits Attention—A very large flywheel fitted to the motor makes for continuous turning effort and houses the clutch as well. The latter is of the regular cone type, fitted with cork inserts, the action of which is to give easy engagement, coupled with great holding power. Back of this is the transmission, which delivers no less than three speeds and reverse, operating on the selective principle. The gear shifting is done with the inner lever at the right side, this being of the ball-ended style and operating in an H-slot. The transmission shafts are both mounted on ball bearings of the Hess-Bright make, with the driving shaft located above the countershaft.



Ignition Side of the Motor, Showing Bosch Magneto

From here to the rear axle, the drive is through the medium of a very large propeller shaft. It has a universal joint at each end, which joints act to nullify the strains of the angular drive. The rear axle is one of the Timken masterpieces, being of the full floating type, the wheel drive at the outer ends taking the form of six-jaw clutches. In order not to have any of the loading strains come upon the driving shaft, the arrangement is such that the casing, a solid steel casting, without strut rods, carries all of the weight. Differing from the rear axle in the form of service, which it must render, the front axle is given a different form, that of the I-beam. Upon this the front wheels are carried through the medium of tapered roller bearings.

The cross rod is carried back of the axle, so as to be protected from injury, and the steering rod is above the I-section for the same reason. Steering is effected by a gear of the Gemmer production, which acts on the double worm principle.

Frame Follows a Popular Shape—The main frame of the car is of pressed steel, of channel section. In its form it follows a popular shape, being straight in both a horizontal and vertical plane, back to the rear axle, where it is given a sharp upward bend to clear the axle and give sufficient room for a large rebound effect. The forward portion carries a sub-frame upon which the engine and transmission are hung. This frame is connected to the axle by springs of the semi-elliptic type. The same style of spring is used both fore and aft, the two differing only in length. The fronts are 40 inches long, and the rears 52. They are assembled from a very wide stock, with all leaves lipped, and before assembling are well lubricated with graphite. The hanging is by double shackles.

Timken Rear Axle Used on Lexington Model A

Very large wheels are used, 36 inches throughout, and equipped with 4-inch tires. The front wheels have 10 spokes and the rears 12, these being of the dovetailed and interlocking type, which, coupled with the dished shape, make the strongest wheel that has ever been produced. To the rear wheels, the large diameter brake drums are bolted, with a bolt to each spoke. These brakes are double, with a band set on the outside of the drum, and within, internal expanding brakes.

The body work is of a high order, special attention being given to that part of the work. As ordinarily sent out, the body seats five, but the long wheelbase of 120 inches allows a body which is long enough to seat seven. So, when specified, two extra folding seats will be placed in the tonneau. The painting and trimming are also of a very high order, as would be necessary with a fine body, while the exposed woodwork is right up to snuff, too. The steering wheel and dashboard are of Circassian walnut, and highly polished. The latter is what is known as a clean dash, being encumbered with nothing but the coil box. The painting of the body is optional with the purchaser. The body comes equipped with irons for a top, although this is an extra. A full set of tools and spare parts is included, housed in a neat, yet compact, tool-box, located on the left running board. Complete with gas tank, robe rail, foot rest and other parts usually considered as extras, the car lists at $2,500.

Chase Car Designed for Special Business Uses

NEW UTILITY WAGON FOR WESTERN ROADS

Pursuant to a well-defined policy to give the public what it wants and asks for, the Chase Motor Truck Company, Syracuse, N. Y., is now bringing out a surrey or business wagon, which is in great demand in the West. There, the call is for a combination of business and pleasure, which extends even to the automobile. The new Chase model is patterned along lines which permit it to be used for this purpose, or it may be made into a commercial wagon, pure and simple, by means of a few small changes. In mechanical construction, that is, the chassis, it does not differ radically from other Chase products.

The power is supplied by a three cylinder vertical engine of the two-cycle type. The bore of this is 3¾ inch, which with a stroke of 4 inch allows of a conservative rating of 15 horsepower. The simplicity of this power plant is even more apparent when it is considered that it is air-cooled as well, which means that there is no pump, no water to be renewed frequently, no piping to leak, nor any other sources of trouble.

Simplicity both in number of parts and their operation is heightened by the use of a two speed and reverse planetary transmission, running in a bath of oil. This reduces the control to the point where anyone can operate it.

Even the oiling system shows what an effort has been made to reduce the number of parts to a minimum, as a mechanical oiling device means numerous leads to leak, means a driving mechanism, which adds weight and complications. For this reason, the makers have adopted the self oiling system, in which the oil is introduced into the fuel tank, when the latter is filled. This method brings the lubricant into the cylinders with the fuel, whence the interior is thoroughly lubricated. From the cylinder the oil will drop to the bottom of the crankcase, from which point it will be splashed onto the sides of the case, and flow to the two bearings. Nothing could be simpler.

From the jackshaft, the final drive is by means of double side chains to the rear wheels. These are of large diameter, following modern tendency, in fact, anticipating a few years, the fronts and rears both being 40 inches in diameter. They are equipped with tires of solid rubber, 1⅝ inches in diameter, and spokes of 1¼ inches.

Combined with large wheels, the long wheelbase of 100 inches makes a very easy riding car, while having an unusual amount of road clearance, and the ability to surmount large obstacles, if necessary. A set of full elliptic springs helps to make the car ride easy, while standard tread is adhered to.

The brakes are of the band type and are placed on the rear wheels, the lining being such as to allow easy renewal. Considering the weight is but 1,500 pounds, the axles fitted to this car are ample in size, and their 1¼ inch square section will carry loads far in excess of anything the wagon body would house.

The body ordinarily fitted is of the surrey type, with removable rear seat, the seat in position accommodating four passengers, which the removal and consequent conversion into a runabout reduces to two. A top of the canopy style may be had if desired but at an addition to the regular price of $900. This car is designed to take care of the needs of traveling salesmen and to enable them to cover a large number of towns each day.

For this purpose, the removed rear seat leaves a large space behind, which gives room for salesmen's luggage or sample cases. In this way, not only is the railroad fare saved, but more important than that, much time is saved allowing the same man to cover more towns, with less fatigue. Low operating cost, coupled with the inherent simplicity of mechanism and control, make a car which is ideal for this purpose. Telephone and electric light companies will find this model of great value to their trouble men, while farmers will appreciate it for an errand wagon, and with the added rear seat, for pleasure trips.

ANOTHER WHITE GASOLINE MACHINE

One of the largest buggy manufacturers in the West, the George White Buggy Company, Rock Island, Ill., has established an automobile department and will take up and push this work vigorously. The machine upon which the efforts will be concentrated is of the high wheel type with solid tires. Four models are listed, differing only in the body work.

The motive power is a two-cylinder opposed air cooled four-cycle unit, set crosswise of the steel frame, but attached directly to the latter. The fan flywheel is placed in front and the transmission of power is through a two-speed planetary gear. From this a shaft drive of the approved type, and inclosed in a tube serving as a torsion rod, drives back to the rear axle.

The wheels are of large diameter, 36 front and 38 rear, equipped with 1¾-inch tires of the solid type. In contrast with the usual form of motor buggy, this one is fitted with magneto ignition, the magneto being placed between the two cylinders on top of the crankcase, and is friction driven from the rim of the flywheel.

The steel frame carries at the front and rear a pair of full elliptic springs, these being attached to the frame by means of lugs, which extend upward. The result is to bring the center of gravity as low as is consistent with large road clearance.

SOUTHERN CAR DEMONSTRATORS OUT

BALTIMORE, June 28—Although only engaged in business for a short time, the Carl Spoerer Sons' Company has a number of orders booked for the latest models. These include a 30-horsepower machine, the demonstrator of which type is out, and a 50-60 horsepower car, which will be out in a few weeks. Both models are patterned very closely after the famous German car, the Mercedes. The cars are known by the name of Spoerer.

Dr. C. K. Caruthers' Holsman in Floral Parade

That the well-known high-wheeled Holsman can make its mark in a decorated parade is evidenced by the photograph taken at Pine Bluff, Ark., on the occasion of the Arkansas Travelers' Convention, in that city, June 3.

PIERCE LINE FOR 1910 WILL CONSIST OF SIXES ONLY

BUFFALO, N. Y., June 28—With considerably over one thousand of its six-cylinder cars in successful operation on the road, and the demand for them greater during the past season than the immense new factory could supply, the Pierce-Arrow Motor Car company has announced that for the coming season it will manufacture nothing but six-cylinder cars. A number of considerations have been responsible for this decision, the first of these being the unqualified success that has attended the use of the cars under all conditions of travel by owners. Another is that the indications are that the demand for six-cylinder cars of this make next fall and next year, will be so great as to engage the entire work of the factory to the exclusion of other types.

The coming season will be the fourth in which the Pierce-Arrow Motor Car company has made six-cylinder cars, although it is the first in which it has confined its output to this class. The first six-cylinder cars were placed on the market in the latter part of 1906, when one model was made. One of these cars was entered in the Glidden tour as a non-contestant in order to give it the hardest and most thorough test possible. The car was subjected to much greater hardships than any contesting car, and at the end of the tour showed a mileage of almost double that of the tour itself. By this proof of general efficiency and dependability, the performance paved the way for the adoption of the six-cylinder motor by a large number of motor car users, which has resulted since in their widespread popularity by those who want a car for year-round work under all kinds of road and weather conditions.

The announcement, according to officials of the Pierce-Arrow company, indicates that this company, one of the pioneers in the industry, in making nothing but six-cylinder cars, had found that its experience had cancelled the last doubt in the mind of the public as to the advantages of the six over any other type of motor. For 1910, then, the company will produce three types of chassis, a 36-horsepower, a 48-horsepower, and a 66-horsepower, all of which may have runabout, miniature tonneau, touring, or enclosed bodies fitted.

ELKHART COMPANY BUYS NEW PLANT

ELKHART, IND., June 29—At a meeting of the directors of the Elkhart Motor Car Company, of this city, held last week, it was decided to purchase the new factory building originally erected for the Sterling-Hudson Whip Company, and use it for the manufacture of automobiles. Lack of space in the present factory seriously interferes with prompt fulfillment of orders, and with the new addition the company expects to get out 1,000 cars a year, and employ 400 men.

NATIONAL CAPITAL PLANS FLORAL PARADE

WASHINGTON, D. C., June 28—A floral parade for automobiles and motorcycles is the latest project on foot here. The *Post* has offered prizes aggregating $1,200 in value for the best decorated cars in the several classes, and July 5 is the date selected. The parade will start at half-past four in the afternoon, and the route will be down Pennsylvania avenue to the Peace monument and return, thence to the speedway along the Potomac River, where the judging will be done.

NEW GLIDE SUBURBAN MODEL SHOWS CLASS

PEORIA, ILL., June 28—Increased interest in touring and tours has given body builders much work to do in the line of special bodies, to conform to owner's special requirements. To obviate this, manufacturers are exercising considerable ingenuity to produce high-class bodies which will meet these requirements and thus save the expense and bother of special coach work. A recently catalogued body production comes in this class.

This is the new Suburban model put out by the Bartholomew Company, manufacturers of the Glide. It is a close-coupled body with a place at the rear fitted up for carrying a trunk and two suit cases. This light roadster type of body is fitted to the regular Model G touring chassis, which with a 120-in. wheelbase insures easy and comfortable riding. This same matter is provided for in the springs, these being 40 in. long in front and 58 in. in length for the semi-elliptic rear springs.

This successful new model is well powered with a 4-cylinder vertical motor of 4¾-in. bore by 5-in. stroke. While rated at 45-horsepower, it is said to deliver much more than this. This company was one of the pioneers in the rear axle location for the transmission, which is fast becoming general. It is of the three-speed variety and operates on the selective principle. The tires on Model G are 36 by 4½ in. on all wheels, thus securing interchangeability. In case of extra rapid wear this allows of changing the fronts and rears, so as to lengthen the life of both, the overworked rears being placed in front where the duty is less severe, while the lightly worn fronts are put into service in the back wheels. Although this body is in the nature of a special requirement, the company isn ot making any extra charge for it, but is selling it at the regular Model G price of $2,500, with the option of an Eisemann high-tension type E L magneto at $2.650. The photograph shows the car ready for use.

Suburban Model of the Glide—Latest Product of the Bartholomew Company

WHAT REEVES FOUND IN A ROUND OF FACTORIES

ALFRED REEVES has been making a round of the factories, of course visiting mainly those of the American Motor Car Manufacturers' Association, of which he is the energetic general manager. Being a keen-eyed observer, Mr. Reeves accumulated much information and he supplies a most interesting chapter calling for conscientious reading.

"Of the 200,000 cars planned for the 1910 market," says Mr. Reeves, "165,000 will be of the so-called pleasure variety, 30,000 of the high-wheel buggy class, and some 5,000 utilizing steam and electricity, and also including commercial vehicles. With an average price of about $1,200, and the greatest demand for cars below $1,500, and still no decrease in the demand for high-grade cars, the total business in cars alone will approach $200,000,000.

"Yet with these extraordinary figures on next year's motor vehicle output there is no reason to fear an overproduction, owing to the fact that America's greatest purchasing element in the middle class, has now entered the field together with the farmers, who have been liberal buyers of cars during the year 1909. When it is taken into consideration that there are now 150,000 motor cars in this country and at least that number can be turned out this year, a fair idea can be gained of the present status of the automobile industry.

"It is estimated that this year has seen an oversold condition of about 10 per cent. To many manufacturers it would appear that they could have sold twice as many cars as they made, but in most cases the demand has generally been supplied, and only a small portion of the buying public has been unable to get cars. If next year's record production is to supply the oversold condition of this year the result will be an unsafe business condition. With the great purchasing power of the middle class and of the farmers, there is every reason to believe that the production will be absorbed.

"The importance of the farmers in the buying of automobiles and the influence they will have on road improvement, is more than the average Easterner can understand. There are more than two million farmers in this country, and they have had a big share of prosperity. Kansas, Iowa, and Nebraska have been good automobile States. One maker in Anderson, Ind., told me that 75 per cent. of his $1,250 cars were sold to farmers. The salaried man who believes in good things for his family and the business man who requires quick individual transportation, has made for a greater demand for motor cars, and that situation will be increased very markedly in the coming year of 1910."

Mr. Reeves visited on his Western trip factories in Cleveland, Dayton, and Cincinnati, Ohio; New Castle, Muncie, Indianapolis, Anderson, Mishawaka, and Auburn, Ind.; St. Louis, Mo., and Chicago, Moline, and Peoria, Ill.

On the situation at the factories Mr. Reeves said:

"At Cleveland, Paul Gaeth is making **Gaeth** cars in his usual conservative way, turning out a limited number carefully made. There will be comparatively few changes on the 1910 **Gaeth** as compared with this year's car. Mr. Gaeth is adding to his line a single cylinder commercial wagon for light delivery work.

"At Dayton, O., I was astounded at the size of the Dayton Motor Car Company's plant, which covers three city blocks. A new six-story addition to the factory is being put up that will be 140x110, supplying almost 1,000 square feet more of floor space. I doubt whether any concern in the country makes more of the car than do the **Stoddard-Dayton** people. The company makes its own axles, springs, frames, and aluminum castings. Something like $60,000 worth of new machinery is being installed that will make for a greater production in 1910. The Dayton company is famous for its care of agents, and C. G. Stoddard, the general manager, says the same agent policy would be continued next year. As indicating the size of the plant, I might say that there are 1,600 men employed and that 60 men are engaged in the inspection and testing department.

"The new **Courier** car, selling at $1,000 and marketed by a new $200,000 corporation in Dayton, is practically an offshoot of the Dayton Motor Car Company, for in it are most of its officers and a number of its employees. The car will follow the lines of the **Stoddard-Dayton** car, but on a smaller scale. It will be high-class throughout.

"Another concern in Dayton which is making progress is the **Speedwell** Motor Car Company, which has planned a production of 700 cars for next year. The concern is putting up factory additions, and R. D. Schenck, the president, tells me most of the product has been spoken for by agents.

"Incidentally I was told in Dayton of **a new taximeter** that has many advantages over taximeters now in use. Not alone does it register the distance, amount of fare, and supply similar records, but it turns out a slip just like a cash register, giving the distances, the number of the cab, the time, and the fare. This is given to the patron when he leaves the cab and will be a great source of satisfaction.

"Dayton has been wildly excited over the Wright brothers, and gave a reception such as should be given to men whose names in future will figure with those of Bell, Morse, and Edison. There is an aeroplane club in Dayton with 250 members.

"Cincinnati has been a great city for carriage manufacturers, and at least ten big concerns have announced their intention of turning out motor cars. The majority of them will make cars of the buggy type, but the Jewell Carriage Company is putting out a high-grade four-cylinder car to be known as the **Ohio** that should become a factor in the trade.

"From Cincinnati I visited the giant plant of the **Maxwell-Briscoe** Motor Company at New Castle, Ind. It won't be very long before the name of that town will be changed, for the **Maxwell-Briscoe** people have the biggest factory in town and are factors in the general life. There is a Maxwell amusement park, a Maxwell ball team, a Maxwell gymnasium, and a Maxwell-Briscoe band of forty pieces which is a credit to any community.

"J. B. Meyers, the general superintendent, stated that 1,600 men are now on the pay-roll, and there is great difficulty in housing the help. Houses have been put up at an astonishing rate, but upon my visit there at least 200 men were living with their families in tents.

"The manufacture of **Maxwell** cars is ideal, for the raw material goes in at one end of the factory and comes out a finished product at the shipping platform. Cars are coming through at the rate of forty a day, but the factory is far behind in its orders. A new addition is being put up, 721-310, and another, 721x60. A third floor is also being added to the present factory, all of which is expected to result in a greater production of cars next year.

"At Anderson, Ind., the **Buckeye** Manufacturing Company stated that 75 per cent. of its product this year had been sold to the farmers, and that it is planning for 1,500 cars for next year. The concern says the agricultural people have more money than at any other time in their history and look upon the automobile, not as a luxury, but as a necessity for individual transportation. The friction drive **Lambert** has appealed to them strongly owing to its simplicity. The same design of car will be made next year.

"Claude E. Cox, who designed the Overland, is now chief engineer of the **Inter-State** Automobile Company at Muncie, Ind., which plans a production of 2,500 cars for next year. The company now has a building 440x140, and will build an addition equally as large. The car is of 35-horsepower. F. E. Hart, a successful business man of Muncie, is president of the **Inter-State** Company, and D. W. Henry is sales manager.

"Indianapolis manufacturers accepted an invitation of H. O. Smith, the A. M. C. M. A. chairman, for a luncheon at the Columbia Club on my visit to that city. In attendance were John N. Willys, **Overland** and **Marion**; Walter E. Marmon, **Marmon**; V. A. Longaker, **American**; A. C. Newby, **National**; Carl Fisher, **Empire**; Herbert Rice, **Waverly**, and H. O. Smith, **Premier**. We had an interesting discussion of automobile matters generally, and the next day I visited the various plants.

"One of the sensations in the town has been the advancement of the **Overland** under the leadership of John N. Willys. The company now has five factories working to get out the cars promptly and keep agents supplied. It will have two new buildings near the present Overland factory, each 368x80, two stories high. A production of 10,000 **Overlands** is planned for next year and 1,000 **Marions**. Overlands will be turned out at the new Pope-Toledo plant at Toledo, as well as in Indianapolis. There will be three models of Overlands next year.

"Mr. Willys has gone to Europe to look over trade conditions there, but will return early in September. The sales end of the business is now being looked after by F. A. Barker, formerly with the Dayton Motor Car Company. There are now 1,200 men working for the Overland Company at Indianapolis and 400 on the pay roll at Toledo. The company has been unusually successful.

"That more and more concerns are making their own parts is evidenced by what I saw in the **American** factory, which I visited with Mr. Longaker. Almost the entire car is being made under one roof, instead of depending upon parts makers for supplies. The **American Traveler**, with its underslung body, is growing more and more in favor, and the production is being increased to keep up with the demand.

"Howard Marmon's genius in motor car construction is evidenced in the small **Marmon** of this year, which has met with such favor and which will be continued with comparatively few changes for 1910. The motor is of 32 horsepower and while it is of the small type now so popular, the material and construction throughout is of highest grade. The company will have two machines in the Glidden Tour.

"The **Premier** plant is working nights, for H. O. Smith is a firm believer in caring for agents by giving them cars when the demand from the public is strongest. The **Premier** has had an unusually successful year in contests, and three of them will be entered in the Glidden Tour, besides the Premier that will act as an official car. Additions will be made to the plant next year, although Mr. Smith is inclined to grow conservatively rather than with a rush.

"A. C. Newby, at the **National** plant, showed me plans for a new addition that will supply 40,000 square feet of space. The present line will be continued next year, with some slight changes, the cars having made good in every way. There will be a small four and a big four, and a little six and a big six.

"The **Empire** is the latest car in the field, being the production of R. H. Hassler, backed by a company in which A. C. Newby and Carl Fisher are interested. The old Mohawk Cycle Works factory on the outskirts of Indianapolis has been taken and a thousand cars will be put through for 1910. The motor is 3½x4, cast *en bloc*. A runabout body is fitted, 32x3½ tires, and the price will be $800.

"St. Louis is a busy automobile town just now, the three companies there being the **Moon** Motor Car Company, **St. Louis** Car Company and **Dorris** Motor Car Company.

"Next year the horsepower of the $3,000 **Moon** car will be increased from 35 to 40, and in addition the company will make a $1,500 car rated at about 30 horsepower. The company has had an unusually good Western business, incidentally selling more cars in the State of Texas than in any other section of the country.

"A new company will take over the St. Louis Car Company, which will discontinue the American Mors to make a new car of American design, called the Standard Six, with a motor of 50 horsepower. The general manager is H. E. Walton.

"The **Dorris** Motor Car Company continues to turn out high-grade cars, and each year has seen a decided increase in its business. Manager Krenning is a believer in the one-chassis idea, and the 1910 car will be a refinement of the same model which it has used for the past three years and which has proven so satisfactory. It is of 30 horsepower and sells at $2,500.

"At Peoria I noted a decided increase in the size of the factory of the Bartholomew Company, makers of the **Glide**. The plant will be aided in its production next year by a new factory, plans being under way for the taking over of the old St. Louis Carriage Company plant. Mr. Bartholomew, besides his interest in the Bartholomew Company with his son, A. Y. Bartholomew, and G. G. Godfrey, is the president of the Avery Company, one of the largest manufacturers of agricultural machinery in the country. The Avery plant is a revelation in the manufacturing line, and many of its methods are being incorporated in the automobile plant. The car next year will be a refinement of this year's 45-horsepower, with a motor 4¾x5, the point being made that the satisfactory car of this year required little change.

"In Chicago I visited the **Holsman** Automobile Company. This company is far and away the leader in the motor buggy business, and its production is constantly on the increase. It has had a phenomenal year and is making great preparations for 1910.

"At Chicago I was told that the **International** Harvester Company is planning to produce 10,000 buggies next year, while Sears, Roebuck & Company, the mail-order house, gave an order recently for 10,000 axles to be used on motor buggies for 1910.

"Moline, Ill., is getting to be one of the leading automobile cities of the country, having three factories in operation. At the **Midland** plant they were preparing a car for the Glidden Tour, and making arrangements for next year's trade. A. E. Montgomery stated that the company had been favored with an excellent Southern trade, particularly in Texas, which seems to be coming to the front as an automobile State.

"At the plant of the **Velie** Motor Vehicle Company I found a factory 80x220, four stories high, with an army of workmen building an addition that will double the present capacity. The present car now will be continued next year.

"At the **Moline** Automobile Company's plant W. H. VanDerVoort stated that the last of the product would be shipped from the factory by July 1 and that work is now under way on the 1910 models. He plans to continue his care of agents, supplying cars instead of promises, and believes strongly in supplying a sufficient number of cars to enable an agent to make a profit on his year's business. Additional help is being taken on and more room added for manufacturing purposes, which will permit a 50 per cent. increase in production next year. Three roadsters will be entered in the Glidden Tour for the Hower trophy and they will not be of the untried sort, for they were on the road a month ago and are being put through a series of severe tests. Besides their high-class four-cylinder car, the company makes a $1,500 four-cylinder machine for the country trade.

"The **American Simplex** car, made at Mishawaka, Ind., is the only high-powered two-cycle car built in this country. It is equipped with a motor of 50 horsepower at 900 revolutions. A feature of the car that Messrs. Graham & Gulick showed me was a carbureter of their own design which vastly reduced the gasoline consumption, often a point made in cars of the two-cycle type. The company has a well-equipped factory and is building an addition that will permit about a 50 per cent. increase in the production for 1910. One **American Simplex** will compete in the Glidden Tour.

"To show his faith in the reliability and continuous running qualities of the buggy type of machine, W. H. McIntyre, the manufacturer of the **McIntyre** car at Auburn, Ind., has entered a machine in the Glidden Tour. It is expected by continuous running to make the same average speed as cars of greater power. It will be the only one of its type in the tour. It is equipped with a two-cylinder, air-cooled motor and is shod with solid tires. Incidentally, Mr. McIntyre has been a resident of Auburn for forty years, owns the daily paper there, and is interested in a number of its industries. His carriage factory turns out 30,000 to 40,000 horse-drawn vehicles annually.

"No factory that I visited is more modern than the plant of the **Mora** Motor Car Company, at Newark, N. Y. It is light and clean, with high ceilings, and Mr. Mora insists it all helps the men to turn out good work. All the 1909 cars will be out by July 10 and will be delivered immediately to customers through the agents. Work is now under way on the 1910 product, which will be new in several features, although carrying most of the features that have made the **Mora** car so successful during the past two years. The horsepower of the four-cylinder car will be increased from 24 to 35. Among the other features is the casting of a ledge on the engine base reaching to the radiator, which, combined with the original **Mora** under-pan idea, makes a complete covering of the under part of the machine, insuring a clean motor and clean working parts.

"S. H. Mora, owing to his long experience as sales manager of the Kodak Company, thoroughly understands the handling of agents, and appreciates the necessity of keeping them supplied with cars at a time when the cars are in the greatest demand. His arrangement with agents is such that almost all of them receive an allotment of cars sufficient to make a substantial profit.

"Great preparations for next year in the way of additional buildings and the demand for additional help, to say nothing of the betterment of cars, both in material and construction, coupled with the reports of agents asking for 1910 cars and territory, enables even the poorest prophet to declare for a great selling year in 1910."

DOWAGIAC MOTOR WORKS OFFICERS KILLED

DOWAGIAC, MICH., June 28—F. A. Lake and Leon R. Lyle, both of Dowagiac, Mich., who were killed in the South Shore wreck near Chesterton, Ind., when eleven people lost their lives, were president and secretary, respectively, of the Dowagiac Motor Works. They were homeward bound from the automobile races at Crown Point, Ind.

MRS. "MAXWELL" RAMSEY REACHES OMAHA

OMAHA, NEB., June 28—Nearly half way across the continent, after a run of 1,700 miles, Mrs. Alice R. Ramsey and her party of women autoists, who are traveling from New York to San Francisco in a Maxwell touring car, reached this city yesterday, and this morning resumed their journey towards the Pacific. So far the trip has proven Mrs. Ramsey's contention, that in the right car a woman can make the trip without trouble. Several times the wheels of her Maxwell have gone hub deep into the mud, but each time it pulled out, and once, after having left Chicago, it not only got out of a particularly bad spot alone, but pulled a big, six-cylinder car out, too. Excepting for this, the trip has been without incident, though there have been plenty of amusing incidents from the time the party left New York, June 9. In every way it has been a most successful trip, but one blow-out necessitating a tire change. On account of the many receptions accorded the women, the mileage has been a bit smaller than could have been made. In almost every town and city between New York and Omaha the car and party have been given a great reception, while in Chicago they were met outside of the city limits by a dozen or more cars and escorted in. When they started for Clinton early in the week, the first stop on the run to Omaha, more than 40 cars drove out 50 miles with the tourists, and it was a happy party that left the city. So far, the trip has been thoroughly enjoyable in every way, which, of course, is partly due to the fact that the big touring car has gone from 125 to 191 miles every day, those figures being the lowest and highest recorded.

MAXWELL BENEFIT SOCIETY

Employees of the New Castle, Ind., factory of the Maxwell-Briscoe Motor Company have recently perfected a social and athletic organization and benefit association, which they call the "New Castle Gymnasium." They assess themselves ten cents each per week, and thus have a sick benefit and insurance feature. The company has co-operated with the men and has furnished a very complete gymnasium, reading and billiard rooms, etc., and out of the 2200 people employed in that plant, about 1600 are members of the organization. Under its auspices are a baseball team and the Maxwell-Briscoe concert band of 30 pieces, and during the winter there are classes in mechanical drawing, metallurgy, and other subjects pertaining to automobiles. According to Benjamin Briscoe, president and general manager of the Maxwell-Briscoe Company, this is the largest and most completely organized employees' association in the auto industry.

Overland "Thirty" That Carried a Notable Four

At the wheel on a recent trip over Long Island roads was A. E. Schwartz, foreign representative American Motor Car Manufacturers' Association; in same seat, L. M. Bradley, advertising manager A. M. C. M. A.; in rear seat, A. J. Sticker, of Frank Presbrey Company, and the well-known automobile writer, Arthur N. Jervis.

Good Roads Advocate Klouse and His Rambler

RAMBLER ASSISTS IN GOOD ROADS WORK

CHARLOTTE, N. C., June 28—In an energetic campaign now being conducted throughout the South in behalf of good roads, newspapers, automobile manufacturers, and automobile owners are enthusiastically co-operating. The campaign has now reached a point where the desire for good roads has become almost a mania, and autoists in all parts of the South are making tours to educate the users of the road in the importance of better public highways.

Joseph Klouse, of this city, has just made a trip of 3000 miles in a Rambler, in which he visited many of the important cities in the South, distributed literature along the way in behalf of good roads, and aroused much interest in the movement. The Rambler driven by Mr. Klouse has traveled over 18,000 miles, and it finished one run of 250 miles, from Charlotte, N. C., to Atlanta, in 21 hours and 30 minutes. Mr. Klouse represents the Charlotte *Daily Observer* in the New York *Herald*-Atlanta *Journal* good roads promotion.

FRANKLIN PUPILS LEARN RAPIDLY

SYRACUSE, N. Y., June 29—Tangible results of instruction in the repairmen's course maintained in the automobile school at the factory of the H. H. Franklin Manufacturing Company are in evidence in the shape of two automobiles assembled from raw stock by the pupils. It took three members of the class two weeks to construct the two cars, when the work was passed upon by the testers, just as are cars in the regular course of manufacture. The class has twenty-six members, under supervision of I. O. Hoffman, formerly an instructor in Syracuse University. The course is one of twenty-six weeks, providing both theory and practice, most of the time being spent in practical work.

Class Receiving Instruction in Franklin School

DOW RIMS FOR LARGE TIRE CONCERNS

An announcement of much interest to the trade at large is the adoption of the Dow Remountable rim by the Hartford Rubber Works Company, Hartford, Conn., and the G & J Tire Company, Indianapolis, Ind. In making this announcement, the two tire companies feel that they are offering to the public a rim which can be recommended, and the use of which is spreading very rapidly. The rims may now be had with both the regular Clincher and the Universal Q. D. form.

Under license to the Dow patents, the rims are now being made by the Weston-Mott Company, Flint, Mich., this firm being one of the largest in the country as to size and excellence.

In construction, the Dow rims are extremely simple; there are no loose pieces to be lost, no nuts or bolts to be loosened. The act of putting a rim on or taking one off is very easy, consisting of a few turns of a wrench, and the removal of the tire and rim. This wrench through the medium of a rack attached to the rim rotates the same, which slides wedges over one another, one set being attached to the felloe and another to the rim. As these wedges form the attachment of the rim to the felloe, this rotation loosens or tightens the contact according to its direction. These features have made it easy for amateurs to use and indirectly resulted in the above announcement.

Great Western Car After 800-Mile Mud Battle

This car, which is manufactured by the Model Automobile Company, Peru, Ind., recently made a hard trip through Illinois and Indiana, traveling 800 miles through mud and rain. The bundle on the luggage rack was a brand new suit case at the beginning of the trip, but after the pounding it went through it was in shreds.

REPUBLIC TIRES PROVE EFFICIENCY

Automobile accidents nowadays are limited almost entirely to peculiar and unheard-of mishaps. One of the oddest occurred to Mr. Pratt of the Republic Rubber Company recently. He was driving in New Rochelle, N. Y., when the brass shutter in his carbureter broke off, producing the effect of a wide open throttle. The engine immediately began to race, and while the driver was trying to get control, the car began to travel at top speed. It did not occur to the driver to throw out his clutch for a few moments, as he expected at any instant that the car would respond to the throttle control.

Meanwhile several sharp curves were passed and there was imminent danger of skidding. The car was equipped with Republic staggard tread tires, which were given an unusual test of their anti-skid qualities, and proved remarkably effective so that the expected side-slip never occurred, the tires gripping the road in a most comforting and satisfying way. The car was soon stopped, the trouble located and remedied.

Newark, N. J.—The Imperial Garage has been opened on Belleville avenue by F. W. Briggs, who was formerly connected with J. M. Quimby & Company.

SOME SELECTED AUTOMOBILE PATENTS

Issue of June 15

924,634. Explosion Engine—Richard D. Cody, Winona, Minn. Filed Feb. 23, 1904.

924,639. Governor for Explosion Engines—Hsrry M. Cramer, Lansing, Mich. Filed April 12, 1907.

924,640. Explosion Engine—Harry M. Cramer, Lansing, Mich. Filed April 20, 1908.

924,673. Carbureter—James B. Knickerbocker, Indianapolis, Ind. Filed Nov. 21, 1907.

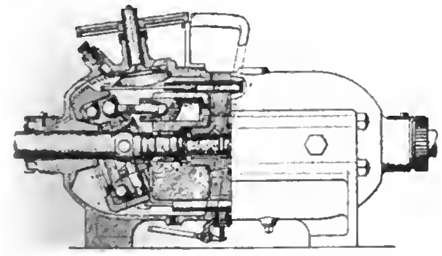
924,715. Self-Measuring Oil Pump—Flavius J. Young, Fort Wayne, Ind. Filed Oct. 23, 1908.

924,724. Spring Wheel—John W. Benson, North Wayne, Me. Filed July 7, 1908.

924,757. Steering Mechanism for Self-Propelled Vehicles—Rodolphus Fuller, Detroit, Mich. Filed Feb. 6, 1908.

924,787. Variable Speed Transmission Device—Reynold Janney, New York, N. Y. Filed July 9, 1906.

This is a combination of oscillating crank engine with speed transmission. The pistons travel back and forth in a housing and in so doing operate a rotary oscillating crank. The admission of fuel to the odd number of pistons is controllable, and, of course, variable. In this manner the speed of the engine may be varied at will. The drive is from the rotating crank by means of a gear, the shaft of which projects through the crankcase. On the extremity of this shaft is placed a gear, either of the spur type, or a sprocket, from which the drive is transmitted. As shown in the patent office sketch, the device is apparently double ended, there being as many pistons at the right hand end as at the left.

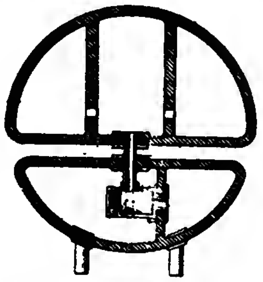


Janney Oscillating Crank Engine

924,806. Antiskidding Attachment for Wheel Tires—George A. Lyon, Philadelphia, Pa. Filed March 18, 1907.

924,812. Pneumatic Tire—Daniel McArthur, Jersey City, N. J. Filed April 15, 1908.

In his tire, McArthur has a series of tire compartments, divided one from the other by means of partition walls, which in use would be perpendicular to the road surface and thus, would take part of the load. These surface partitions are connected to an air conduit in the base of the tire by means of a series of individual valves. In case of the puncture of any one surface section the valve closes so that no more air may enter.

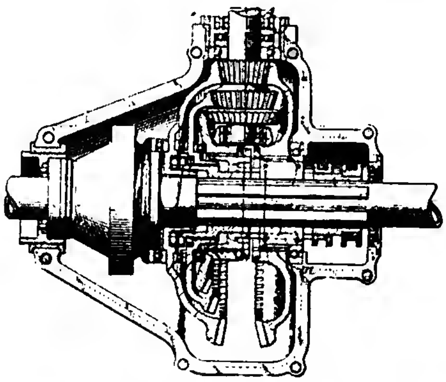


McArthur Compartment Tire

924,863. Spark-Ignition Device for Explosive Engines—James A. Whitton, Los Angeles, Cal. Filed Nov. 26, 1907.

924,889. Variable Speed Gearing—Gustave Chedru, Buffalo, N. Y. Filed July 16, 1907.

A new idea on the part of the Thomas engineer has for its basis a series of bevel gears and pinions, clutched up to the rear axle by means of individual clutches. Throwing the clutch for any one of the gears connects it to the axle, and thus transmits the drive from the engine. In this manner three speeds and a reverse are provided in a very small compass. Although nothing is said about the control, it is easily apparent that this could be arranged to operate upon the now popular selective principle, in which case an excellent and very compact final drive will have been obtained.

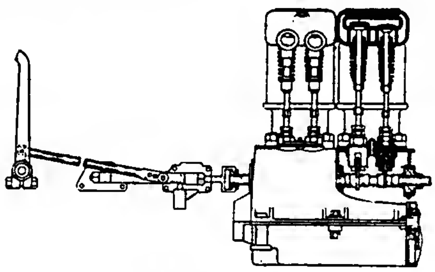


New Thomas Rear Axle Transmission

924,913. Recoil Check—Frederick J. Mellen and Burton A. Edwards, Beloit, Wis. Filed Nov. 11, 1908.

Issue of June 22, 1909

925,528. Pneumatic Brake for Motor-Vehicles—Ernest E. Sweet, Detroit, Mich. Filed Jan. 11, 1908.



Cadillac Braking Device

A device for braking the car by drawing the exhaust cam out from under the valve, when the exhaust gases can not leave the cylinder, and the piston continues to compress them, over and over, this acting to retard the forward motion of the car.

925,536. Vehicle-Wheel Bearing Mechanism—Clarence F. Umholtz, Bristol, Va. Filed Mar. 23, 1908.

925,543. Vehicle-Brake—Joseph H. Wesson, Springfield, Mass. Filed June 30, 1908.

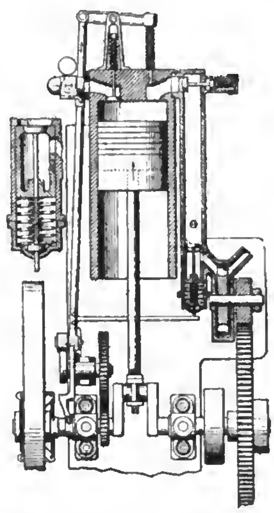
925,560. Felly for Wheels with Pneumatic Tires—Theodor Bruckner, Vienna, Austria-Hungary. Filed Nov. 9, 1906.

925,579. Running Gear for Vehicles—Martin W. Heyenga, Chicago, Ill. Filed April 24, 1908.

925,580. Tire—Charles H. Keiffer, Akron, Ohio. Filed Jan. 25, 1909.

925,766. Internal Combustion Engine — Leander E. Fish, Los Angeles, Cal. Filed Feb. 21, 1908.

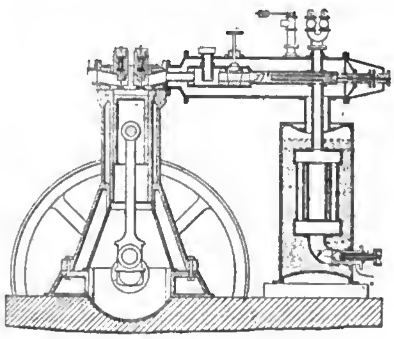
Fish has an idea here of doing away with the valve operating mechanism of one valve, and also utilizing an automatic inlet valve, with all of the advantages of the mechanical valve. This effect is secured by having a mechanical agitator, which at the same time mixes the gases and regulates the amount allowed to enter. These mixed and measured gases enter through a valve operated from the exhaust push rod into a vertical passage. From this latter the entrance to the combustion chamber is by means of an automatic valve. While the drawing makes the engine look complicated it may possess much merit.



Engine Simplification by Fish

925,845. Method of Utilizing Heat of Combustion and Steam Power in Prime Movers—Theodor Schtscherbakoff, Moscow, Russia. Filed Sept. 10, 1904.

The Russian, with the unpronounceable name, intends to utilize the heat ordinarily wasted in the exhaust by passing it first through a muffler, after which it goes to a heating chamber. In the latter, it is made to heat water, which latter the inventor proposes to use in a nearby steam boiler. The idea is to do away with the ordinary feed water heater, probably, but the fault in the whole scheme is that where gas engines are used for power, steam is seldom also used. The opposite of this also holds true, so that there seems to be very little field for a device like this.



Method of Utilizing Waste Heat

925,908. Wheel for Road Vehicles—James Henderson, Burton, England. Filed Aug. 17, 1907.

925,930. Wheel Tire—Joshua D. Marvil, Laurel, Del. Filed Sept. 11, 1908.

Midland Car Makes Plowing a Fine Art

Recently at the factory of the Midland Motor Company, Moline, Ill., additions necessitated the plowing of a large tract of land. Horses being at a discount around an automobile factory, a car was hitched up to a plow and with a man to drive and another to guide the plow, the land was plowed in about one-fourth of the time it would have taken horses to do it.

Grease Lubrication Under Heavy Bearing Pressures—In automobiles abnormal bearing pressures are liable to occur, which severely test the quality of the lubricant employed. In some tests of Keystone grease, manufactured by the Keystone Lubricating Company, of Philadelphia, recently made by a competent authority, this automobile lubricant showed remarkable performance under heavy bearing pressures. The Olsen testing machine was employed, and the pressure was increased by steps of 86.2 pounds per square inch up to the high maximum pressure of 431 pounds, a full sixty-minute run being made at each pressure. During the entire run at each pressure the lubricant maintained true fluid friction between journal and bearing and withstood the temperature rise without a sign of any disintegration. This result is stated by the company to be due to the permanent consistency of Keystone grease under great increase of bearing pressure and temperature—it does not squeeze out of the bearing nor soften by heat and run away from between the surfaces requiring lubrication at the very time it is most needed.

Riggs Becomes an Oregonian—The West gets a lot of the good ones in the automobile business. Perhaps it is the echo of Horace Greeley or the clink of the big round silver simolean that draws the regulars of the trade to the far side of the Rockies, where the people raise enough prunes, oranges and canned salmon to raise the price of good automobiles and thereafter raise dust on all highways anent the Pacific ocean. Frank C. Riggs is the latest—Riggs, till now assistant sales manager of the Packard Motor Car Company, erstwhile vice-president of the Fisk Rubber Company, and one of the old friends back in the days of "Yellow Fellows" and other bicycles that made life worth living while waiting for automobiles. Mr. Riggs will be in Portland, Ore., soon after July 1. He will be dealer for "Three P's"—the Packard "Thirty," Packard "Eighteen" and Packard truck. Mr. Riggs will have temporary headquarters at the Hotel Portland, but will establish a permanent store without delay.

Enlarged Factory for Hartford Shock Absorbers—"We have found it necessary," says Edward V. Hartford, president of the Hartford Suspension Company, "to increase our manufacturing facilities at Jersey City. For the past six months we have been so swamped with orders not only from automobile manufacturers, who use our suspensions as standard equipment, but from individual users as well, that we have arranged to duplicate our already large factory. With these increased manufacturing facilities we expect to catch up on past orders and in three weeks to a month's time hope to be able to deliver promptly."

Winton Branch and Road Men to Meet—Sales Manager Churchill has called a convention of Winton branch managers and road men to be held at the Winton factory in Cleveland during the week of June 28. Final reports in the $2,500 Winton Six upkeep contest are expected sufficiently early for the judges to meet in Cleveland about July 10 and make the awards. Indications are that the winning record of last year—11,683 miles at a repair expense of $12—will be beaten by this year's winner. The upkeep contest is an annual Winton fixture and will, of course, be continued.

Stearns Sure to Get Parts—The F. B. Stearns Company, of Cleveland, has adopted a new plan of insuring its securing prompt delivery of the materials and parts which go into the Stearns product. For next year an expert will travel all over the country to call on firms from whom the Stearns company purchases, such as magneto, bearing and other manufacturers, and it will be his duty to see that adequate steps have been taken to give the Stearns concern its supplies on schedule time. If there are any methods by which these can be hurried along he will suggest them.

Colwell's Play Meets with Success—M. Worth Colwell, of the Wagner-Field Company—advertising, not theatrical—has produced his vaudeville sketch in Brooklyn and the play was well received. It is entitled "The Child from Pittsburg" and was written jointly by Colwell and Alan Brooks. The latter, who was "Bub" Hicks in Ade's "College Widow," and later a comedian in "A Stubborn Cinderella," plays the title rôle, and Jeanette Despres, who was with Hitchcock in "A Yankee Tourist," is the leading woman.

Big Prize Money for Cobe Winner—Louis Chevrolet and his team-mates, Robert Burman and Louis Strang, have been presented with a purse of $10,000, to be divided equally among them, for their performances in the races on the Crown Point course. Chevrolet won the Cobe cup for big cars with his Buick, and all three men took part in both events. This reward is in addition, of course, to their regular salaries and to the sums which Chevrolet received from certain manufacturers of accessories.

F & S Bearings and U & H magneto on Prince Henry Winners—The J. S. Bretz Company, New York, has been advised by cable that the F & S bearings, which it imports, were on all of the first twelve cars in the Prince Henry contest except the seventh, and that these bearings were also used by the winner of the speed test. Another cablegram states that the U & H magneto was on the Opel car which won the contest and that the same make of magneto was used by the first two cars in the speed trials.

Covert to Erect Big Shops—The Covert Motor Vehicle Company has purchased a large block of land in Lockport, N. Y., between Grand and Green streets, near Lock street, on which to build a new factory. The present plant is not large enough, and the first building of the new one will be of brick, 130 feet long and 50 wide, two stories high. This allows space for other structures.

New York Tradesmen Form Baseball League—The baseball fever is epidemic with the New York tradesmen, evidenced by the New York Automobile Trade Baseball Association, which comprises the following teams: Packard, L. H. Wessels; Thomas, W. A. Woods; Pierce, Walter Wunder; Studebaker, James H. Barry; Diamond Rubber Co., C. G. Studebaker; Republic Rubber Co., George C. Kloss.

Vanguard Company to Enlarge—The Vanguard Manufacturing Co., Joliet, Ill., maker of spark plugs and wind shields, has had plans completed for a new building which will be 60 by 250 feet in size, one story high, constructed of brick and concrete. This will more than double the present output and will give facilities for operating a brass foundry and adding specialties to those now made.

Chalmers Winner Had Continental Rims—The use of demountable rims, which are positive in their action, both as to ease of replacing and as to security when fastened, is necessary in automobile races. The winning Chalmers-Detroit car in the Indiana trophy race was equipped with Continental demountable rims and was able to make tire changes in record time.

Lexington Company Will Increase Capital—The Lexington Motor Car Company, of Lexington, Ky., is about to double its capitalization, raising it from $25,000 to $50,000, in order to enlarge the factory facilities. The cars have been in great demand and it is now stated that orders are on the books which will take up the entire output of five or six cars a week for two months.

Dorris to Increase Output—The Dorris Motor Car Company, St. Louis, has purchased ground at Sarah street and Forest Park, 185 by 200 feet on each, respectively, on which to enlarge its present factory. The new building will be of brick, three stories high, and will cost $60,000. The output of the Dorris cars will be considerably increased.

Last 1909 Winton Shipped—The last 1909 Winton Six has been sold and shipped from the factory in Cleveland, marking the close of the most successful season in the history of the Winton company. The company's products for 1910 will be announced July 10.

IN AND ABOUT THE AGENCIES

Pullman Makers Make Agency Contracts—The York Motor Car Company, manufacturer of Pullman automobiles, announces closing with the following concerns of agency contracts for 1910: New York, Cimiotti Brothers; Boston, Crown Motor Car Company; Buffalo, Meyer Carriage & Auto Company; Baltimore, Shaffer Manufacturing Company; Minneapolis, Minn., Victoria Motor Car Company; Oklahoma City, Okla., O. G. Lee.

White Company Opens Washington Branch—The White business in Washington, D. C., has grown to such proportions, due in no small measure to the patronage of President Taft, that it has become necessary to establish a district branch office of the White Company in that city. The new branch is located at 1124 Connecticut avenue, in charge of F. I. Chichester, and is under the control of the Eastern branch in New York.

Renault Extends Trade in West—Renault Freres' selling branch in New York announces that it has arranged with F. A. Bennet to handle the Renault cars in Oregon, Washington and Idaho, and with the Colburn Automobile Company of Denver for the State of Colorado. The new cars, with reinforced axles and springs, and extra high clearance, have proven very successful on the Western roads.

Pierce-Arrow, Pittsburgh—Headquarters have been secured by the McCurdy-May Company, new agents in Pittsburgh for the Pierce-Arrow Motor Car Company. Buffalo, N. Y. The building is located at Baum street and Euclid avenue, East End. Robert R. McCurdy, for six years with the Banker Brothers Co., will be manager of the new company.

Two Diamond Branches Under One Manager—The Diamond Rubber Company states that although for more than a year George J. Bradley has been manager of the company's Detroit establishment, he is still manager of the Cleveland branch as well. Division of his time between the two points has led to some confusion.

Great Western Agents Appointed—The Model Automobile Company, manufacturer of the Great Western automobiles, announces the following agencies: Omaha, Neb., F. A. Reynolds; Scribner, Neb., John Borcher; Wadena, Ind., C. R. McNown; Nicholasville, Ky., C. A. Kenney.

Diamond to Open Atlanta Branch—The Diamond Rubber Company has arranged to open a direct factory branch in Atlanta, Ga., at 48 Auburn avenue, about the middle of August, from which to handle the growing Southern trade.

Miller Will Open Hartford Branch—Charles E. Miller, of New York, it is reported, will open a branch house for the sale of automobile supplies in Hartford, Conn.

Brown, Thomson & Company, Hartford, Conn., have taken the agency for Stevens-Duryea and Cadillac automobiles in place of the Packard.

RECENT BUSINESS CHANGES

Baltimore—The local agent for the Oakland, Reo and Hupmobile, Little Joe Wiesenfeld, has secured the services of David Asher, a former New Yorker. O. G. Hoff, until recently with the local branch of the Olds Motor Works, has taken a position with Leo Schaab, who conducts the Baltimore agencies for Stoddard-Dayton and Renault cars.

PERSONAL TRADE MENTION

A. W. Hall, of Cleveland, formerly a member of the firm of Hall Bros., Cartercar and Plymouth truck agents, has left the above concern, going to Plymouth, O., to take entire charge of the Plymouth factory. Hall Bros. has become The V. R. Hall Automobile Co., continuing with the same line of machines as before.

Ronald E. Maude, representative of the Deasy Motor Car Manufacturing Company, Ltd., of England, is now in this country with the purpose of introducing the product here. The Deasy company makes three types of cars, all with four cylinders.

Maurice Bernin, the former Renault racing driver, will shortly go to New Orleans, where he will start a Renault Taxicab Company and also have the agency for the Renault cars.

T. Dudley Riggs, representative in Hartford, Conn., for the Simplex automobiles, has returned to his old home, Baltimore, and will enter the automobile business there.

TAXICABS AND TRANSIT

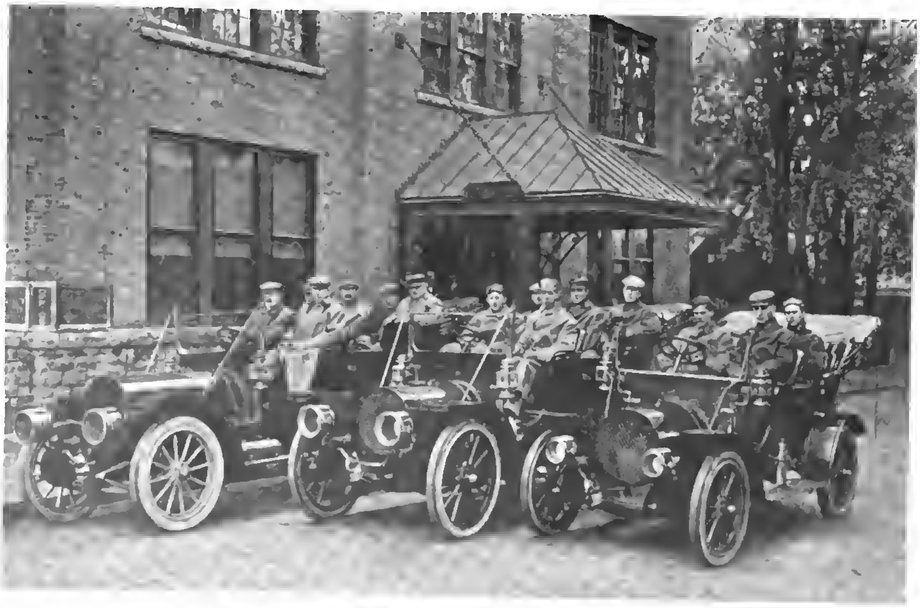
Taxicab Ordinance Changed—After several months of backing and filling, the New York City Board of Aldermen finally amended the taxicab ordinance so as to limit the charges to 30 cents for the first half mile on two-seated cabs and 40 cents for four-seaters. As there are practically none of the former in the city, this amounts to lowering the present universal rate of 50 cents. The ordinance also provides for frequent inspection and correction of taximeters. It was signed by the Mayor and will go into effect about October 1.

HOW WINNERS LUBRICATED

Matson, Chalmers-Detroit winner of the Indiana trophy, and Chevrolet, Buick winner of the Cobe cup at Crown Point, Ind., June 18 and 19, chose for their lubrication Harris oils. The makers are much elated at the double victory.

TESTED NEW MODELS HIMSELF

It usually happens that the work of trying out the new models for an approaching season is left to a paid tester, to whom the job is like any other, all in the day's work. Not so at the Franklin factory, when three of the newer cars for 1910 had been completed; these were taken in hand by President H. H. Franklin himself, with a specially organized party of factory heads, and personally driving one of the three. They were subjected to a five-day tour, in which an average per day of 165 miles was covered, the total being 823 miles. This was over roads, through mountain climbs, and wherever hard going could be found in the general direction in which the party was traveling. The roads, hills and speed tests put up to the latest product of the big Syracuse factory were fully equal to anything which will be met on this year's Glidden Tour. The main course was from Syracuse to Boston, with an extensive detour through the Catskills. The largest car was the seven-passenger forty-two horsepower machine driven by Mr. Franklin. The other two were a twenty-eight horsepower touring car carrying five and driven by Arthur Holmes, and a four-passenger car of eighteen horsepower, driven by R. A. Vail. The whole party included President Franklin, Vice-president Giles H. Stilwell, Secretary-Treasurer F. A. Barton, Sales Manager F. R. Bump, Advertising Manager J. E. Walker, Sundry Sales Manager J. G. Barker, Traffic Manager Herbert Hess, Superintendent F. J Haynes, Chief Engineer John Wilkinson, Assistant Engineer Arthur Holmes, Engineer R. A. Vail, Engineer R. W. Coughtry and Charles Slingerland.



The Franklin Testing Party Starting from the Factory with the 1910 Models

RECENT PUBLICATIONS

Peerless Motor Car Company, Cleveland—An announcement of the 1910 models of this prominent firm includes no radical changes, but only the incorporation of new features, these being rather on the infinitessimal order, and one new model, a 20-horsepower town car. The latter is equipped with a four-cylinder 4x4 5-8 motor, for which the A. L. A. M. rating would be 27, but which the makers prefer to rate at 20. This will be known as Model 29, and will be equipped with but two body styles, limousine and landaulet. For both, the wheelbase will be 113 inches, and the wheels 32 inches in diameter with 3 1-2-inch tires all around. The minor changes in the standard cars include more stiffening ribs on the one-piece crankcase, a new carbureter, larger diameter clutch on the "six," the advanced position of the transmission case, which allows a more comfortable location of the levers, the lengthening of the propeller shaft which accompanies the movement of the transmission, with consequent decrease in the angle of the same. In addition, the springs are lengthened, the fronts by two inches and the rear sides by four inches. This latter change should make a very easy riding car, for the springs of last season were already long.

Societe Anonyme Des Automobiles "Unic," Puteaux, Seine—As a sample of the better class of French car manufacturer's trade catalogues, this is very interesting. The artistic and the practical are combined excellently, there being a surfeit of neither one. The press work, unusually difficult with the three colors used, is very well done. Five chassis are built, or rather five engines are used, the number of chassis being far in excess of this. These five motors are placed in as many chassis for runabouts and touring cars, while four of them are also used for commercial vehicles. Of the latter four, two may be had fitted for cab use or light delivery wagons. Two more are put into special chassis for truck, omnibus, and other heavy work of a similar nature. The five engines are: 10-horsepower, two cylinders, 102 by 110; 12-horsepower, four cylinders, 75 by 110; 16-horsepower, 87 by 110; four cylinder, 24-horsepower, 102 by 116; and a "six," 25-horsepower, 85 by 120, the latter being used for touring cars only. A series of very interesting marginal cuts show the various engines, most of the parts of the same, views of the transmissions, and other car parts, as well as numerous scenes in the large shops at Puteaux.

Gramm-Logan Motor Car Company, Bowling Green, O.—Facts relative to the economic use of the commercial vehicle are ably presented in the catalogue of the Gramm-Logan Company, recently issued. The book is gotten up in the same style and with the same evident care as that bestowed upon the best of the publications illustrative of the modern high-priced pleasure cars, bound in heavy stock of a pleasing blue color. Gramm-Logan trucks are built in numerous styles, upon three general chassis models, depending upon the loads to be carried, using water-cooled motors for the large machines, and air-cooled ones for the light delivery wagons and buses. The features of these engines, as well as of the transmissions, general driving mechanism, axles, ignition system, etc., are explained in detail, and illustrations given of the different kinds of bodies which can be secured upon short notice. A double page, in the center, is devoted to a comparison of the cost of horse-drawn transportation as compared to that of the Gramm-Logan trucks, based upon actual work, and shows conclusively the advantages of the latter.

Prominent Autoists Tour in Cuba

This photograph was taken on a recent trip to the Queen of the Antilles by H. S. Firestone, president of the Firestone Tire & Rubber Company; James Couzens, secretary and treasurer of the Ford Motor Company, and Frank Presbrey, general advertising agent, of New York. These autoists did considerable touring while in the island.

Cartercar Company, Pontiac, Mich.—Friction-driven Cartercars are well known throughout automobile circles, particularly because of their transmission feature, and further details of this, as well as of the other parts of the cars, are narrated in the new catalogue, No. 10, just received. A number of illustrations are given, the frontispiece being a reproduction of a photograph taken of a Cartercar in service on Mount Hamilton, Cal., running to and from the Lick observatory; there are cuts showing factory details—the motor assemblage, that of the new chain-in-oil drive, and, finally, several of the completed cars to show their various body types. The Cartercar Company has recently moved into its new factory, with the most modern equipment and ample facilities for the construction of a large number of machines annually. The catalogue mentions this and gives an interesting sketch of the origin of the friction transmission. Seven styles of bodies for Cartercars are shown pictorially—touring cars, runabouts, roadsters, coupés, taxicabs, and commercial vehicles being represented.

Diamond Rubber Company, Akron, O.—Motor truck tires, both of the wire mesh base and side wire types, are described in the most recent publication of the Diamond Rubber Company. The covering of this book is one to instantly attract attention, in that it is a brilliant red color, with gilt trimmings, and the descriptive matter in the interior is well printed on heavy, cream-colored stock. The material used in the Diamond products is called to attention, the reasons for certain processes, and then the regular catalogue features are taken up. Not only are the various tires illustrated as to their general appearance, but also their cross-sections, and tables of sizes. Machines for applying the side wire tires are illustrated, and directions given for their use, so that the book contains a fund of information, especially valuable to those engaged in commercial businesses, for these tires are applicable to horse-drawn vehicles as well as automobiles.

Bartholomew Company, Peoria, Ill.—"Logic, which has developed the Glide car, and the reasons for its low cost of upkeep" is the title of a pamphlet issued by the Bartholomew Company recently. It is as interesting as its subject would indicate, in that it takes up the reasons for certain points in the construction of the Glide, for instance, showing why the spokes of the wheels were gradually increased from a diameter of 1¼ inches to 1⅝ inches, and why the rear driving axle was enlarged from 1¼ inches to the present 2 inches, both now fulfilling the requirements where the smaller sizes were found too light. Similar comparisons are made to show why the Glide has but one universal joint, whereas when the Glide was first built there were other manufacturers who were using two, three, and in cases four.

Wonderful Car Illumination by Apple Electric System

In the parade for the Wright brothers' homecoming celebration at Dayton, Ohio, the car of V. G. Apple attracted very much attention, being outlined with electric lights. In all 260 tungsten lamps were used, the current being supplied from an Aplco electric lighting outfit.

RECENT INCORPORATIONS

Regal Tire & Rubber Company, Camden, N. J.—Capital, $250,000. To manufacture automobile, carriage and other tires. Incorporators: W. H. Wilson, Stewart Murray, Frank A. Kuntz, W. C. Reinhold.

Eastern Auto Transit Company, Albany, N. Y.—Capital, $35,000. To operate a stage line between Albany and Schenectady. Incorporators: William A. Cryne, Edward D. Wintersteen, Charles B. Henry.

Quadruplex Auto Tube Company, Wilmington, Del.—Capital $600,000. Incorporators: Phelan Beale, 150 West Forty-seventh street, New York; M. D. Nave, G. U. Smith.

Queen City Auto Livery Company, Buffalo, N. Y.—Capital, $25,000. To operate an automobile livery service. Incorporators: C. V. Roty, H. C. Shufeldt, W. J. Hickey.

Morrison Motor Car Company, Chicago—Capital $20,000. To manufacture automobiles and accessories. Incorporators: J. T. Morrison, H. E. Piermont, O. H. Wolfe.

Electric Service Company, New York—Capital $50,000. To manufacture automobiles and accessories. Incorporators: W. L. Ernst, M. E. Harby, A. A. Ernst.

Waterhouse Carbureter Company, Boston—Capital, $100,000. To manufacture and sell motors of all kinds. Incorporators: H. D. Waterhouse, F. C. Hersee.

Jean Flying Machine Company, New York—Capital $5,000. To manufacture flying machines. Incorporators: Octave Jean, C. S. Horowitz, Herman Weiss.

Anderson Airship Company, New York—Capital $25,000. To operate vehicles through the air. Incorporators: J. J. Harper, E. J. Forhan, H. M. Browne.

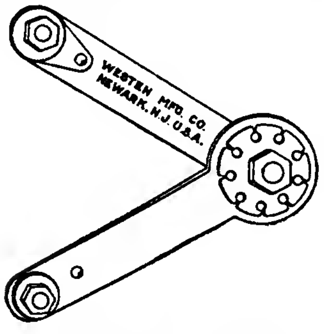
Cole Motor Car Company, Indianapolis—Capital, $100,000. To manufacture and sell automobiles. Directors: J. F. Morrison, J. J. Cole, Nellie G. Cole.

Brazier Garage Company, Philadelphia—Capital, $100,000. Incorporators: Carter G. Glenn, James K. Davis, John Y. Sinton, Robert Summers.

Automatic Inner Tube Company, Wilmington, Del.—Capital, $350,000. Incorporators: A. M. Bango, A. R. Bango, G. G. Steigler.

Information for Auto Users

Shock Absorbers Make Riding Easy—Tours like the Glidden, at the same time extended and strenuous, have done much to bring into use shock absorbers and other devices designed to make for easy riding. In the jolt-eliminator, made by the Westen Manufacturing Company, 290 Halsey street, Newark, N. J., two friction planes are used to check all large oscillations. Of these, the smaller is

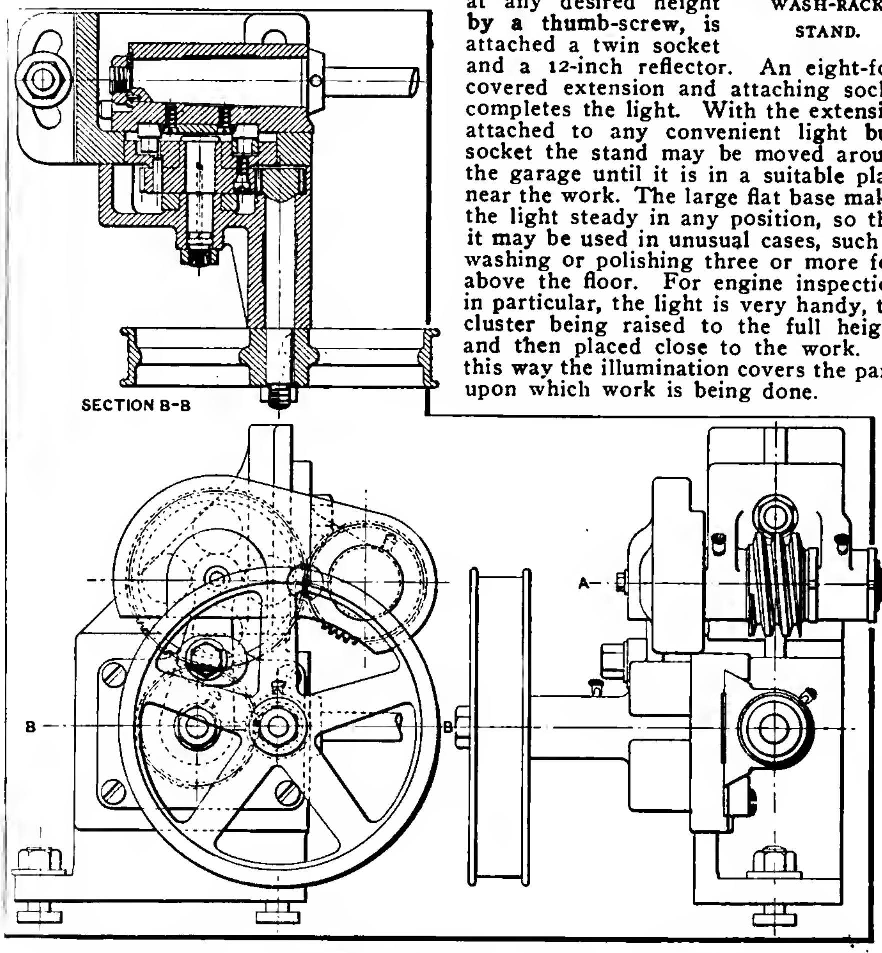


WESTEN SHOCK ABSORBER.

brought into use on small obstructions, such as are met ordinarily, while the larger plane comes into active use only on very rough surfaces resulting in unusual bumps. This makes for simplicity of construction and consequent adjustment, which is well worthy of consideration on the part of the new driver. After being once set—that is, when both planes have been adjusted—the makers say that no further adjustment is necessary. There are no moving mechanical parts to get out of order. In external appearance, as the line cut above shows, this device for making automobiling more pleasant resembles an older and well-known absorber.

A Handy Tire Inflator—Back breaking is a phrase which no longer applies to tire inflation, for the number of devices which are designed to eliminate the manual labor connected with tire inflation is augmented daily. The latest thing out is the Prest-O-Tire tube, made by the Prest-O-Lite Company, Indianapolis, Ind. This is a very small and consequently very compact tube filled with compressed carbonic gas. The supply carried in one of these little tubes, which take up practically no room in the tool box, is sufficient to inflate completely one large 36 by 5 inch tire, or, used with care, it will pump several deflated tubes. In use, it is the acme of simplicity, a valve and hose attachment screws into the end of the gas tube, thereby puncturing a metal cap in the end of the tube. This allows the flow of gas as soon as the valve is turned on. The other end of the rubber tube is attached to the tire valve, hand valve or supply cock is turned on and the compressed gas inflates the tire. The tube itself is but 1 1-4 inches in diameter by 12 inches long and weighs but one pound when filled. As the tubes cost but a dollar each, and, empty, are redeemable for 80 cents, the expense of inflating a tire in this manner is very small.

Improved Tooth Chamfering Machine—The increasing use of gears and with that the greater use for chamfered gears has naturally brought out machines for doing this work, thus replacing the slow and costly hand work. Of these machines one of the better known is that of the Long Arm System Co., Cleveland, O., of which the up-to-date improvements are worthy of mention. The machine itself is too well known to require any additional mention, but since it was first brought out several changes have been made. Thus the spindle position has been changed from a vertical to a horizontal one. By adding a tail stock, possible with this position. the range of work has been much extended. In addition to this, the new position allows chamfering gears in the middle of an integral shaft, which could not be done before. So, too, with unusual angles, it is now possible to swivel the attachment to such an angle as to do any desired form of chamfering. It is an improvement as far as the parts are concerned, for the chips do not fall on the work, and the wear on both cams and rollers is balanced at all times. The countershaft and consequently the whole driving mechanism are simplified, while the present direct belt drive does away with the idler pulley and balance weight. The cut shows a section through the working spindle, an end view and a side view.



THREE VIEWS OF THE LONG ARM SYSTEM COMPANY'S TOOTH CHAMFERING MACHINE.

Saves Electric Light Bills—Everybody loves the electric light companies so, and takes such delight in paying the light bills, that doubtless a device for economizing on the current used will not become popular. The Portland Wash-Rack Stand, made by the Brown Company, Syracuse, N. Y., does this by presenting a secure basis for the light fixture, and at the same time permitting of its movement toward the work so that superior illumination is secured from the same or a lessened number of lights. For garages, either public or private, this should prove invaluable. It consists of a four-footed flat base, hung low for steadiness, and provided with space for holding small articles in use while the light is being used. From this base, extending upward, is a three-foot riser or vertical upright, which, in turn, supports a special design of carrying bracket. On this bracket, which is held at any desired height by a thumb-screw, is attached a twin socket and a 12-inch reflector. An eight-foot covered extension and attaching socket completes the light. With the extension attached to any convenient light bulb socket the stand may be moved around the garage until it is in a suitable place near the work. The large flat base makes the light steady in any position, so that it may be used in unusual cases, such as washing or polishing three or more feet above the floor. For engine inspection, in particular, the light is very handy, the cluster being raised to the full height, and then placed close to the work. In this way the illumination covers the parts upon which work is being done.

PORTLAND WASH-RACK STAND.

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VOL. XXI NEW YORK—THURSDAY, JULY 8, 1909—CHICAGO No. 2

THE AUTOMOBILE

NEXT THE BIG TOUR OF THE YEAR

DETROIT to-day is the Mecca of Autodom. Thither are headed those who will participate in the annual tour of the American Automobile Association, involving the winning of the Glidden, Hower and Detroit trophies. The first of these is historic in American automobiling, and the 1909 winner will earn his honors in a more strenuous test than has ever been projected in the way of a prolonged endurance tour in this country.

From Detroit to Kansas City, by the route to be followed, the distance will exceed 2,600 miles, and the roads met with will embrace good, bad, and indifferent, with possible wet-weather complications to add to the trials and tribulations of cars and drivers. In July 'tis likely to be hot.

But the great Middle West will enjoy the spectacle of a big contest tour, which unquestionably will add to the prestige of the motor-driven vehicle and bring to the attention of thousands its pleasurable necessity.

Preceding the official start of the tour on Monday morning next, there will be several days of "doings" in the "City of the Straits," which has prepared an elaborate program such as might be expected from a city of Detroit's importance in automobiling. 'Tis really the capital of American motordom, for its enormous factories turn out most of the thousands of cars being produced.

That many will visit Detroit for the sole purpose of seeing the start, is known to be the case, for the hotel accommodations of the city have been tested to their limit, to accommodate the excess of visitors.

Once upon a time, in the palmy days of cycling, Detroit entertained the League of American Wheelmen. Now it is to be the host of the autoists who have succeeded the lowly cyclers; and, mayhap, a decade hence, the same hospitable city will stretch forth the hand of welcome to the aerial brigade in one of its annual gatherings.

It is notable that the conditions for the 1909 tour are wholly different from those of former years. For the first time the Glidden trophy is up as a prize for an individual, to be held by him for one year. It will no longer go to a club nor be competed for by teams. In order to permit of this and of the increased distance, it was necessary that the deed of gift be altered and this was done with the consent of the donor, Charles J. Glidden, who will be on the tour.

Besides the Glidden trophy there are two others, each of which becomes the permanent possession of its winner this year. First of these is the Hower trophy for runabouts, and this will be the third Hower trophy to be awarded. The other prize is a new one offered under unusual circumstances. It is a trophy for the miniature tonneau car making the best score and is known as the Detroit cup. In appreciation of the honor of having the tour start from their city the members of the Detroit Board of Commerce agreed to donate a trophy to be competed for by miniature tonneau cars. The Mayor and Common Council of the city got ahead of the merchants, however, and for the first time on record an appropriation from the city treasury was voted for a trophy, without the matter being referred to a committee. The Common Council voted $250 for the prize and a committee, headed by Mayor Breitmeyer, was appointed to make the purchase. The Mayor found the sum insufficient and added $250 from his private purse.

The rules for 1909 are more strict than any former set, and cars will be penalized in fractional marks for any work done on them. All the extra parts and tools carried will be listed, an observer will ride on each car, and there will be an inspection of the parts and tools at the finish and perhaps during the tour. The system of penalization has been worked out by tenths of a point, so as to make it reasonably certain that a winner will be evolved, and yet no car be heavily penalized for repairs that are trivial and quite ordinary. The cars will be divided into five comprehensive classes this year, separated as follows:

Class A—Cars listed at $3,751 and upwards.
Class B—Cars listed at $2,451 to $3,750 inclusive.
Class C—Cars listed at $1,751 to $2,450 inclusive.
Class D—Cars listed at $1,000 to $1,750 inclusive.
Class E—Cars listed at $999 and under.

Henry Souther, the well-known technical expert, and Joseph Tracy, noted both as an expert and a driver, will serve with Chairman Hower on the special technical committee.

THE LIST OF PARTICIPANTS

About fifty cars will participate in the 1909 tour. The entries July 4 numbered forty-seven, and to this will be added several post-entries, mostly non-contestants. Herewith is the rather incomplete data available just before going to press:

FOR THE GLIDDEN TROPHY

No.	Car	Entrant or Driver	Address
1	Premier	Webb Jay	Chicago
2	Premier	George A. Weidely	Indianapolis
3	Chalmers-Detroit	William Bolger	Detroit
4	Marmon	H. C. Marmon	Indianapolis
5	Marmon	Frank E. Wing	Boston
6	E-M-F	E-M-F Company	Detroit
7	E-M-F	E-M-F Company	Detroit
8	E-M-F	E-M-F Company	Detroit
9	Maxwell	E. G. Gager	Tarrytown, N. Y.
10	Jewel	C. P. Bernhart	Massillon, O.
11	Pierce-Arrow	F. S. Dey	Buffalo
12	Pierce-Arrow	W. C. Winchester	Buffalo
14	Glide	A. Y. Bartholomew	Peoria, Ill.
15	Thomas	Gus G. Buse	Buffalo
16	Midland	E. O. Hayes	Moline, Ill.
17	Stoddard-Dayton	Dayton Motor Car Co.	Dayton, O.
18	Stoddard-Dayton	Dayton Motor Car Co.	Dayton, O.
19	White	H. N. Searles	Cleveland

FOR THE HOWER TROPHY

No.	Car	Entrant or Driver	Address
100	Moline	C. H. VanDerVoort	East Moline, Ill.
101	Moline	J. A. Wicke	East Moline, Ill.
102	Moline	Sylvester Gregory	East Moline, Ill.
103	Brush	Frank Briscoe	Detroit
104	Brush	Frank Briscoe	Detroit
105	Chalmers-Detroit	J. Machasky	Detroit
106	Hupmobile	F. Stineman	Detroit
107	Maxwell	Charles Goldthwaite	Tarrytown, N. Y.
108	Pierce-Arrow	J. S. Williams	Buffalo
109	Pierce-Arrow	C. Schofield	Buffalo.
110	McIntyre	Frank Goodwin	Auburn, Ind.
111	Stoddard-Dayton	Dayton Motor Car Co.	Dayton, O.
112	Jewel	Jack Shimp	Massillon, O.
114	Mason	F. S. Duenenberg	Des Moines, Ia.
115	Lexington	J. C. Moore	Lexington, Ky.
116	Stoddard-Dayton	Dayton Motor Car Co.	Dayton, O.

FOR THE DETROIT TROPHY

No.	Car	Entrant or Driver	Address
51	American Simplex	Simplex Motor Car Co.	Mishawaka, Ind.
52	Chalmers-Detroit.	Chalmers-Det. Mot. Co.	Detroit.
53	Premier	H. O. Smith	Indianapolis.

NON-CONTESTANTS

No.	Entrant	Car	Address
75	General Service	Rapid Truck,	Pontiac, Mich.
76	"The Automobile" & "Motor Age".	Thomas,	N. Y. & Chicago.
77	77 Diamond Rubber Co.		Akron, O.
78	B. F. Goodrich Co.		Akron, O.
79	Press	Maxwell,	Tarrytown, N.Y.
80	Press	Maxwell,	Detroit, Mich.

OFFICIAL

No.		Car	Address
98	Pilot	E-M-F,	Detroit, Mich.
99	Chairman's Car	Premier,	Ind'apolis, Ind.
97	Pilot	E-M-F,	Detroit, Mich.
96	Secretary and Starter	Acme,	Reading, Pa.

ITINERARY OF THE 1909 A. A. A. TOUR

Date	Route	Miles
July 12	Detroit to Kalamazoo	142.3 miles.
13	Kalamazoo to Chicago	173.3
14	Chicago to Madison	175.2
15	Madison to La Crosse	154.4
16	La Crosse to Minneapolis	177.8
17 & 18	Remain at Minneapolis.	
19	Minneapolis to Mankato	132.0
20	Mankato to Fort Dodge	138.6
21	Fort Dodge to Council Bluffs	181.0
22	Council Bluffs to Kearney	200.2
23	Kearney to Julesburg	206.2
24	Julesburg to Denver	204.8
25 & 26	Remain in Denver.	
27	Denver to Hugo	173.5
28	Hugo to Oakley	165.0
29	Oakley to Salina	199.7
30	Salina to Kansas City	212.8
	Total mileage	2,636.8 miles.

The route is indicated more fully by the following itinerary, giving the principal places passed between the night stops:

Detroit, Ann Arbor, Jackson, Battle Creek, Kalamazoo, Mich.; South Bend, La Porte, Ind.; Chicago, Waukegan, Ill.; Racine, Milwaukee, Madison, La Crosse, Wis.; St. Paul, Minneapolis, Mankato, Minn.; Fort Dodge, Council Bluffs, Iowa; Omaha, Fremont, Grand Island, Kearney, Cozad, North Platte, Neb.; Julesburg, Fort Morgan, Denver, Colorado Springs, Hugo, Col.; Sharon Springs, Oakley, Hays, Salina, Topeka, and Kansas City, Mo.

For the benefit of those who will want to communicate with the tourists a list is supplied telling where to address mail at various places. This is as follows, the date of the tourist's arrival being given first:

Date—Place	Address
July 12—Kalamazoo, Mich.	Burdick House.
" 13—Chicago, Ill.	The Annex.
" 14—Madison, Wis.	Avenue Hotel.
" 15—La Crosse, Wis.	Stoddard Hotel.
" 16—Minneapolis, Minn.	West Hotel.
" 19—Mankato, Minn.	Saulpaugh Hotel.
" 20—Fort Dodge, Iowa	General Delivery.
" 21—Council Bluffs, Iowa.	Grand Hotel.
" 22—Kearney, Neb.	General Delivery.
" 23—Julesburg, Col.	General Delivery.
" 24—Denver, Col.	To be announced later.
" 27—Hugo, Col.	General Delivery.
" 28—Oakley, Kan.	General Delivery.
" 29—Salina, Kan.	General Delivery.
" 30—Kansas City, Mo.	To be announced later.

Express packages should be sent to the hotel when one is given as the mail address. At Fort Dodge, Iowa, express matter should be sent care of the station agent of the Great Western Railroad. At Kearney, Julesburg, Hugo, Oakley, and Salina, anything sent by express may be addressed in care of the Union Pacific station agent.

HOW SLEEPING CARS WILL SERVE AS HOTELS

Every year there has been trouble finding suitable over-night accommodations for the two hundred and odd tired, dirty, and hungry participants of the tour, but this year the problem was a really formidable one, owing to the size of some of the places

Moline Dreadnaught Squadron Which Will Compete for the Hower Trophy

Contestants in the Sixth Annual A. A. A. Reliability Touring Contest Will Traverse Ten States

where it is necessary to call a halt. These details Chairman Hower of the A. A. A. touring board had to wrestle with and settle, and he finally found that the only way possible to run the tour over the chosen route would be to engage sleeping and dining cars, to be side-tracked at the night stops from Fort Dodge to the finish, which will be ten and a half days. The Pullman people would not permit the cars to be summoned and dismissed at will, so that after they are once brought into requisition they will have to be used (or at least paid for) even in the places where hotel accommodations are to be had. The arrangements call for six sleeping cars, three dining cars, and a headquarters car for the officials and their outfit. At Council Bluffs a baggage car will be added for the use of the tire makers who send along supplies. Although the sleeping and dining cars will be used at Council Bluffs, the headquarters will be at the Grand Hotel. The tourists will sleep in the Pullman berths and will get not only their dinner at night and their breakfast in the dining cars, but also will receive each day a lunch put up in a box. Concerning the arrangements for the Pullman cars Chairman Hower has issued a special notice to participants which, in part, reads:

"There has been some difficulty in making arrangements with the Pullman people, but through the efforts of F. C. Donald, commissioner of the Central Passenger Association, we have been successful in completing what promises to be very satisfactory arrangements. For the ten-and-one-half days the contestants will rely on the Pullman service, there will be a charge per day of $7.45 for each person, making a total of $78.23 for each person for the entire number of days. This charge includes breakfast, lunch, dinner, and lodging. Qpite naturally it was necessary for us, in completing these arrangements, to agree to pay the Pullman company the entire amount prior to the start, as they must complete their negotiations for the entire trip."

This price, it is estimated, is not more than it usually has cost the tourists per day, all told, when they stopped at the big hotels.

The Pontchartrain hotel, where Chairman Hower is now located, is the headquarters at Detroit.

DETROIT WILL SUPPLY GRAND SEND-OFF

Detroit, July 6—Visitors to Detroit during "Glidden tour days" will be afforded an impressive object lesson on the hold the automobile has taken on local enthusiasts. One week before the actual opening of the festivities in connection with the A. A. A. tour, nearly one thousand automobiles had been entered in the big parade for Saturday July 10, which it is planned to make the crowning event of the occasion. It is expected that when the lists have been completed, this number will have been exceeded, and that the greatest spectacle in the history of the industry will result. More than $700 worth of valuable trophies will be awarded the best decorated cars in each division, there being eight prizes in all. These are:

The most beautiful car in the parade, any description.
The best decorated car driven by a lady.
Best decorated electric car and second best.
Best decorated gasoline or steam car and second best.
Best decorated commercial vehicle and second best.
First, second and third best decorated motorcycles.

In addition, several hundred dollars will be distributed in prizes to contestants in the athletic events taking place at Belle Isle at the conclusion of the parade. The parade will start on North Grand Boulevard, at 1:30 Saturday afternoon, the route being through the center of the city to Jefferson avenue and east to Belle Isle, where a panoramic picture of the procession will be taken. Following this will be the inter-factory athletic con-

Possibly the most enjoyable feature of the "Glidden tour day's" entertainment (inasmuch as it will take the guests away from shop talk and familiar scenes and give them a new conception of the advantages enjoyed b ythe hub of the automobile industry will be the boat ride to be tendered tourists and others on Sunday on the steamer *City of Cleveland*. The boat will leave the city at noon, running down to Lake Erie, turning about and going up past the city and across Lake St. Clair to the St. Clair Flats, the Venice of America, returning to Detroit early in the evening, so that the tourists will be able to

The festivities will open with a banquet Friday evening at the Hotel Pontchartrain, to tourists, A. A. A. officials, and visiting newspaper men, at which it is promised that something more than good feelings will be uncorked. The committee in charge

Indications are that Detroit will be invaded by the most representative body of automobile men it has ever had the honor of entertaining. All the accommodations planned for have been taken, and there are still many to be heard from. The following program has been arranged for the entertainment of the visiting tourists:

Friday Evening, July 9—7:30, Hotel Pontchartrain, banquet to the A. A. A. officials and directors.

Saturday, July 10—From 9 to 12 a. m., automobile manufacturers receptions at the factories.
From 1 to 3 p. m., street parade of decorated automobiles.
From 3 to 4:30 p. m., ball games and athletic sports at Belle Isle Athletic Grounds.
4:30 p. m., entertainment to the Executive Board of the A. A. A. by the Automobile Club of Detroit.
7:30 to 9:30 p. m., band concern on the campus in front of the City Hall.

Sunday, July 11—12 to 5:30 p. m., river excursion on the palace steamer, City of Cleveland, up the Detroit River, through Lake St. Clair and the Flats. Lunch served on board from 12:30to 2:30.
Sunday evening, rest.

Monday, July 12—Tour starts with demonstration, bands, military salutes, etc.

A. Y. Bartholomew in the Glide Entry, No. 14

ONE MAN'S OPINION OF THE TOUR

By H. O. Smith, Chairman A. M. C. M. A.

With more than forty cars entered in the Glidden tour, America's automobile touring classic, it is evident that this great annual event, which means so much to the industry at large, is more popular than ever. Vague and unfounded rumors have tried to impress upon the public that the Glidden tour was not wanted by the manufacturers and the automobile purchasing public. The large list of entries fully demonstrates that the makers thoroughly believe in this great event.

It is my desire to see this year the best Glidden that has ever been held. There is no question in the minds of those who have closely followed this tour that it has done more for the automobile industry than any racing or touring event which has ever been held in America.

The Glidden has worked wonders for the industry and pastime. It has shown the makers the good and bad points in their cars. It has given the makers the opportunity to try out the cars and locate the strong and weak points with the view of perfecting them. One may say that the maker can take his car on the road, put it through all kinds of stunts, climb steep hills, make it wallow through deep sand and over bad roads, and learn just what the car is capable of doing. To a certain extent this is true, but running under schedule and strict regulations means more to the maker than could be learned in private tests.

I know of many concerns that have entered the Glidden with what they supposed was a perfect car, and when the tour was finished opened their eyes in wonderment at little things which were supposed to be strong details but turned out to be weak. I have in mind one concern that had widely advertised the superiority of their braking system, and thoroughly believed that the brakes were right, but in going over a section of hilly country in the tour two years ago, every member of the crew was standing on the running boards ready to jump if the brakes gave way. To-day this concern is making good brakes, and brakes that would hold the car on the roof of a house. There are many other similar lessons to be drawn from the Glidden.

The buying public demand the Glidden, and watch with keen interest the result and the progress of the cars during the event. They feel safe in buying a car that goes through the tour with a perfect score, or even with a good showing.

It is interesting to compare the list of entries in this year's event. For the first time in its history a buggy type car has been entered in the McIntyre. This little car will be closely watched by those interested in this type. Interest will also center on the wonderful little \$500 Brush with one cylinder. Other cars which will be the cynosure of all are the Marmon. Premier, Maxwell, Glide, Midland, Stoddard-Dayton, Moline, American Simplex, Rapid Truck, and others.

The McIntyre is a High Wheel Entry from Indiana

HOW MINNEAPOLIS WILL ENTERTAIN

Minneapolis, July 6—The citizens of Minneapolis, headed by the Minneapolis Automobile Club, have raised a fund of several thousand dollars and appointed a committee of entertainment. headed by Col. F. M. Joyce, president of the State Association, to give the tourists a large time. It will astonish some Eastern motorists to learn that the Minnesota A. A. A. is now the second largest State organization in the country.

One of the features illustrative of the thoroughness with which details are being executed is found in the fact that the club has ordered 400 gold and enamel cap badges, one to be presented to each of the participants in the tour and is also having printed a beautiful souvenir book of views of Minneapolis for distribution, each book properly addressed and stamped ready for mailing to home of each recipient, after its inspection. The program will be as follows:

Friday, July 16—Reception of tourists and escort to hotels.

Saturday, July 17—Forenoon: Trip in chartered trolley cars to Minnehaha Falls and Fort Snelling, where a special dress parade and guard mount will be held.
Afternoon: Special train for Savage, Minn., where a special matinee race will be held between Dan Patch and Minor Heir, the two fastest horses in the world, at the home of these champions, the International Stock Food Farm.
Evening, 8 p. m.: Illuminated automobile parade for the visitors through the city and over the parkways and boulevards. Governor Johnson, Charles J. Glidden and Frank B. Hower will act as judges to award the prizes to the contestants in the parade.

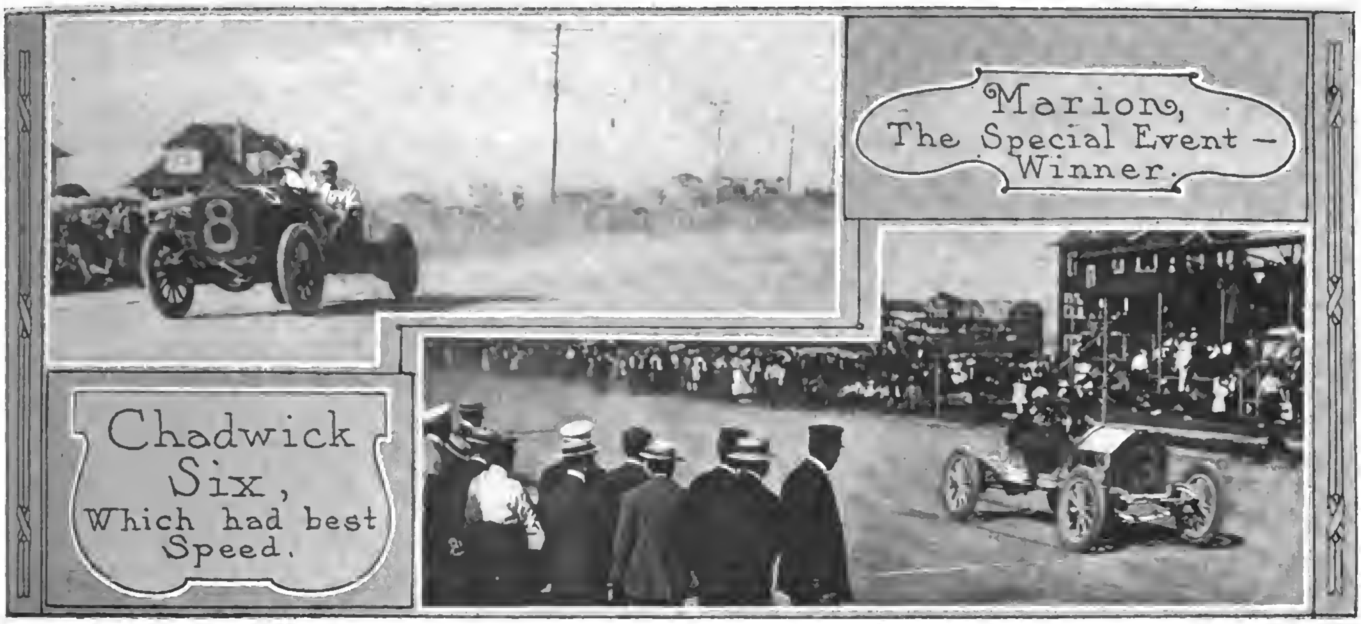
Sunday, July 18—9 a. m.: Automobile trip to Lake Minnetonka.
10 a. m.: Cruise around upper and lower lakes in chartered steamers.
1 p. m.: Dinner at Tonka Bay Hotel.
2 p. m.: Automobile trip through the country near Lake Minnetonka.
4 p. m.: Automobile Country Club, where buffet lunch will be served and a band concert by the Fort Snelling band enjoyed.

Monday, July 19—Escort by club members of the tourists on the road to Mankato.

PIERCEITES ARE FROM VARIOUS CITIES

Buffalo, July 6—Although the Pierce-Arrow Motor Car Company, of Buffalo, never has maintained a team of professional drivers for contests it has been uniformly successful in endurance runs. It would be hard to find a group of men with more widely segregated homes, in fact, than the eight who will have the Pierce-Arrows in charge in the Glidden tour this year. No two of them come from the same city. Some have had experience in A. A. A. tours before, others have not, but all are thoroughly impregnated with enthusiasm for the contest.

Two six-cylinder, 48-horsepower Pierce-Arrow touring cars will compete for the Glidden trophy. Forbes S. Dey, of Kansas City, will drive one, with E. M. Grady, of Denver, as his mechanic; while Walter F. Winchester, of Buffalo, will pilot the other, with A. A. Ledermann, of Utica, as mechanic. For the Hower trophy, two six-cylinder, 36-horsepower runabouts have been entered, the first to be driven by John S. Williams, of New York, with Andrew J. Hettrick, of Philadelphia, as mechanic. Charles Schofield, of Detroit, will be at the wheel of the second runabout and Frank Jungjohann, of Davenport, Iowa, will be in the mechanic's seat.



CHADWICK SETS NEW RECORD IN WILDWOOD MEET

WILDWOOD, N. J., July 5—Independence Day was fittingly celebrated at this resort to-day in its most successful automobile carnival. Not only were there well entered handicap events, a large attendance, and a well policed course, but there was also that charm of an automobile race meet—breaking of fast records. To the Great Chadwick Six stock car, driven by Len Zengle, belongs the honor of the day in clipping more than a good second from the best previous time over a mile straightaway on Central avenue. In a special event, the climax of a series of good ones, this car flew down the gravel course in 41 seconds, a speed of 87.8 miles per hour, and well within the time set last year by Schill, of :42 3-5.

There were eight regularly scheduled contests for the afternoon, but these were increased by the fullness of the field and the consequent necessity of running heats. Then in the special time trials each of the six machines were given two attempts, and so the enthusiasm of the 10,000 people who lined the course was kept at a high pitch. Under the direction of Fred J. Wagner the cars were started, and the arrangements for the meet were so well handled that there were no tiresome intermissions, there was no friction between the participants, and the event has well been called the most successful ever held here.

A very important feature of the contest was that the machines were all of the stock class, many stripped of course, but there were no special racers, and the popular interest seemed to be increased thereby. The Chadwick and the two Knox cars were the victors in practically every event, but they had some speedy runners-up, and there were no walk-overs. Of the dozen times that the cars covered the distance in competition, the Knox team won five, the Chadwick three, the Marion two, an Allen-Kingston one, and one was a tie between a Knox and the Marion. Many trips were made in less than the minute, and it was sometimes necessary for the drivers to shut off their power before finishing even then. The track was in splendid condition and the finishing end had been improved so that there was less danger in stopping. Handicapping was carried out by price, there being a second for each $200 difference, and the contestants were started off with the time allowance so that the finishes were true. This method may not always be as satisfactory or accurate as piston displacement ratings, but it furnishes good sport, and that was the chief aim to-day.

The police of the island were ably assisted by the Ninth company of the Boys' Brigade of Philadelphia, who were in their khaki uniforms and carried regulation rifles. They kept the crowds back as well as the most efficient regular infantry. The referee was W. Clive Crosby, and the judges were H. U. Sharpe, H. A. Bonnell, and C. A. Woolson. The summary:

TIME TRIALS OVER THE ONE-MILE COURSE, TWO TRIALS TO EACH ENTRANT

Pos.	Car	H.P.	Driver	Time
1	Chadwick	60	Len Zengle	:44 :48 4-5
2	Allen-Kingston	48	Hugh Hughes	:49 :50
3	Knox	48	Al. Dennison	:49 1:06
4	Knox	38	W. A. Bourque	:52 :53
5	Marion	32-35	Charles Stutz	1:01 8-5 1:04
6	Knox	38	J. V. W. Westervelt	1:06 1:07

SPECIAL TRIAL FOR TRACK RECORD

1	Chadwick	60	Len Zengle	:41
	Best previous time			:42 3-5

KILOMETER TRIALS

1	Chadwick	60	Len Zengle	:26
2	Knox	48	Al. Dennison	:28
3	Knox	38	W. A. Bourque	:31 1-5
4	Buick	30	E. Wilkie	:32
5	Marion	32-35	Charles Stutz	:37

FREE-FOR-ALL

1	Chadwick	60	Len Zengle	:48 2-5
2	Knox	48	Al. Dennison	
3	Knox	38	W. A. Bourque	

GASOLINE CARS, HANDICAPPED ACCORDING TO REPUTATION OF CAR AND DRIVER

1	Marion	32-35	Charles Stutz	1:11 2-5
2	Knox	48	Al. Dennison	1:16 1-5
3	Knox	38	W. A. Bourque	1:16 2-5

HANDICAP, GASOLINE CARS, ONE SECOND FOR EACH $200 IN VALUE

1	Knox	48	Al. Dennison	1:08
2	Atlas		Elmer Knox	
3	Marion	32-35	Charles Stutz	

HANDICAP, GASOLINE CARS COSTING FROM $850 TO $2,000; ONE SECOND FOR EACH $200 IN VALUE

1	Marion	32-35	Charles Stutz	1:14 2-5
2	Buick	30	E. Wilkie	
3	Overland	28	George L. Ries	
4	Mitchell	30	W. M. Cram	

HANDICAP, GASOLINE CARS COSTING FROM $2,000 TO $3,000; ONE SECOND FOR EACH $200 IN VALUE

1	Knox	38	W. A. Bourque	1:00 1-8
2	Chalmers-Detroit	40	C. J. Rodgers	
3	Knox	38	J. V. W. Westervelt	

HANDICAP, GASOLINE CARS COSTING FROM $3,000 TO $4,000; ONE SECOND FOR EACH $200 IN VALUE

1	Allen-Kingston	48	Hugh Hughes	:58
2	Knox	48	Al. Dennison	

INDIANAPOLIS SPEEDWAY GETS ITS FIRST SANCTION

INDIANAPOLIS, Ind., July 5—After many months of preparation the Indianapolis speedway has been so nearly completed that the director of contests, E. A. Moross, has secured a sanction from the Americal Automobile Association for the first race meet. On August 19, 20, and 21 the circuit will be the scene of the fastest races ever held in this country, and ones which will compare favorably with those on the Brooklands track in England.

According to the plans already outlined, the first day will be given over to events for the big cars at short distances, a sort of warming-up process, with record trials from one to ten miles. These will be followed by a long distance event, 250 miles, for the most valuable trophy ever given to cars whose cylinder displacement is between 230 and 300 cubic inches. The second day will have as a feature a contest of 300 miles, for cars measuring between 301 and 450 cubic inches displacement, for the Prest-O-Lite trophy. There will also be semi-final heats of the first day's free-for-all contests. As a climax the third day. Saturday, will see the finals for the free-for-all racing machines, a free-for-all handicap, and a great classic for which Wheeler & Schebler have donated a $7,500 trophy. The race will be 350 miles long, and for cars whose cylinder capacity is from 451 to 600 cubic inches, including all of the famous racers in this country or Europe.

Mr. Moross has been assured of entries from many quarters, some of which will be a surprise to the automobile industry. Such, for instance, is the statement by Henry Ford that he will rebuild his six-cylinder "999," and that it will be driven by Frank Kulick. Those makers who have been entering the recent important contests will undoubtedly be present. The trophies and prizes for this series will be the most expensive given for such an event, the value being about $10,000.

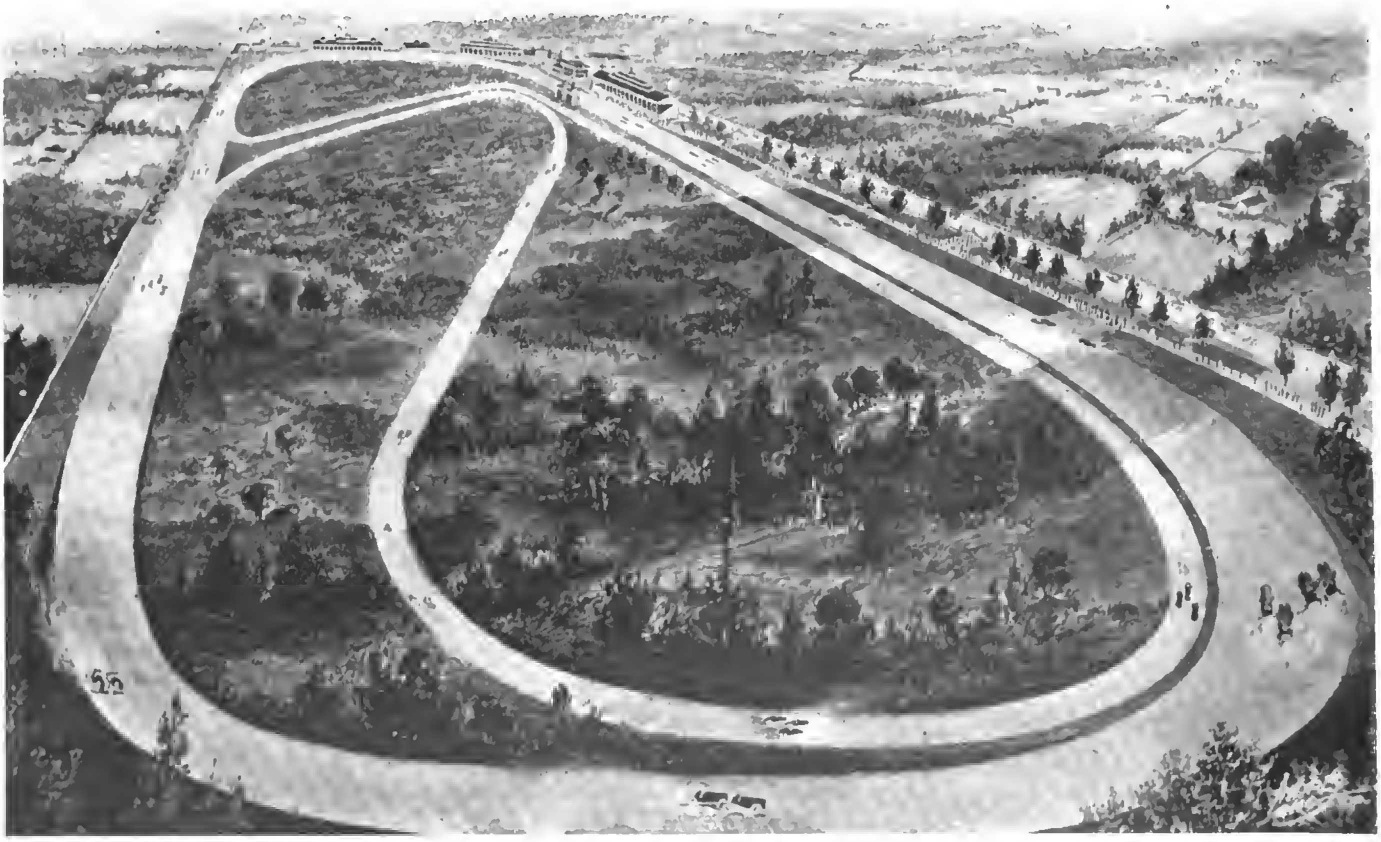
The big track is nearly finished. The top layer of gravel is now upon the straight stretches, and a concrete mixer has been requisitioned to mix the gravel and oil which will be rolled as the final dressing. The main grand stand and the smaller private ones are having their roofs made and will soon be completed. The pits are being constructed at present and there seems to be nothing that could be thought of left undone.

COLUMBUS HAS FAST TRACK MEET

COLUMBUS, O., July 3—Featured by a race of 100 miles, in which the world's record was very nearly broken, two days of automobile racing were conducted by the Columbus Automobile Club yesterday and to-day. The scene of the meeting was the local driving park, a one-mile circular track, which was in fine condition, and some very fast work was done by the professionals. In the big contest there were five starters: Lorimer and Cannon in Chalmers-Detroits, and Burman, Strang and De Witt in Buicks. Burman and Strang were the only finishers, and the time for the former was 1:44.

Perhaps the most interesting short events of the meet were the 25 miles, free-for-all, and 10 miles for the city championship. The former was won handily by Lorimer in a Chalmers-Detroit *Bluebird,* in :26 2-5, with Burman second. Barney Oldfield had his new National in this event, but had to stop because of tire trouble. In the city championship class only residents of this city and vicinity were eligible, and the race was won by a Packard, driven by Lawrence Kelly, in 11:21, with George Schlereth second, in a Pope-Hartford. There were no serious accidents.

Barney Oldfield tried to take a fall out of De Palma's one-mile record, and of Chevrolet's at five miles. His time in his new National was 4:43 1-5, which is 2 1-5 seconds more than the five-mile record, and his best mile was the last, 54 seconds, three more than the mark held by De Palma.



Bird's Eye View of the Indianapolis Motor Speedway Which Will Be Completed July 15, and Formally Opened August 19-21

With the Wrights at Fort Myer

Wilbur Wright on left and C. Taylor, their Mechanic, watching Orville Wright in flight

WASHINGTON, D. C., July 3—During the week of June 28-July 3, Orville Wright gave three successful demonstrations at Fort Myer, preliminary tuning up flights in preparation for the tests which the machine will have to pass before being accepted for the Signal Corps for the Government.

The first few attempts were failures, inasmuch as the aeroplane barely succeeded in getting off the track, and in remaining in the air but a few seconds of time, coming to earth in five different trials within short distances of the end of the starting rail. In none of these trials did the time in the air exceed thirty seconds, nor the distance three hundred yards.

Orville and Wilbur had different ideas about the cause of the trouble, Orville claiming lack of power, and Wilbur improper distribution of weight. With each successive flight, more and more power was obtained from the engine by alteration of the position of the spark and amount of gasoline feeding to the intake pipe. The Wright engine uses no carbureter, but takes gasoline directly into the intake pipe for vaporization there. Inasmuch as the minimum speed is thirty miles, and the maximum but little over forty, the Wrights believe that speed regulation, if dependent on a carbureter, would be obtained at too great a cost of unreliability and carbureter troubles.

The first successful flight came Wednesday evening, when the machine got up in the air and flew. It lacked both the lightness and ease it had last year, and appeared to labor, an impression doubtless conveyed by the steep angle which the planes had with the air. The speed, as a result of this angle—or, perhaps it is better to say, the low speed which caused this angle—was not more than 32 or 33 miles an hour during the Wednesday flights.

Thursday a short flight showed some improvement, and Friday saw the machine flying as the last year's model did—lightly, easily, with no wavering or hesitation in the air, and climbing at once and with apparent ease to an elevation of 75 feet, which was always the favorite height for Orville's flights.

Disastrous Ending to First Good Flight—The most successful flight, however, was to end in disaster. In the ninth round of the second flight of July 2 the engine either stopped in the air from an unknown cause, or was stopped by Orville in an endeavor to imitate his brother's spectacular feats in France, when, at heights of over a hundred feet, he would stop his motor and glide safely to earth. The doubt in the case is a contradiction in statements. Immediately after this glide to earth, Orville said the engine had stopped, a statement colored favorably by the fact that it had been missing almost continuously during the flights. Wilbur, on the contrary, said that Orville had stopped the engine on purpose. However that may be, at a spot almost over that on which the fatal fall of 1908 occurred, the engine stopped, the propellers ceased to revolve, and the machine made a beautiful glide to earth.

Unfortunately, Orville mistook a tree, some six or eight feet high—scarcely more than a bush—for a low clump of weeds. Too late he saw what it was on which he was to land, and too late tried to avoid it. It was struck by the extreme edge of the lower right hand plane, which was punctured by it. The tree immediately became a pivot, and the machine a compass. The forward motion was translated to movement in the arc of a circle which literally scraped the skids or landing runners from the machine. Had it not been for the tree, the glide down with motor stopped would undoubtedly have been successful. Orville said that, so far from being injured, he did not even feel the jar of the fall. As nearly as could be estimated, the glide down began at a height of 75 feet and carried him 500 feet, or at an angle of about one in seven. If Orville had any nervousness from his experience of last year it must have been dispelled from the way in which the machine behaved in thus becoming a glider. The glide down was upon an absolutely even keel and seemed under full control of the operator.

During the preliminaries and the performances of these different flights a feature of considerable interest that disclosed itself was the utter ignorance of the average person concerning even the most elementary principles of aerial navigation. Despite all that has been said and written on the subject, and the numerous successful flights that have been made, not one man in a thousand seems able to express a well-informed opinion on aeronautical prospects, or to impart a clear idea of aeroplane mechanism to friends. Even among the trained newspaper men frequent amusement would be afforded by the vagaries of an occasional rustic newsgatherer, who would insist upon interrupting efforts to give real information from the close-mouthed but good-natured Wright brothers with fool questions concerning the obvious—"Is that tall thing really the radiator, Mr. Wright?" or by dissertations on their positive understanding that the engine was formerly a two-cycle, or that, "anyway, last year a two-cycle motor was surely used."

Lack of General Information Very Apparent—General information on the subject of modern aeronautics having thus lagged so far behind actual accomplishment, a few words concerning the more fundamental principles involved can hardly be amiss, even though they be given at the risk of boring such readers as are no longer in the A B C class.

The design of the Wright aeroplane, in common with those of all others of their general type, such as the Farman, Voisin, Antoinette, Bleriot, Curtiss, etc., is fundamentally based on the very simple principle that inclined surfaces, moved rapidly through the air in an approximately horizontal direction, receive considerable support from the deflected streams of air that their angular placing causes to be forced down under them. Even with flat surfaces considerable lifts can be obtained, but with properly curved surfaces, approximating the form of the soaring bird's wing, sustensions of from two to five pounds per square foot of surface are readily to be had at speeds not in excess of 40 miles an hour.

The speed required for the requisite lifting effect demands that a flying machine of the aeroplane type be run on the ground at its slowest flying speed before it can begin to lift. In the case of the Wright machine, this initial impulse is given by towing the vehicle along at a rapidly accelerating rate, by the pull of a cable attached by a simple pulley system to a heavy, trigger-released weight that is dropped in a small "starting tower." Once in the air the horizontal travel is maintained by the thrust of two oppositely-rotating, two-bladed wooden propellers, which are said to develop a thrust of 80 pounds apiece, and which are driven by roller chain transmission from an ordinary water-cooled, four-cylinder, 30 hp gasoline engine, weighing about seven pounds to the horsepower.

Problem of Equilibrium a More Difficult One—The matters of sustention and propulsion taken care of, the considerably more complex and difficult problems of maintaining equilibrium remain to be considered. These problems reduce themselves primarily to questions of lateral and of longitudinal equilibrium. In the Wright machine, the lateral equilibrium is controlled by a single lever by the manipulation of which the wing extremities can be "warped"—that is, twisted up on one side and down on the other, or vice versa.

Steering as well as side balancing is accomplished through the wing warping, but since the wing extremities of steepest angle receive the greatest resistance as well as affording greatest lift, they tend to lag back instead of going faster, as is necessary in turning. Therefore, not primarily to steer, but simply to resist this tendency, a rear "rudder" is provided. In the Wright machine at Fort Myer this is controlled by a third lever, but in the machine used by Wilbur Wright abroad it is operated by the wing-warping lever, which is given a compound movement that it may serve the double purpose.

Obviously, the natural and most simple type of sustaining surface is the monosurface of the bird, but the difficulty of making this strong enough without exceeding the weight limit in a man-made contrivance causes the bi-plane to present a marked advantage, which is that it lends itself perfectly to a very strong and light, bridge-like, truss construction. And, with the superimposed surfaces separated a distance bearing a proper relation to the width of the surfaces, the action of one in reducing the lifting of the other is present to an immaterial extent.

This Machine Very Different from Its Prototypes—The present machine at Fort Myer has the same motor that was used last year, but otherwise is entirely new, and differs from its predecessors in a number of essential particulars. Instead of 40x6½ ft., for example, the main surfaces are now about 36x6 ft., with other dimensions reduced in proportion. One result of this change is a reduction in total area from some 580 ft. to about 490 ft., requiring, since the reduced machine has been increased in strength by not being lightened in weight, a lifting effect of 22-5 lbs. against the 2 lbs. per sq. ft. of the previous model. This, in turn, requires from two to three miles an hour more speed for a given sustention, but does not call for quite a proportionate increase in power, because the head and aerodynamic resistances are lessened by the smaller sizes. Nevertheless, in the first of the present trials certain differences were very evident to the close observer. First, there was the inability to get into the air at all at a flying speed until the motor was speeded up and the starting rail lengthened, despite attempts to secure results through a redistribution of weight.

From the action of the aeroplane during these preliminary flights, when it seemed to rear up in the air and thus diminish its speed before it was fairly launched, Wilbur got the idea that the forward planes were too light.

The Trouble Is Found and Remedied—Further attempts were made with less weight, and the machine behaved very much as before. Finally, Orville discovered that much of his trouble was due to a defective sparking mechanism, which allowed the spark to jar back almost to zero in flight, of course thus greatly diminishing the power of the engine. Further attempts proved him right, as the next day, with spark adjusted, the engine developed enough power to make a successful flight.

In the first flights that were made the machine, besides progressing at an unduly uptilted angle, seemed to lack the lightness and speed of its larger prototypes, and flew "as though it burdened the air," as one observer put it, and seemed barely able to stay up. In coming down the brunt of the contact with the ground is taken by the runner-like alighting gear. This feature of the machine also has undergone modification, the runners being now much higher than before, so as to reduce the chances of injury to the lower wing surfaces from the machine careening over in landing.

Particularly impressive are the landings, which seem quite without measurable hazard, even to the most critical. Approaching the ground at a very flat angle, the first evidence of the machine's closeness to it is the dust blown up by the propellers. Then as the runners make contact, almost as lightly as feathers, and the power is shut off, the machine quickly is retarded to a stop by the braking effect of the runners.

Difference in Flight of Two Machines Very Noticeable—Last year the invariable comment of every one who saw the machine was, "How easily it flies." Those who knew an aeroplane from an ice wagon were wont to remark upon the flatness of the angle of the planes when in the air. The difference was thus greatly marked when, in this year's flights, the machine barely dragged itself aloft and stayed there with effort.

Immediately after the unfortunate accident at the end of the glide, Orville said: "I am sorry it had to occur now, because it means delay just when the engine and the aeroplane were getting right." This is true, since the last flight before the accident showed that no mistake had been made in altering the dimensions of last year's successful machine, and that it was getting thoroughly tuned up ready to make the tests.

These tests are exhaustive and stringent. The first is a speed test. After some cogitation and exploration, the Wright brothers selected the so-called Alexandria, Va., course for this trial. The machine will get in the air, get up speed, and cross a line on the parade ground, fly five miles over rough and open country to Alexandria, Va., where it will round a small balloon and return to the fort. Time will be allowed for the turn and counted only on the straightaway, the idea being to determine the speed at which the machine flies. The price paid will depend on this speed. For 40 miles an hour the Wrights will receive the tidy sum of $25,000 for the aeroplane. For every mile in excess of this speed, up to and including 44 miles an hour they will receive 10 per cent of this amount additional. For every mile less than this amount per hour, 10 per cent of $25,000 will be deducted from the purchase price, down to and including 36 miles per hour. Less than this speed will not be accepted by the Signal Board.

The speed test must be made with a passenger on board and enough gasoline at the start to carry the machine 125 miles.

The second test is an endurance test, and must be made also with a passenger and gasoline for 125 miles. During this test the aeroplane must remain continuously for one hour in the air, during which time it must be demonstrated to be under full control, and make such evolutions in the air, right and left turns, etc., as show this to be a fact.

Further than this, the Wrights must instruct two officers in the art of aeroplane manipulation until they can fly successfully.

The lieutenants who will receive instructions are Lieut. Frank P. Lahm, in charge of the aeronautical corps, and Lieut. Benjamin D. Foulois, of that branch of the service. Lieut. Lahm is an experienced balloonist, and was the first man in America to be a Wright passenger. Lieut. Foluois is inexperienced in any but dirigible work, but an expert there.

Functions and Frailties of Motor Cylinders

By Thos. J. Fay

CORE is the name of the part of a mould, as used in a foundry, by means of which the shape of the interior of a cylinder, or other form of castings, are made. Cores are made separate from the rest of the moulds, and inserted in them at the proper time; in "coring up" in a foundry, the cores are carefully placed in position, ready for the casting process; unless the cores are rightly set the result will be as shown in Fig. 5, and the walls of cylinder will be of varying thickness, due to misplaced core, which may follow bad centering or shifting during the process of "ramming."

If cores are not provided with adequate bearing, the result may be as shown in Fig. 6, resulting in a thin dome of the cylinder, and since the greatest pressure comes on the dome it is almost sure to fail in service. Accuracy of core making depends upon accuracy of the previous core-box work, and cylinder patterns that match up. Frequently in foundries that are accustomed to the demands of cylinder casting, which is far more exacting than in the ordinary run of work, defects come from inferior patterns; which defects may be due to lack of skill on the part of the pattern maker, or lack of good material in the pattern. True, a good pattern will last but a short time in the hands of foundrymen who fail to appreciate the delicacy of the task, and who throw the patterns around as if they were of almost no importance at all.

Selected grades of seasoned Mexican mahogany will serve very well for patterns, and the cost of the material is not high enough to warrant the use of inferior wood. Since cylinders are required in quantity, and the patterns are, as a rule, in continuous use, core boxes, of pattern pine, of the first grade, may serve extremely well, especially as they are not nearly so delicate as patterns, but, as before stated, it is of the greatest importance to have the cores and the patterns match up. In actual practice there is no better plan than to take the first cylinder, after a good looking one is run off, and saw it into quarters, in the longitudinal plane, and through the valve chambers, in the same way, after which it will be possible to measure the thicknesses of walls, although, as a rule, the eye will detect differences, at sight, after the cylinders are sawed in twain.

If the walls are not of substantially the same thickness at all points, it will be well to ascertain the reason, and if it is found that the cores are not central in the pattern, as fixed by core boxes, there is nothing remaining but to make the necessary adjustments. If the core prints are without sufficient bearing, or if they shift in the process of ramming, the corrective measures should be applied, and account should be taken of the thinness of walls used in cylinders; the factor of safety being barely sufficient if the walls in castings are as in drawings, which makes little or no allowance for defects in the foundry.

Neat Match at Parting Line—In view of the difficulty in reaching the inner surfaces of cylinders in the region of the valves, it is important to have the parting line come with a neat match. As a rule the parting comes at the top, in the bore, and unless the match is neat the seam, as shown in Fig. 7, will show around the bore, and pass along the walls of the ports, just at a point where it will be difficult, or impossible, to machine away the protruding metal. Fins are very prone to heat to a point above the temperature of the rest of the material and pre-ignition will follow, especially if the compression is fairly high in the cylinders, or provided the cooling is inferior during operation.

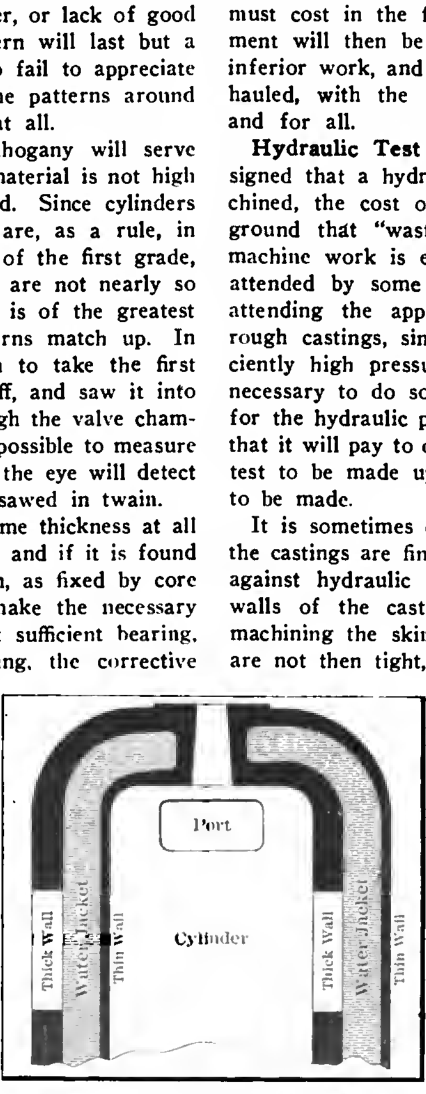


Fig. 5—Misplaced core, resulting in thin cylinder walls

The outline which separates the parts of a mould will only be neat if the foundryman is skilled—assuming patterns and core boxes do not warp—even when the pattern work is of a character above fair criticism, and while this is not a matter of great importance in ordinary casting work, it takes on extraordinary proportions in the process of casting cylinders, for the very reason that pre-ignition will follow if partings do not match, since the resulting fins cannot be removed if the space is restricted, and tools cannot be made to reach the line of parting at all points, which is usually the condition that obtains in cylinder castings. When castings are received at the plant where they are to be machined, it is a good practice to have them inspected at once, and if the workmanship is inferior a good inspector will be able to judge of the fact; to promptly advise the foundry of the condition obtaining is equal to saving must cost in the finishing process, since the foundry management will then be in a position to restrict the percentage of inferior work, and if conditions warrant patterns may be overhauled, with the expectation of correcting the defects, once and for all.

Hydraulic Test Should Be Made—If cylinders are so designed that a hydraulic test can be made before they are machined, the cost of finished product will be reduced, on the ground that "wasters" will fall by the wayside before any machine work is expended on them. This is a detail that is attended by some resistance, as a rule, due to the difficulty attending the application of hydraulic testing equipment to rough castings, since joints will only be tight against a sufficiently high pressure if they are well made. Generally it is necessary to do some facing off in order to make the flanges for the hydraulic piping as tight a fit as the occasion requires; that it will pay to do the necessary work to enable the hydraulic test to be made upon receipt of castings is one of the points to be made.

It is sometimes claimed that the test cannot be made before the castings are finished, on the ground that they may be tight against hydraulic pressure when the "skin" is on the inner walls of the castings; this is probably not true, for after machining the skin is on the outer wall, and if the cylinders are not then tight, it is proof of lack of virtue of the "skin." The average foundryman depreciates all attempts at testing that are made with a pressure above 50 to 60 lbs. per sq. in.; that this pressure is adequate for the purpose is highly improbable, and that 500 lbs. per sq. in., hydraulic pressure, will develop every defect is one of the matters that can be taken for granted.

For the purpose of making tests, by hydraulic means, high-pressure equipment, adapted for testing steam boilers, serves, and the cost of the pump and gauges, as well as tight-joint fittings, is so low as not to be a factor: less than $100 will cover the whole item of cost. Ammonia fittings, in which a system of packing is used, work very well for the purpose, and

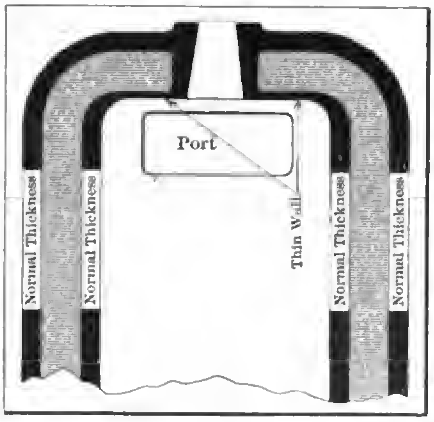


Fig. 6—Displaced core, resulting in thin dome of the combustion chamber

they have the virtue of being quickly taken apart; they can also be tightened under pressure, and to draw them up until they are tight is a very simple matter that can be intrusted to a workman of no great skill. In the absence of good and tight fittings it is impossible to make a satisfactory test, since the pressure will fall down within a few seconds of time. In testing cylinders, if they do not shoot a "geyser" at 100 pounds per square inch pressure, they will serve very well, even if a little fine spray does develop at the higher range of pressures; if the pressure is left on for a time, provided the spray does not advance to the dignity of a stream, there will be no advantage in continuing the test. That a second "inspection" test should be made on the finished cylinders is one of the matters that would seem to fall within the pale of good practice, particularly in view of the importance of cylinders in motors, and the labor item involved in changing them if they show defects in service.

Defects That Do Not Always Develop—Slag, which is the dross or recrement from metal, while it is cleared from the top of the molten mass in the cupola, for the most part will betimes entrain, and when it settles in the section of the casting the defect may be deep enough as not to uncover. Cinder, which comes from a cinder bed, if the same is used in the process of venting will, at the behest of a workman of careless proclivities, settle in the casting and may come to the surface in the process of machining, as shown in Fig. 8, so that slag and cinder, whether they uncover or not, will weaken the metal in proportion as they are present; slag, especially, is likely to abound, and in the castings that carry this increment, the strength is much reduced, thus rendering the same unfit for cylinder castings. If slag or cinder pockets uncover, the bore of the cylinder, in such a case, will show the defect, although it may not be fatal; this is a matter that has to be treated by makers of cars when they decide on the quality of the product they propose to deliver to patrons; some makers will prefer to ignore the presence of surface blemishes, if they do not come in a vital spot in the castings.

Shrinkage Defects Are Prone to Creep In—If a bunch of metal is allowed to accumulate at a point in the section of an otherwise symmetrical wall, shrinkage will follow, as a matter of course, and a shrink hole will appear in the section. Shrinkage represents the dimension lost by contraction in metal while cooling; the zone of slower cooling will hold the defect; the section of greatest dimensions will be defective under the circumstances. The sprue, which is the hole through which metal is teemed into the gate of the mould, is usually made to include a "waste piece," to which the sullage will float, and metal will draw from this excess to render the casting solid. In this is an illustration of the point to be made, and in Fig. 9 a boss is shown, the section of which is so great, relative to the main section, that a shrink hole becomes a normal expectation. In the same way a shrink hole will be found in the "lug" that projects like an ear from the bottom flanging, to take the holding-down bolts of the cylinders; if this lug is massive it will have a shrink hole in its section, as depicted in Fig. 10, and the strength of the lug will be reduced very much.

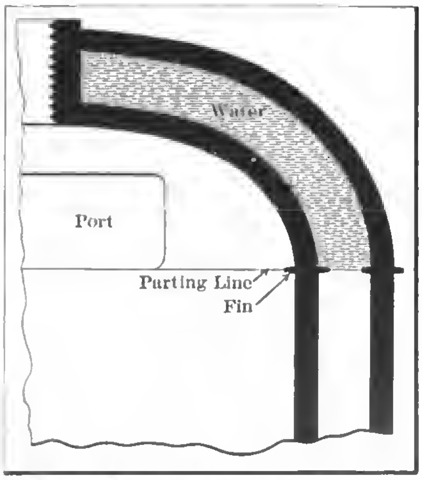


Fig. 7—Fin, at parting line, the product of warped patterns or inferior moulding

As another example of shrink holes, due to the use of fillet work, that is wholly unnecessary, in that the radius of the fillets does not have to be so great, Fig. 11 is offered, in which it will be observed that the shrink hole comes at the junction of the water jacket with the cylinder. This is bad enough, but it is no whit of the difficulty that follows when the shrink hole comes in the junctions of walls of the valve ports, thus offering opportunity for the combustion pressure to leak through into the water jacket, and for water to flood the cylinder on the suction stroke, when the pressure within the cylinder is below atmosphere.

Difficulty Attends Casting Work for Air-Cooled Cylinders—In the pioneer days of the industry, when air-cooled cylinder work was undertaken by foundries of no experience in this line, it was found that nearly all the cylinders were defective, as shown in Fig. 12, owing to the laws of shrinkage, the bunching of metal, due to the presence of ribs or flanges. In one instance the author procured 54 cylinders from a foundry before enough modifications were made to enable the foundry to cast good work. In this undertaking the design was on a par with current practice, and the foundry was accustomed to do good cylinder work, with many hundreds of fine examples to be seen in cars that made a fair record. Despite the favorable circumstances it was found that the castings were defective in every case until after the number of cylinders, as above enumerated, were poured, and as the problem became better understood the results improved, until finally the castings were run off on a better basis, more nearly free from defects.

Fig. 8—Cinder pocket, due to careless foundry work for the most part

Nearly all the defects showed up in the bore of finished cylinders, and in the above example, they were so numerous that it was not possible to consider their use. Even the best cylinders, made of the class in which flanges are integral, do not show a perfectly uniform surface structure, nor is it likely that cylinders, with the ribs cast integral, will ever be as uniform in structure, over the surface of the bore, as will follow in the class of work that includes a uniform thickness of cylinder walls, and other characteristics to match.

Some makers of air-cooled motors, to get away from this, and other casting troubles, follow the practice of applying cooling flanges, after the cylinders are machined in and outside. In this way air-cooled cylinders become very efficient for the purpose, particularly if the flanges are applied so tightly that the joint between them and the cylinder wall is good, from the point of view of the transfer of heat. True, no joint will be as efficient as integral metal; equally true, more flanges can be applied than may be cast integral; the result is that more surface, which is desirable, offsets the slight disadvantage, and this construction has the property of assuring positively good cylinders and enough surface to afford an adequate measure of cooling.

Good Cylinders Are Cast in the Vertical Position—In the old days it was common to see cylinders cast in the horizontal position, with the result that the sullage settled in the barrel, on the top side, and many such cylinders were found to be too defective to sustain in service, thus accounting for the many cylinder failures in automobiles of the earliest time. This same problem was struggled with in the early days of water, and other cast-iron piping, until the practice of casting vertical, in the sand, was adopted; from that time cast-iron piping became a reliable reality. Likewise, in cylinder work, it was found that vertical casting gave the best results, and it is now the accepted practice to so cast them.

In this way, in view of the specific gravity of sullage, which is below that of molten cast iron, the sullage floats to the top, and if a suitable sprue is provided, with gating properly done, all the sullage will be in the "waster" piece; if provision is not made to dispose of the scoria, or other contents that will fall short of quality in the finished casting, it is very prone to settle in the metal, in the region of the valve seats, as shown in Fig. 13; that the sullage will be largely in the surface metal is one of the points that follows logical deductions, and accords with experiences, from the very fact that the sullage is lighter than the body of metal, and is, by the heavier metal, displaced and floated to the surface. In some cases it is the practice to add double "finish" to the valve seats, rather with the expectation that the defective surfaces will be machined away, although, as before stated, it is better to run high sprues and allow the sullage to gate away to a point where it will do no harm.

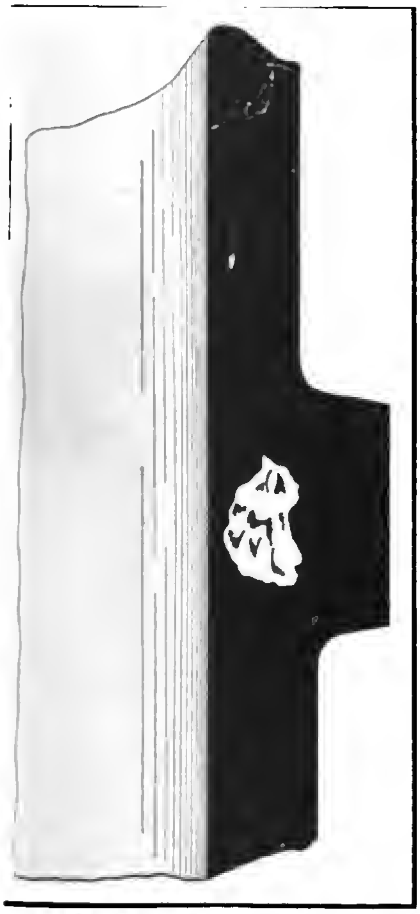


Fig. 9—Section at oil-boss indicating shrink hole due to presence of excess metal in boss

On account of the great importance of having very good metal in the valve seats, it is the practice in some schools of design to provide special metal in the seat, as shown in Fig. 14, by having the valve seat, and its casting, separate from the cylinder casting; with valves in the head, using individual valve housings, the advantage is on the same basis as in the case here shown, excepting that with valves in the head they must be of small diameter, because there is not room enough to make them as large as the standard of practice would seem to dictate. In standard work it is considered that the valves should be in diameter equal to half the diameter of the cylinder, if the speed of the piston is to be 1,000 ft. or over per minute. All valves are not made so large, for the reason that many designers consider that warping is the more prone to happen, and a leaky valve will do more damage, by way of reducing the performance, than will follow if the passageways are a little restricted, as they will be if the valves are smaller.

Ill Effect of Excess Finish In the Bore—Finish is indicated on working drawings by means of the (small) letter f, placed on the line, depicting the boundary of the casting, if it is to be machined on that boundary. In cylinder work, of the class used in automobile motors, it is not the practice to allow for reboring more than once, and the finish is also restricted to the least possible, as fixed by practical considerations, one of which is that the castings much finish up in the bore, because the bore must be free from imperfections. That the surface should be one that will wear well is also a consideration that cannot be overlooked, and in order to be sure of this point, it is the custom to take advantage of the superiority of surface metal, which is somewhat more dense and closer grain than the metal below the surface, as Fig. 15 indicates.

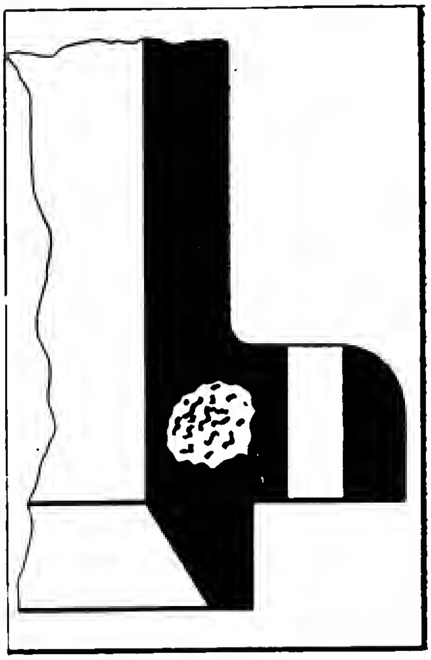


Fig. 10—Shrink hole in section of bolting lug, following presence of excess metal

"Chill," while it is a property that is not wanted in castings that have to be machined, is nevertheless taken advantage of to a slight extent, since chill metal is quite as dense as some grades of steel. In the foundry, when it is desired to have the metal chill to a considerable depth, the proportions of the "charge" in the cupola are adjusted to afford just such results, and chill moulds are used to intensify the result; the moulds are faced with chills, that is to say, facings of iron are used, and since iron has a better heat conductivity than moulding sand, the heat is conducted away from the metal to be chilled, and the result is about the same as if the castings were to be quenched in a quenching bath, as is done to render steel as hard as its characteristics (which is dependent upon the carbon content of the steel) will allow of.

In cylinder work no chills are employed, because it is not desired to render the surface so hard

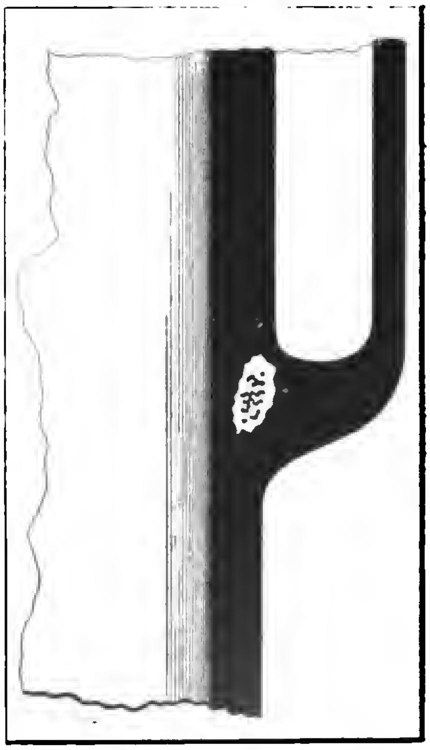


Fig. 11—Imperfection, at junction of water jacket, influenced by use of large fillets

that difficulty will be experienced in machining them; the charge in the cupola is so regulated that the metal in the bore, if excess finish is not allowed, will take on considerable degrees of hardness, under normal conditions, in regular moulds. The amount of finish that should be allowed depends, to a vast extent, upon the quality of the patterns, skill of the moulders, which naturally includes the accuracy of cores, and the core setting as well. If the finish is reduced to 1-16 in. it is barely possible to assure that the surface of the metal, under the finish, will be sufficiently hard to warrant the assumption that a slight chill surface will be present.

The difference between chill iron and the balance of the casting is the difference between gray and white cast iron in a gray iron casting. The gray product is soft and runs high in graphitic carbon, while the white iron is hard and partakes of the qualities of steel to some extent, due to the increased presence of combined carbon. The presence of chills in a mould, while they have the property of quickly cooling the metal as it contacts with the chills, will not result in the same depth of chill of all grades of pig iron, due, among other peculiarities, to alterations in the silicon content; if silicon is high the chill phenomenon will be reduced.

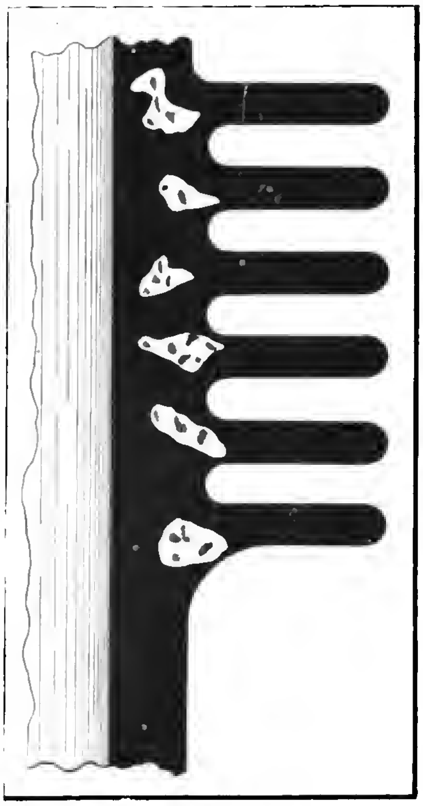


Fig. 12—Defects, characteristic of cylinders, of the air-cooled variety

That a perfectly symmetrical shape is of the greatest advantage is found to be true, and since it is desired to have the least possible surface between the combustion chamber and the cooling medium, a shape that will give the least surface should be selected. A semi-sphere affords the least surface, and is frequently selected for the dome of motor cylinders on that account.

Before going into this phase of the subject, however, it is important to point out that cylinders are made with integral heads, for the most part on account of the difficulty experienced in packing joints when they are in the great heat and expansion changes that are normal to automobiles. It has been found that no form of packing will stay tight for any length of time, and even when joints are "ground" they are prone to leak in the course of events. It must be remembered that the pressure is high—varies from below atmospheric to the maximum at a sharp rate —and is attended by rapid heat changes which accentuate the tendency. If the holding bolts are separated any considerable distance the castings are likely to deform enough to leak compression, and destroy the good working of the motor. In some cases it was found that long holding bolts would stretch enough to allow the head to raise off the cylinder and the compression would leak out in this way; this form of trouble was extremely difficult to detect, since the head would be perfectly tight with the cylinder cold, and the leakage would be momentary, due to expansion of the bolts from heat and pressure. In some examples of twin cylinders, with very thin walls between them, especially with soft and porous metal, leakage develops between the cylinders, and the greatest difficulty, due to this defect, lies in the transfer of the products of combustion from one cylinder to the other, thus destroying the advantage derived from complete scavenging. This trouble is avoided in some designs by having a gap between the cylinders, so that the walls are not common to both of them, and while the space required is increased, the plan has the advantage of absolutely defeating trouble of this sort.

In cylinder casting work, in view of the main requirements, it is not desired to have the chill properties too prominent, and in order to have a facing of white iron over the gray iron core, it is necessary to fix the finish accordingly, which is merely a question of resisting the same, and making up for this restriction by doing fine work in the patterns, to begin with, and in the foundry for the rest.

Quality of Cylinders Depends Upon Co-operation — From what has been said it may be inferred that the quality that must reside in cylinder castings, if they are to excel, depends upon the co-operation of the pattern maker, the foundryman and the machine shop artisan. Each will be able to thwart the other in any attempt to evolve quality, but good foundry iron must be settled upon concurrent with the use of mahogany for patterns, and certain degrees of "horse sense" in the shop. No matter how competent the designer may be, if he is not supported in all departments, the purchaser of the car, and the shareholders of the maker will have to face loss.

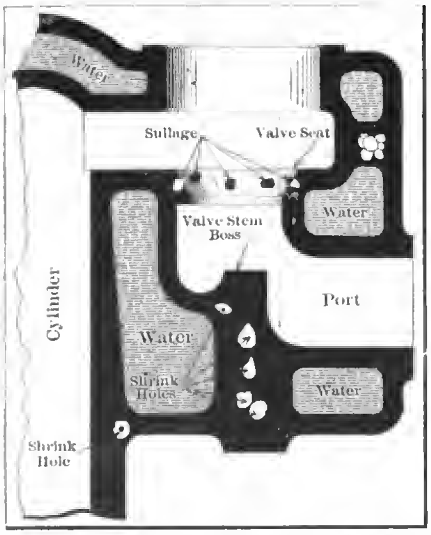


Fig. 13—Sullage renders valve-seats defective when the cylinders are cast vertical, and carelessly done

From the point of view of the designer, in the process of evolving good cylinders, it is necessary to determine as to the compression that will afford the best results; then, the shape of the cylinder is important, in that the mean effective pressure will depend upon the shape, as well as upon the ratio of clearance to displacement volume.

Cylinders cast en bloc, to be used in motors of the class having crankshafts with but two bearings, must be as short as possible to favor the crankshaft, and in such cases it is the practice to make common use of the separating walls of the cylinders: in such cases, trouble is guarded against by the proper "venting" of the moulds, which is possible owing to the method of using separate covers for the water-jacket, thus affording good venting for the gases to escape, and assuring close metal with freedom from attending troubles of the character above named.

(To be Continued.)

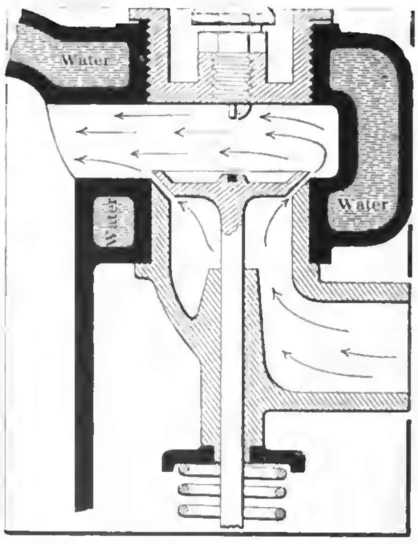


Fig. 14—Separate valve housings afford an opportunity to use superior metal in valve seats

A Constant Pressure Engine

By Morris A. Hall

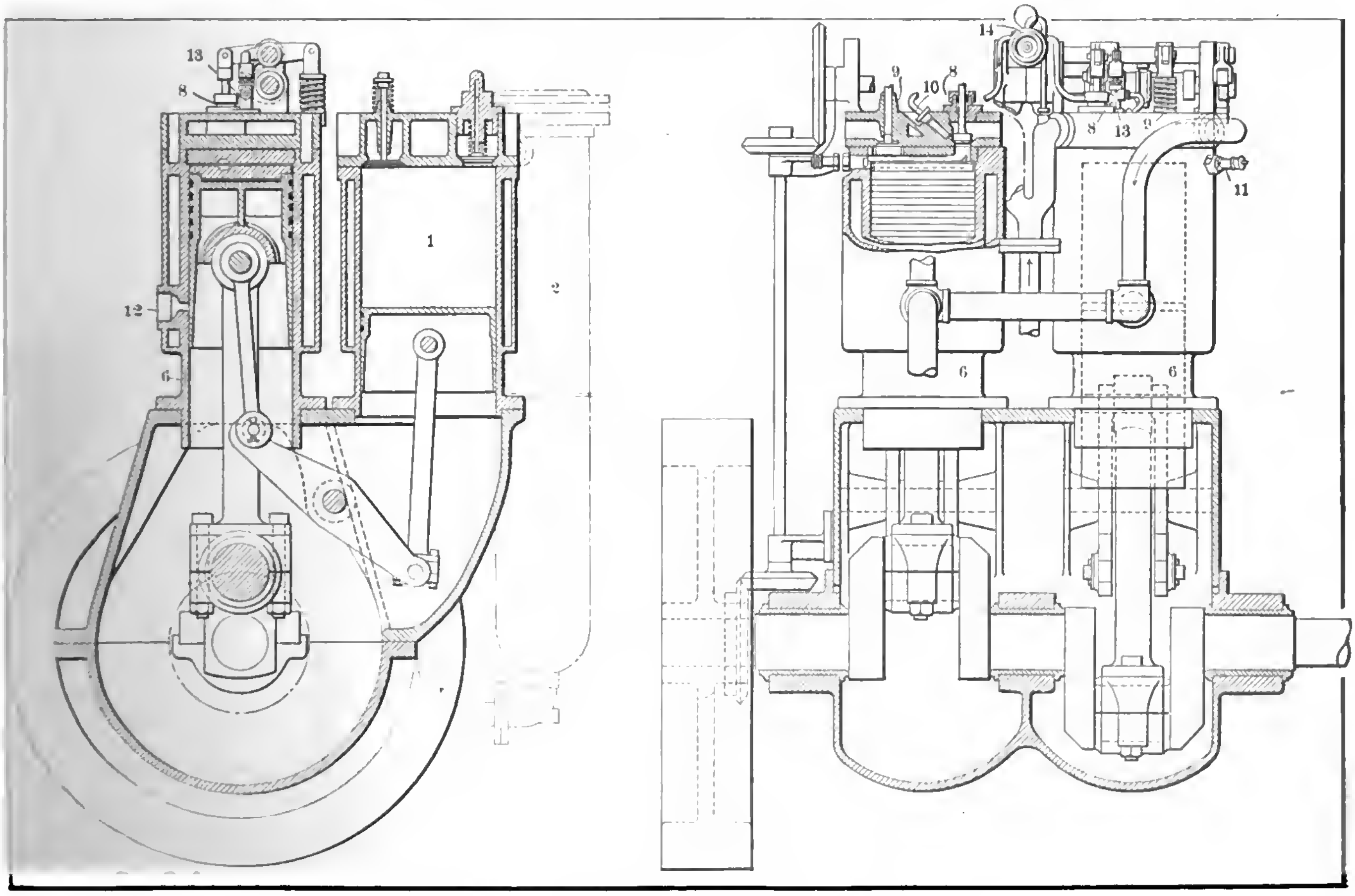
WHEN Brayton brought out his constant pressure engine in 1873, he did so at an unfortunate time, for just then the Otto cycle engine was beginning to come into its own. The simplicity of this, coupled with the additional complications of the Brayton engine, particularly noticeable in small powers such as were usual at that time, did much to discount the Philadelphian's invention, although theoretically it had much to commend it, and the machines built and operated then were unusually successful.

In as much as some work is being done now upon engines of the Brayton type, one having been brought out very recently, a short mention of the principle upon which the type works, and of the particular features which distinguish it from the ordinary gasoline engine, is well worth space.

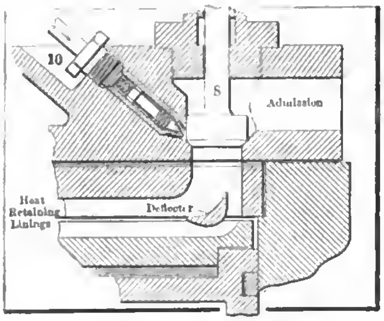
First, as to the history, Brayton was a Philadelphian, who invented and constructed an engine in 1873. This was exhibited at the Centennial in 1876. The foreign rights to the invention were purchased by Messrs. Simon, of Nottingham, England, who constructed a machine along the same lines, but differing somewhat in detail. A Simon-Brayton engine was exhibited by the English firm at the Paris exhibition of 1878, and attracted much attention. The additions made by the Messrs. Simon were not very successful, in fact their engines did not perform as successfully as did the original. One year later, a German firm, Hennig & Company, brought out an engine of this type, under license from the Simons, but this also was not very successful, due to the fact that Germany had then taken up with the Otto form, going in for it very extensively. So, the more complicated constant pressure machine could hardly get a hearing. Probably the last attempt of that period was made by a Scotchman, Foulis, of Glasgow, who brought out his motor in 1881, although his patent was dated some three years previous to this. Like its English and German prototypes, this was shortlived.

Diesel Shows Some Similarity—The German Diesel engine shows a marked similarity to these, in that it operates at a constant temperature and theoretically it comes in the same class. But Diesel introduces his fuel in the form of a spray, projected into a highly compressed mass of pure air, the temperature of the latter being such as to ignite the fuel instantly. The compression of the air is an adiabatic change, and the fuel is so sprayed in as to maintain a constant pressure. This continues up to the point of cut-off, whereupon a decrease in pressure with a corresponding rise in volume takes place, this being adiabatic expansion. It is said that this cycle does not approach the true Carnot heat cycle as closely as would an engine in which the operation proceeded along constant pressure lines rather than constant temperature. That is to say, that although the Diesel motor has up to date shown the greatest efficiency of any known internal combustion engine, its possibilities are far below that of the engine operating at constant volume. On the score of efficiency then, the Brayton may be considered as of a much higher type than the Diesel.

The working cycle of an engine of the Brayton type consists of five operations. These are:



Section and Elevation of Stilz Constant Pressure Internal Combustion Engine



Detail of Admission Valve

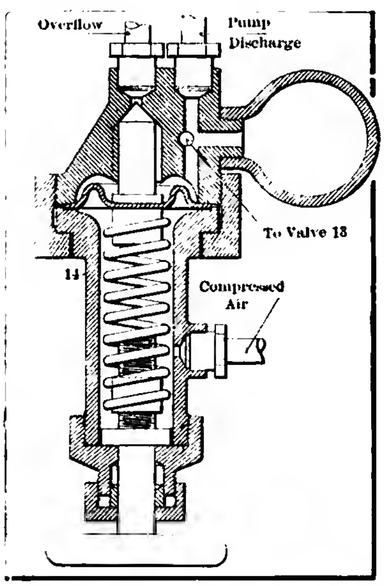
1. Charging the pump cylinder with gas and air mixtures.
2. Compressing the charge into an intermediate receiver.
3. Admitting charge to expansion cylinder in the state of flame, at the pressure of compression.
4. Expanding after admission.
5. Expelling the burned gases from cylinder.

All of these requirements are well within the range of the possible, but to carry out the cycle in an efficient manner a number of conditions will have to be fulfilled. Some of these are: there should be no throttling during admission of the charge to the pump; no heating of the charge as it enters the pump from the atmosphere; no loss of compression to the pump and receiver walls or within the latter; no throttling of the charge as it enters the motor cylinder from the receiver; no loss of heat by the flame to the sides of the motor cylinder and piston; no back pressure during the exhaust stroke, and the latter must be very complete, that is. the working cylinder should have no clearance. This last, however, is but a mechanical detail of construction, easily attained.

Newest Constructor a Philadelphia Man, Too—The newest constructor along the lines as laid down by Brayton thirty-five years ago, is also a Philadelphian, H. B. Stilz, by name. Stilz has built and operated several engines for widely differing purposes, having gone far enough in each case to prove his design a markedly successful one. The engine possesses a number of modifications over that of Brayton or any of his contemporaries, and all of these are by way of improvements tending to make the resulting product more efficient, in the light of thirty years progress.

In this engine, the compression being more or less isothermally that of cool air, is accomplished with less work (than in the Diesel type) and without any great temperature rise. The cool compressed air absorbs more than enough heat from the exhaust gases to balance the cooling loss in the compressing outfit and thus the engine gains by the difference in the work of cool and hot compression. This saving, though small, is in the nature of a recovery from the exhaust and therefore indirectly a source of power.

Stilz scores again in the compression, for a specific weight of air is a necessity, which with hot compression involves pumping a much greater volume at the same pressure, due to the natural expansion under heating and consequent loss of volume. This additional pumping means more power and is a direct loss. What heating or expansion may take place in the Stilz engine does so at the expense of the exhaust, a loss anyhow, so that no actual loss is sustained.

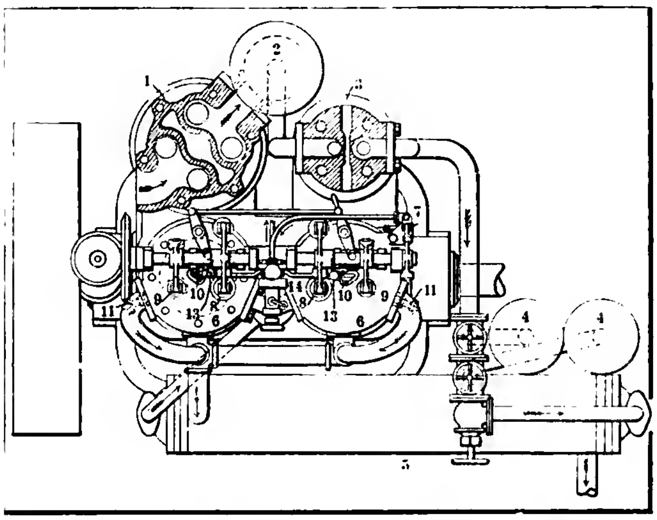


Construction of Fuel Regulator

Possibilities for Improvement—It may readily be proven that the heat efficiency of any internal combustion engine is increased by compressing the working medium with the least possible rise in temperature so as to make possible the greatest recovery of heat from the exhaust, and by securing complete combustion at a constant pressure. In so far as this presents in a concise form the points sought after by both the Brayton and Stilz designs, it is fair to say that the latter has but to prove that he obtains them, to secure the recognition awaiting a genius, who succeeded where others failed.

Only time and continued tests can prove these points but a description of the engine will show if the device is such as to bring them within the range of possibilities.

The engine shown is of a type suitable for automobile or marine use, but the first engine built by Stilz, and even now running successfully, was of a more substantial type intended for stationary use. This was somewhat larger than the one shown, having a single power cylinder 5½ inches in diameter by 7 1-2-inch stroke, single acting, but receiving an impulse every stroke, thus being comparable with a two-cycle engine. The low pressure cylinder was 4 1-8 inch by 6 inch working double acting and driven from the main shaft, this being like a two-cylinder crankshaft with cranks at 180 degrees. The high pressure cylinder was much smaller with a bore of 2 1-8 inch and


As Stilz Engine Appears from Above, Partly in Section

a stroke of 6 inches. This was driven by an extension of the piston rod of the low pressure cylinder worked single acting.

Details of the Automobile Type—Coming next to the design of a lighter model suitable for automobile work, many changes from the stationary type are found. As shown in the large sectional views and the top or plan view, two power cylinders are used. These are supplied with fuel by a system of cylinders, tanks and piping, which includes a low-pressure cylinder marked 1, the piston of which is driven from one end of a lever, pivoted on the crankcase partition wall, the other end being reciprocated by a second lever attached to the piston pin of the power cylinder. The high-pressure cylinder marked 3 is operated in a similar manner from the other piston pin.

The engine operates upon oil as follows: air is drawn into the low-pressure cylinder (1), and after compression there, passes into the intermediate receiver and cooler (2), from which it is further compressed in the high-pressure cylinder (3). It is then delivered into the compressed air system, into which two receivers (4) are connected so as to furnish a means of starting the engine under load, as well as helping to carry overloads. Normally, these are, or may be, cut out by the valves shown. In running condition, the air passes from the high pressure cylinder to the exhaust gas heater and muffler (5). From the heater, the warmed air is admitted to the two power cylinders (6) alternately first to one and then to the other.

Oil is delivered from the oil pump (7) of the plunger type, driven from the overhead camshaft, into the pressure regulator

(14), shown also in an enlarged view. This regulator has a flexible diaphragm at the center of which is connected a spring, located in a chamber to which the air has access at its highest pressure. To the other side of the diaphragm is attached a valve, situated in the space connected to the oil pump delivery pipe. The combined pressure of the compressed air and the spring tends to keep the valve seated, so that no oil flows. But when the oil pressure exceeds the other pressures combined (the hand wheel allows of adjusting this to the correct amount) the action of the diaphragm lifts the valve off of its seat and allows oil to escape. Under ordinary conditions, the oil flows through the valve (13) which opens simultaneously with valve (8) operated from the camshaft. Passing through the valve to the pipe (10) the oil is given a rotary motion which breaks it into a fine spray. This causes it to be uniformly mixed with the air charge, which enters at the same time through valve (8). Entering the combustion space thus, the combined air and fuel charge is deflected toward the igniters (11) by the deflector plates placed in the cylinder head for that purpose. The ignition may be of any kind, although that shown was supposed to be of the regular jump spark type. After combustion, the burned gases are exhausted through the mechanically operated valves (9) and the auxiliary ports (12). A minor improvement consists in so shaping the cams as to change the period of valve opening by shifting the camshaft longitudinally. The speed of the engine may be controlled in this manner.

Principal among the advantages claimed for this style of engine are flexibility approaching that of the steam engine, highest efficiency, impossibility of preignition and consequent backfiring, more uniform turning effort brought about by the elimination of explosions, positive control, compactness, light weight and extended possibilities for the use of many and varied fuels other than the ordinary gasoline and the fuel oil used in this particular engine.

NEW TYPE OF FRANKLIN AIR-COOLED ENGINE

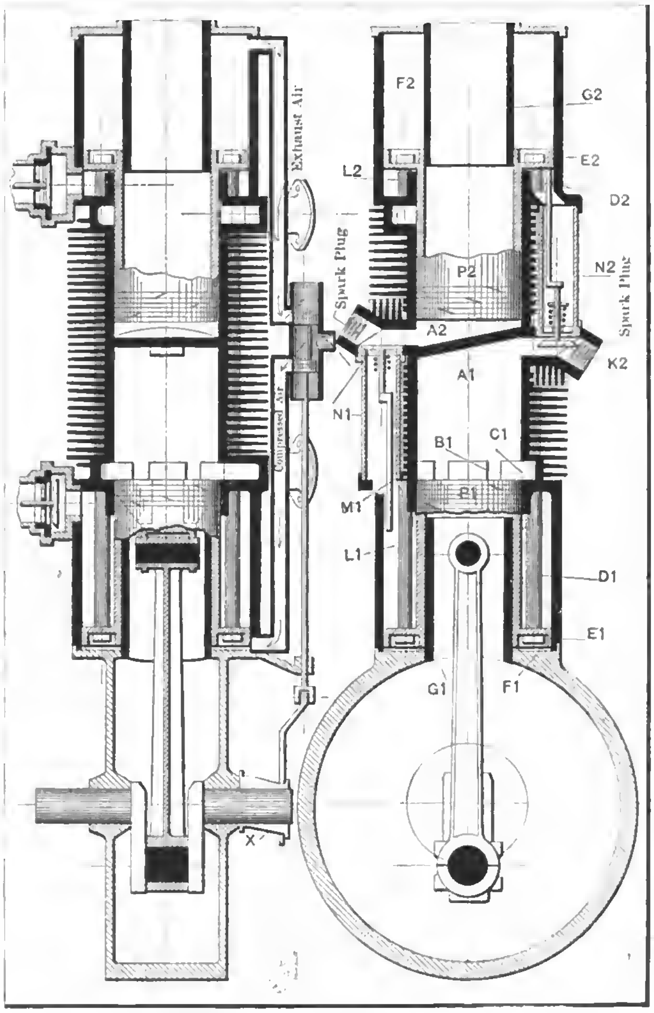
AFTER six years of experimentation and construction, Ernest Franklin, Portland, Ore., has succeeded in building and operating an engine for automobiles and motor boats, which has a number of remarkable and very prominent features. Mr. Franklin's first field of experiment was the double-acting engine, but after long research in this line, he became discouraged with the results and turned to the two-cycle type.

His latest production, shown in the illustration, is of the differential piston type of two-cycle motors, but has this radical departure from current practice: the cylinder is open ended and has within it two pistons. These are connected together by means of tie rods, and actuate a single crank. The engine is cooled by means of air, thus doing away with the troublesome water, piping, and pump.

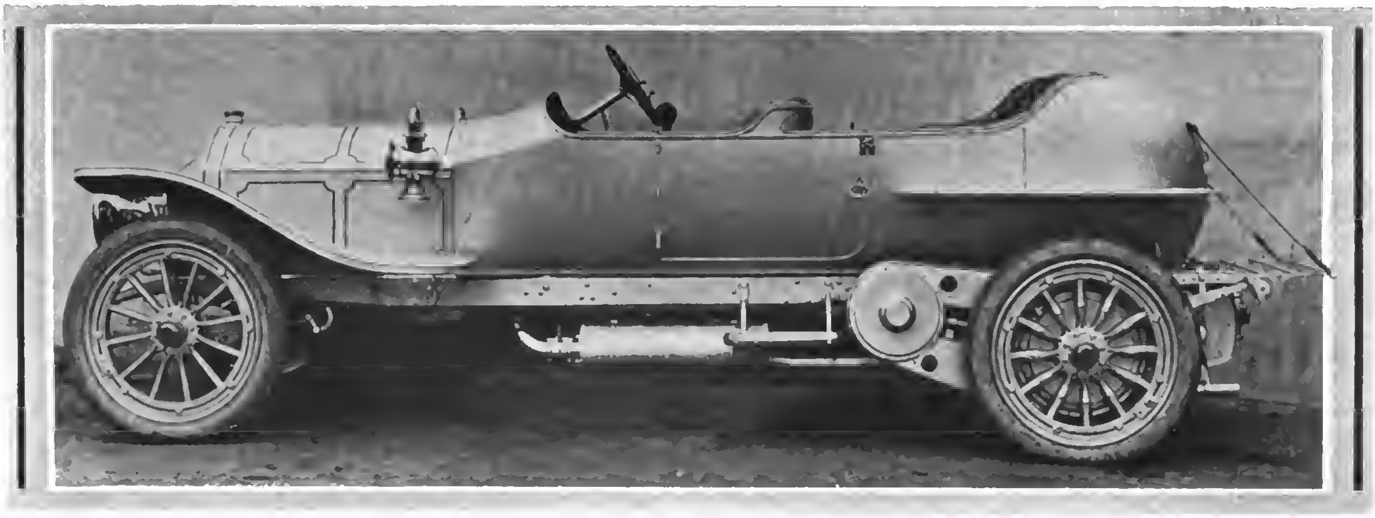
As might be expected with an engine of this type, the explosions take place in the middle of the cylinder, where a partition is thrown across to divide the two and answer as a cylinder head. The charge is drawn in at the extremities of the two pistons of larger diameter. These compress it and deliver to the working pistons of smaller diameter, the upper one feeding the lower working piston while the lower furnishes the fuel to the upper piston. By an ingenious arrangement, camshafts are dispensed with and all valves are either operated by suction as in the case of the fuel inlet valves or are actuated from some other part of the engine as in the case of the admission of the compressed fuel from the differential piston to the working piston. This is done by the piston itself, which at the limit of its stroke opens a valve leading into the smaller cylinder.

In addition to being air cooled, two-cycle, differential, two piston, this engine is self starting, that is, in the design provision was made for starting by compressed air. The sliding piston valve seen in the right side of the first section controls this. Air being admitted at that point, will pass up or down the jacket provided for that purpose, to the piston which is properly placed, and thus, turn the engine over. The piston valve just spoken of is connected with the crankshaft and in that way directs which piston will receive the compressed air.

All of the parts are marked with subscripts, the ones above the center being marked 2 and the lower ones 1. The pistons are P_1 and P_2, and are connected by the tie rods D_1, D_2, which pass through bushings in the cylinder casting. The extensions of the pistons work in the larger bore, and convert the chambers L_1 and L_2 into compression spaces, L_1 supplying piston P_2 and L_2, P_1. The former works through the transfer port N_1 and the valve K_1. The exhaust ports are cut right through the walls of the cylinder at C_1 for the lower piston. The sleeves G_1 and G_2, shown in solid black, are said by the inventor to be placed in the cylinder for the sole purpose of allowing the compressed air starting arrangement to work. Be that as it may, as shown in the working drawing of this engine, they are of such a small diameter that the connecting rods can only oscillate about 20 degrees each side of the center and cannot make a full revolution. A mere trifle like that should not worry a real inventor, however. Mr. Franklin states that he is now working on a two-cylinder engine with cylinders set at 90 degrees to each other, and working on a single crank, which he says would give four explosions per revolution and thus be equal to a regular eight-cylinder four-cycle engine.



Franklin Air-Cooled Two-Cycle Differential Piston Engine



A English Idea of the New Torpedc Body, on 60-Horsepower Mercedes Chassis

BODY BUILDERS NOW EXERCISING MUCH INGENUITY

SPURRED on by the continuous calls for something new, different, or original in the line of coach work, Continental and English body builders have now gone far into a new line of body types. These are so radically different that with regards to them, all automobiling people at once line up in one of two classes—either the newest bodies are about the best thing ever, or else they are by far the most homely, not to say ugly, specimens of coach work ever produced by intelligent men.

Starting some years ago with the so-called Napier "bath tubs," bodies have followed a general tendency to length, and lack of height, giving a low, rakish appearance. Following in this same line came the side doors to the front seats, brought out last year, which attained much popularity.

Then, at the time of last year's Prince Henry trials, Germany took the lead with the dust-proof rear construction, from which the now popular name for this type, the torpedo body, came. Although the body shown on a Mercedes chassis is of home make, the idea is exactly the same as the German builders expressed in their work. While looking very peculiar, appearance alone had little to do with the shape, which was evolved as a solution of the dust problem. The idea in this was to prevent the suction of dust at the rear which obtains with any body having flat space at the rear, whether vertical, horizontal or inclined. Moreover, this shape does not concentrate its claim to usefulness in the one item, but possesses many meritorious features.

Bulging Rear a Veritable Storehouse—Chief among these are the utilization of the huge and unusual bulge at the rear as a storage place for tools and sundries. In actual capacity this is a veritable storehouse, as there is untold room here for tools, spare parts, extra garments, and luggage of all sorts. As the rear view with the doors open shows, the storage space is very large.

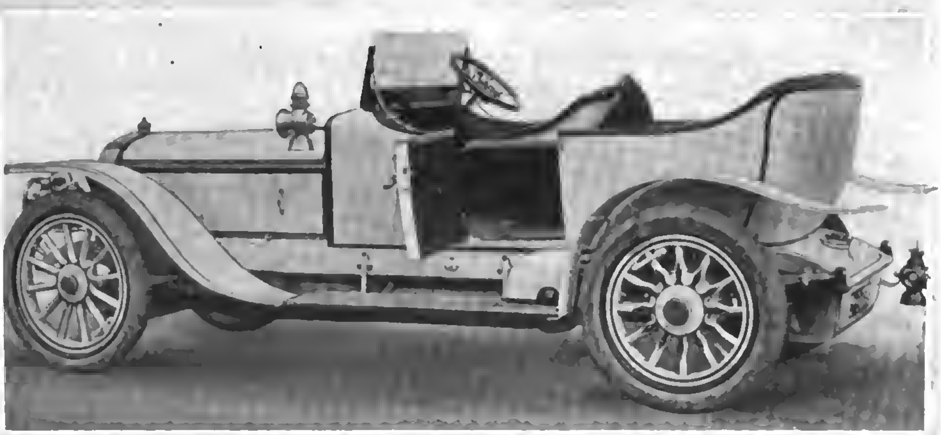
In addition to making the rear of the car dustless, so that in dry weather the tonneau is more comfortable even than the front seats, this construction allows of the practical removal of the rear fenders, with consequent improvement in the whole appearance. This car body was probably the first to appear with the single entrance to both tonneau and front seats, one long side door answering for both.

In this epochal body, too, appeared for the first time the flush sides as complemental to the dust-proof feature. It meant reducing the capacity of the car or else a tremendous wheel base, because the large tonneau capacity could only be obtained with bulging sides. The reduced capacity was well received, and many subsequent bodies have incorporated the flush sides until they have become quite general.

Many English Firms Fell Into Line—Quite taken with the natty and rakish lines obtained in this manner, many of the more prominent firms fell into line, notably Napier, Austin, Gregoire-Gordon, Brown, Arrol-Johnston, and others. Several styles of bodies by Austin's body builder are shown. In these it will be noticed that all do not agree. The large 100 horsepower chassis is fitted with a body creation along Mercedes lines, including the single side door opening toward the front. There are several noteworthy differences. Among them the most prominent is the substitution of the full rotund back shape in place of the extreme torpedo shape, although even this body comes under the new classification of torpedo. With the elimination of the globular stern will be noticed the return to the use of rear fenders.

Rear View, Showing How the Space Is Utilized

The earlier Mercedes bodies with the single side entrance had the left-hand front seat attached to the door, so that it rotated out over the step when the door was opened. In late models, as for instance the one shown, this is changed, and the door is so located as to straddle the length of the front seat, allowing entrance to the front, forward of it, and to the tonneau, back of it. The Austin provision differs from this and consists of tipping the left-hand front seat, it being back


Inclined More to the Rotund Curve with Straight Lines, 100-H.P. Austin

of the right-hand or driver's seat enough to allow the back of it in tipping to clear the back of the stationary driver's seat.

This particular car is one of the six-cylinder Austins that ran in the last Grand Prix race. Unlike the Mercedes body, which is of aluminum, this is made from selected woods.

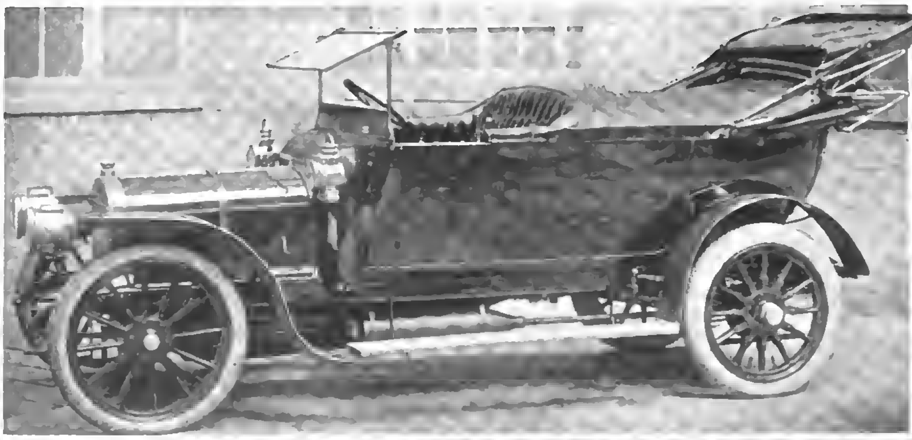
Builds Also for White Steamers—The straight-line torpedo body on the smaller Austin is a product of Cann & Co., the London firm that builds the bodies for White steam cars over here. This little Austin has a four-cylinder engine rated at 18-24, with cylinders of 105 mm. bore by 127 mm. stroke. This body, it will be noticed, differs from the larger one, in that two side doors are used, although the straight lines in the side view are the same, as is also the rotund curve at the rear. The very narrow front door is placed close up to the dashboard and opens forward. The rear door, on the contrary, is very well placed, is very wide and commodious, and opens toward the rear. The fenders, too, are different. On the little Austin, the step is carried lower down to accentuate the low and long appearance and offset the short look which the wheel base of but 115 inches would otherwise give. To aid in this deception, both front and rear fenders are carried down with a sharp dip, the fronts at the rear end and the rears at the front end. While the whole effect is very much on the straight-line order every opportunity is seized to depart from this. It can be noticed in the deep curving dashboard, in both front and rear doors at the lower back edges, in the long fender sweeps, and elsewhere on the sides of the body.

Extreme Only in Appearance, Not in Dimensions—In all of the bodies shown, there has been a sensible compromise between the extremely high and equally uncomfortable seats of several years ago and the very low, undignified "couches" of more recent times. The latter, in some cases, went as low as 8 or 9 in. above the floor of the body, with the seat backs not over 18 to 20 in. total height. With these went the long leg room, which, coupled with the low seats, gave the body its long, low appearance. This increased and increased until it passed 36 in. In the torpedo types, the latter feature has been retained, but without extremes, a distance of 34 in. from seat to dashboard predominating. So, too, with the height of seats, the very low position, not being necessary to further the body lines, has been abandoned in favor of a more sensible, more dignified height. Probably most of these torpedo bodies upon detailed examination would be found to have not far from 12 in. from the top of the front seat cushion to the floor, this being increased to 14 in. in the tonneau.

Of the two styles of torpedoes brought out thus far, it would seem as if the rotund rear with straight line flush sides would be likely to meet with more favor than the globular shape, because the latter borders more on the extreme, although both savor of the shops, so up-to-date are they, or up-to-the-minute stated in more correct language.

In all probability the future will bring out more and varied torpedo bodies, offering new suggestions, and doubtless many of them will bring forth additional ideas on the subject of dustlessness, as incorporated in the shape and proportion of the body, not only at the rear, but along the sides and underneath the body proper as well.

New Little Mercedes Similarly Equipped—The latest production of the famous Daimler works differs very markedly from its predecessors in mechanical construction, but is equipped with the now-famous torpedo shaped body. This new car has a small engine with an unusually long stroke, in which are shown the effects of the numerous competitions of the past year in which the stroke was unlimited. The motor is of 80 mm. (3⅛ in.) bore by 130 mm. (5⅛ in.) stroke and is rated at 15-20 horsepower. With the unusually long stroke, a ratio of 1 to 1.625, the power developed would be far in excess of even the higher rating. To this is fitted a flush sided body of the torpedo type, but with many differences from that of the larger and more powerful chassis. The elimination of the chain for driving and the substitution of shaft drive, changes the whole rear construction and also calls for rear fenders. This practically makes the front fender a necessity, and with both in use, the step is natural, while on the larger car, the practical elimination of both fenders made the use of the step superfluous. On the little car, too, the use of the two doors is at once noticeable. The rear is very similar to that ordinarily fitted to a short tonneau and opens to the rear in approved style. But the front door, on the other hand, is very narrow, very high in proportion to its width, and opens to the front. On the driver's side of the car, hinges are dispensed with and the door slides upward, being pulled clear up and out for admission on that side. The prolonged dash peculiar to all torpedo bodies is retained, while the body door, molding and other curves take away the very straight line.


18-24-H.P. Austin with Same Style of Torpedo Body, But Two Side Doors

LETTERS INTERESTING AND INSTRUCTIVE

NEW FRONT DRIVE SCHEME

Editor THE AUTOMOBILE:

[1,934]—While looking over the copy of the June 10 issue of "The Automobile," I could see no reason why the front drive need be so compactly or complicatedly built, so am sending you a sketch of an idea of mine for a front drive which is not so complicated. R. T. PALMER.
Hampton, Va.

The sketch is shown elsewhere on this page and differs from other front drives only in that the engine is set in the standard and stereotyped position at the front and parallel to the axis of the car. Back of this is the transmission, which carries on the left side a pair of bevel gears. By means of these and a shaft drive back to the front axle, the power is transmitted. In this form of drive the power is transmitted from front to back and then from back to front again. What possible advantage there can be in this "gun-shoot-around-a-corner" scheme, only the inventor can see. A more reasonable method, if it is not desired to place the engine across the car, is to place the engine at the back and drive forward continuously from engine to transmission, to front anxle.

The disadvantage of this is accessibility, which also applies to the design shown on the sketch. The transmission is under the body where it is very inaccessible. Also, the arrangement of the driving shaft would have to be such as to allow the front axle and shaft to rotate around the bevel, when the front wheels surmount an obstacle.

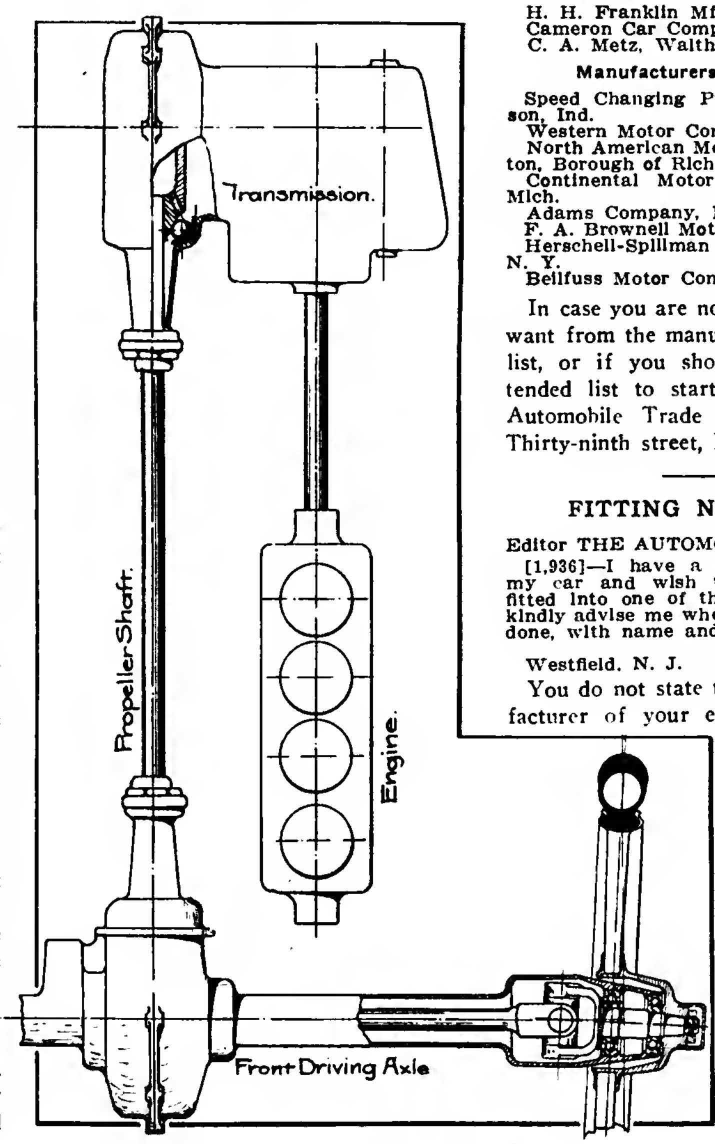
A disadvantage of this scheme, which the inventor has overlooked, is the fact that if the engine is placed in the center of the frame, the drive will have to be off center. Or, if the drive is set central, the engine will have to be off center. An equally weighty argument against this form of drive lies in the fact that at least three pairs of bevels will have to be used, and these are objectionable for they consume more power than do spur gears.

Since we are going into the disadvantages of the proposed scheme, it will be well to mention all of them. Thus, the center of the car location of the transmission will take just that much weight off the driving wheels. As weight means traction, this is an apparent disadvantage.

In his remarks about the compactness and complicated appearance of the front driving scheme of Christie, the father of this suggestion missed the point. The cab described does not have to have the compact drive as shown; in fact, this could have been worked out in a number of other ways, all possessing some merit. But this design was made special for a special service, and as such it has very much merit. If Mr. Palmer will reread the description, he will see on page 953, the situation is summed up as follows:

There is, however, a secondary advantage, which is alone and of itself amply sufficient to call for serious consideration of motor cab front driving and steering. This is the possibility of a front motive and steering assembly of small dimensions, entirely self-contained and very readily detachable from the remainder of the chassis and car body assembly.

This means that with one extra fore-carriage for, say, every ten cabs, the whole ten can be always kept in working condition with only the one small fore-carriage assembly in the repair shop, and all ten of the bodies and rear wheels assemblies out on the street earning money. With the rear wheel drive any failure back of the motor puts the whole car on the sick list, if, indeed, the motor is so constructed as to be readily removed from the car.



Palmer Front Drive with Motor in Regular Position

SMALL AIR-COOLED ENGINE

Editor THE AUTOMOBILE:

[1,935]—Could you inform me where I could purchase a four-cylinder air-cooled motor of about ten or twelve horsepower and suitable for a midget automobile? LEON PELLET.
Dallas, Texas.

The size of engine which you require is so small that we are unable to call to mind any firm making it. According to the A. L. A. M. rating formula an engine of 4-cylinder, 2¾ in. in diameter would be rated at 12.1 horsepower, and one of 2½-in. bore would rate at 10 horsepower. These are very small sizes. However, we are giving below a list of car and engine builders, most of whom build some small-sized air-cooled engines. It is possible that the car manufacturers would not care to sell you an engine, but you can only try them and find out. The list follows:

Manufacturers of Complete Cars.

H. H. Franklin Mfg. Co., Syracuse, N. Y.
Cameron Car Company, Beverly, Mass.
C. A. Metz, Waltham, Mass.

Manufacturers of Motors Only.

Speed Changing Pulley Company, Anderson, Ind.
Western Motor Company, Logansport, Ind.
North American Motor Corporation, Stapleton, Borough of Richmond, New York City.
Continental Motor Mfg. Co., Muskegon. Mich.
Adams Company, Dubuque, Iowa.
F. A. Brownell Motor Co., Rochester, N. Y.
Herschell-Spillman Co., N. Tonawanda, N. Y.
Bellfuss Motor Company, Lansing, Mich.

In case you are not able to get what you want from the manufacturers on the above list, or if you should want a more extended list to start with, write to "The Automobile Trade Directory," 231 West Thirty-ninth street, New York City.

FITTING NEW PISTONS

Editor THE AUTOMOBILE:

[1,936]—I have a two-cylinder engine in my car and wish to have a new piston fitted into one of the cylinders. Will you kindly advise me where I can have the same done, with name and address of firm? WM. EHMLING.
Westfield, N. J.

You do not state the name of the manufacturer of your engine or car else we would refer you to the makers, who are the best ones to do the work, as they will doubtless have pistons of this type on hand which will go right into place. If you have to have this work done in an ordinary machine shop it will cost you a lot of money, because it will be necessary for them to measure up your piston, have a pattern made, get a casting from this, machine it up like the other piston, then balance the old and new ones exactly alike, and finally fit the new piston into the cylinder.

We might give you the name and address of a number of firms near you which would do the work, and do it well, but in view of the great expense connected with this method of procedure, as outlined above, it would be better to look for the name of the maker and go to him.

In default of finding this, or in the case that the car is an assembled one, it would be well to go to an automobile factory near you, as it might happen that they had a piston which was near enough to yours so that a good finished product could be produced from their casting. This would save you the first expense of measuring up your piston and making a pattern.

SELF-STARTING MAGNETOS

Editor THE AUTOMOBILE:

[1,937]—In the June 10 issue of "The Automobile" in "Letters Interesting and Instructive" I note in answer to letter 1,908 that you state there are several magneto manufacturers who are putting out devices tending to start the engine by producing a spark, this being done by rotating the magneto armature. Will you kindly give me the names of these manufacturers, as I am interested in this and anxious to get in touch with them? E. J. WARING.

Providence, R. I.

As to starting devices, you will find out much about these by simply reading over the pages of THE AUTOMOBILE, something on this order being published every little while. Descriptions of devices of this sort have appeared in recent issues, as follows:

December 17 issue, pages 859 to 860.
January 7 issue, page 25.
January 7 issue, page 26.
March 18 issue, page 486.
June 3 issue, page 927.

and, finally, if the subject of starting interests you, an excellent article on this subject headed "Self Starting Devices Attract Much Attention," by Morris A. Hall, appeared in the April 1 issue. This dealt more particularly with the mechanical than with the electrical schemes for starting the engine.

VALVE STEM SIZES

Editor THE AUTOMOBILE:

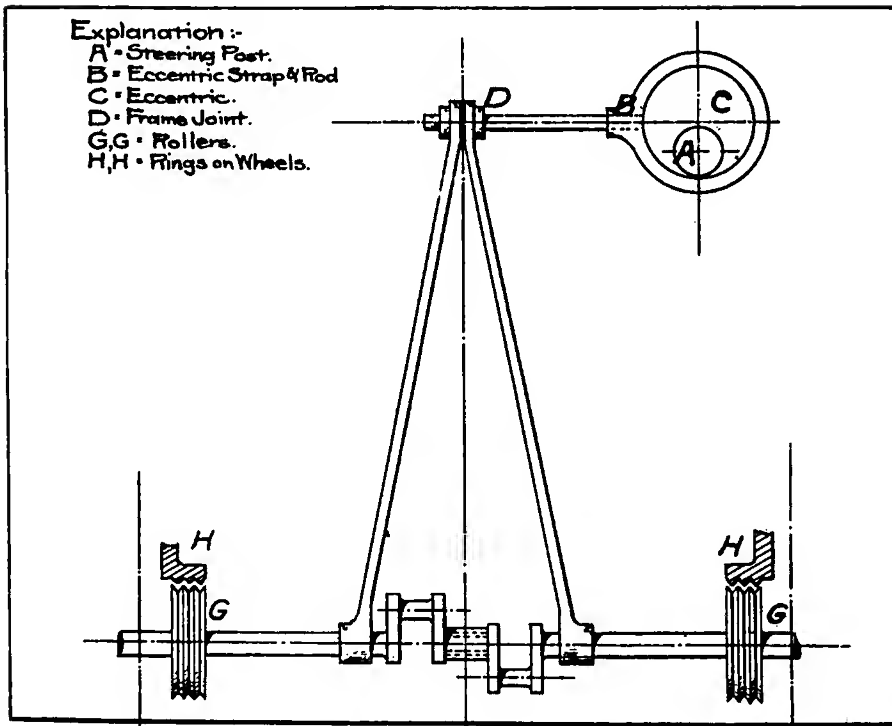
[1,938]—Having seen a number of empirical formulas given in "Letters Interesting and Instructive," I write to ask you to give me one for proportioning valve stem diameters. SAM MANNHEIM.

New York City.

While we deprecate the use of empirical formulæ for parts which may be calculated, you will find the formula desired below. Valve stems may be figured on the basis of any good column formula, taking into account the load on the head of the valve. A very nice looking valve stem will result, however, from the use of the formula:

$$D = \frac{d}{5}$$

In which D is the desired valve stem diameter; d is the clear diameter of the valve.



Sketch of Duryea Differential Showing Operative Mechanism

DIFFERENTIAL INTERESTING

Editor THE AUTOMOBILE:

[1,939]—Your reply to number 1,892 in "Letters Interesting and Instructive" about eliminating the differential and your remarks about the Gould patent in the June 3 issue of "The Automobile" are along right lines of thought and lead me to believe that you will appreciate a description of the Buggyaut scheme for getting around a corner. I send photo of the chassis and diagram of the substitute for a differential. In the chassis the two central bars running from below the cylinder heads to the support at the front are part of the engine and power plant frame. This power plant is hung to the side bars at one point on each side and these bars are supported at the third point front. This makes a three point support to the three pointed power plant. The driving rollers are at the rear points. The front point can be shifted sidewise. If shifted to the right it will throw the right roller to the rear. Or vice versa. A very little movement is sufficient to release the metal to metal contact between the rings and rollers.

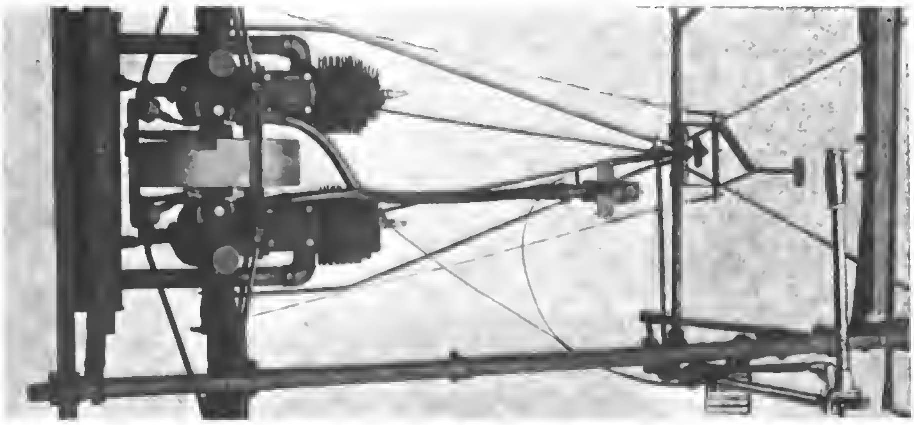
On the steering post is an eccentric. Its center is forward of the center of the post. It is surrounded by a strap and has a rod running to the front point of the power plant. Adjusting nuts are provided so the rollers can be made to engage exactly alike. When the steering post is turned to the right in steering, the eccentric is thrown that way and the eccentric rod pulls the front of the power plant to that side which lessens or releases the contact of the right roller. This is of course the inner one and the proper one to release. The same action also tightens the outer contact and renders it able to take up the whole propulsion of the vehicle. The degree of release is proportional to the angle of the turn or practically so. The only parts required are the eccentric, its strap, rod and the two nuts. I cannot conceive a simpler device than this for the purpose.

And simplicity is not all, for it does the work better than the usual device. It drives the outer wheel. If one wheel slips on ice the engagement can be set tighter and it will then drive the inner wheel. In ordinary turning it drives the inner wheel some, although not powerfully. In straight going it drives both wheels alike. This makes it particularly adapted to solid tired rigs because their wheels bounce badly and with a balance gear of the usual type one or the other wheel is wasting the power of the engine by spinning in the air and then cutting the tires as they strike the ground. With the Buggyaut drive, the power of the engine is expended in propulsion so long as either wheel is on the ground. I feel sure designers and users have not paid enough attention to this part of the automobile's anatomy and am pleased that you are calling attention to it.

CHARLES E. DURYEA.

Reading, Pa.

The letter above from Mr. Duryea, as well as the two figures given, and the other devices are recommended to those interested in improvement of the automobile.



Photograph of Duryea Buggyaut Incorporating Differential

MAY EXPORTATION OF AMERICAN CARS DOUBLES

TO patriotic Americans there is perhaps no feature of the automobile industry which interests them more than the growing exportation of domestic-made automobiles. For many years the balance has been in the other direction, but a tendency to turn has been shown; and, in fact, during the month of May just past the exportations far exceeded the importations. Of course there are many more people going abroad with their own American machines, but nevertheless, there is a steadily growing foreign trade in the automobiles from the United States. The Department of Commerce and Labor has just issued its statistical summary of the month of May, and a comparison with that of the same month in 1908. By this it is shown that the number of domestic cars shipped to foreign countries was double that of a year ago, and two-and-a-half more than that of arrivals this year. Yet the importation continues to grow, for the comparison shows a trebling of cars, and a doubling of the value of parts, brought over. As an important side line, the figures on india rubber indicate that the amount imported was less, but the value was greater than previously.

During the month of May 519 automobiles of domestic manufacture were sent abroad, valued at $816,450, as against figures of 229 and $389,487 for 1908. But at the same time the necessity for supplying parts to American cars on foreign strands has decreased, for it is noted that this year the value of these shipped in May was $60,427, as against $69,570. It is likewise interesting to notice which countries have been included in the growing adoption of our nation's products in motor vehicle lines. The United Kingdom took a valued allotment of $281,180, doubling that of May a year ago; Italy received four times as many; British North America trebled its demand, taking cars worth $281,806 more than the mother country; the West Indies and Bermuda also received three times the former figures, and other parts of Europe, and British Australia both doubled their requirements. France and Germany both received more than in May, 1908, and Africa increased its valuation of imports from $127 to $3,422. There was also a decrease seen in some sections between the two months under consideration. Mexico dropped slightly, from $39,908 to $32,009; South America, from $21,534 to $14,913; the British East Indies, from $1,611 to $28 (automobile parts); other Asia and Oceania, from $10,598 to $666; and other countries, from $662 to $375. The decrease in the amount of parts necessary is, of course, a pleasing feature, showing improved wearing quality of American cars.

As to the importations of foreign-built cars to this country, the figures change from 72 in May, 1908, to 193 in this year, with the value from $170,185 to $301,971. A great many of the cars brought in were taxicabs. France has a strong lead, with 148 shipments, and the other countries are: Italy, 28; Germany, 8; United Kingdom, 5; all other countries, 4. The standing has not changed in the year. The sum of parts received almost doubled this spring, increasing to $72,616 from $42,515.

The situation in the rubber industry may be imagined from the fact that this year the importation was of 6,363,955 pounds as against 7,823,323 pounds, but the value changes in a different ratio, from $4,164,578 last year, to $4,450,356 this year, indicating an increase in the price of the raw materials.

British North America leads in the purchasing of American cars, with the United Kingdom second; France, third; other Europe, fourth; Mexico, Italy, Germany, the West Indies and Bermuda, and South America, following in the order named. This is considerable of an alteration in the score for May of last year, which read: United Kingdom, France, British North America, Mexico, Germany, South America, other Europe, other Asia and Oceania, and the West Indies and Bermuda.

NEW BOOKS FOR AUTOMOBILISTS

Internal Combustion Engines—As the title would indicate, this work deals primarily with the internal combustion *per se*, and not alone with its application to the automobile. However, all but five of the twenty-three chapters are pertinent to owners or operators of automobiles, and even those have an indirect interest. The five exceptions are Chapters III. on Diesel engines, VIII. on producers, XVII. on frames, XVIII. on foundations and XX. on governing. The first and last of these, it is true, have something of great interest as representing future possibilities than present everyday use.

Of the other chapters, the history of the gas engine is well written, and the two and four cycles are carefully explained in terms which the beginner could easily understand. One of the best chapters in the book deals with carburetters and fuel vaporization. With the exception of the extensive notice given to mixing valves, which are not in general use, this is excellent and brings out the principal points relative to fuel vaporization, always a difficult subject, in a very clear and intelligible manner. The chapters devoted to compression and the indicator card include all of the abstract mathematical formulæ given and are worthy of some study.

Most of the rest of the book is devoted to the detailed dimensions of the parts. In this, it appears as if the stationary engine is given the preference. Formulæ are given so that this portion of the book would be of great service to the designer. This part of the work, as would be necessary if it would be of use to designers, is right up to date, and valves in the head, copper water jackets, single cam for two valves, and other items of latter-day practice are described and commented upon.

The book is written by William M. Hogle, B. S., and published by the McGraw Publishing Company, 239 West Thirty-ninth street, New York City.

AUTOMOBILE CALENDAR OF EVENTS

Shows, Meetings, Etc.

Aug. 5-7..........Chicago, Midsummer Meeting Society of Automobile Engineers.

Nov. 6-13.........Atlanta, Ga., Auditorium-Armory, National Automobile Show.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Decennial International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Races, Hill Climbs, Etc.

July 12...........Detroit, Start of Sixth Annual A. A. A. Tour for Glidden Trophy.

July 12...........Portland, Ore., Road Contest, Portland Automobile Club.

July 31...........Richfield Springs, N. Y., Hill Climb, auspices of the "Earlington."

Aug. 5...........Chicago, Fourth Annual Algonquin Hill Climb, Chicago Motor Club.

Aug. 26-28.......Minneapolis, "Little Glidden Tour," Minnesota State Automobile Association.

Aug. 19-21.......Indianapolis Motor Speedway, First Race Meet.

Sept. 6-11........Lowell, Mass., Automobile Carnival, Lowell Automobile Club.

Sept. 15..........Denver, Col., Start of Flag to Flag Endurance Run to Mexico City.

Oct. 7............Philadelphia, Second Annual Stock Chassis, 200-mile Race, Fairmount Park, Quaker City M. C.

Dec. 29-30.......Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

THE SCOTTISH TRIAL

By Joseph A. Mackle

Climbing Amulree Hill near Loch Freuchie

GLASGOW, June 21—The searching nature of the annual trial of the Scottish Automobile Club has always been admitted, but there is no doubt that the event just completed ranks far ahead of its predecessors in this respect. Before mapping out the course of 1,000 miles, longer by 200 miles than the usual distance, the trials committee had scoured all the byways and mountain tracks of the northern country, and the net result proved to be something of a startler for most of the competitors. But, then, the modern car is so reliable under normal conditions that it requires an extremely severe test to render defects apparent, and only a gruelling such as is rarely encountered under normal conditions can afford a reliable indication to the buying public. Nineteen only of the sixty-five cars that started away on Monday last have returned with clean records—a proportion much smaller than usual—showing that the trial has succeeded in its object, while at the same time, the fact that no less than 58 cars finished in schedule time speaks well for the general qualities of both the cars and their drivers.

The total distance was divided up into six daily runs of approximately 170 miles each, and, as noted later, every part of Scotland—save the extreme south—was traversed, and every conceivable variety of road encountered.

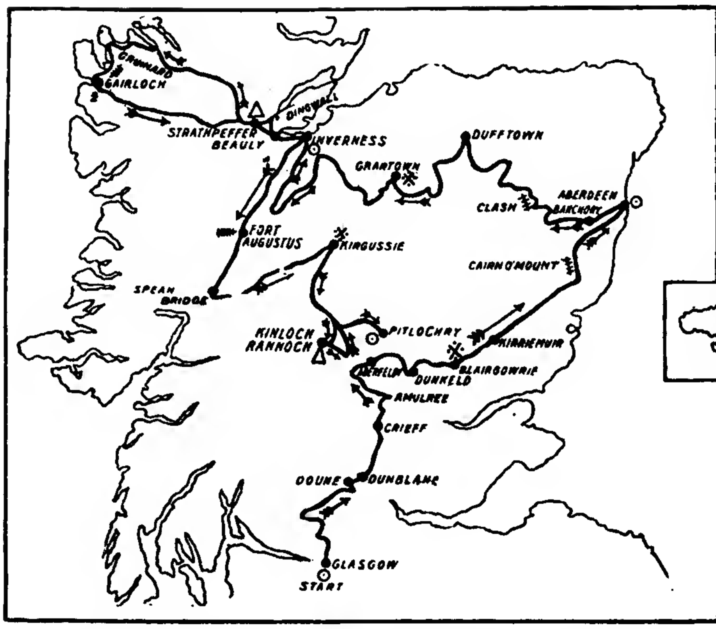
Sixty-five Starters Divided Over Eight Classes—The 65 cars were divided into eight classes on a price basis, but in Class H, for price above $3,250, the 50-horsepower Ariel was ranked by itself, which fact clearly demonstrates the decrease in popularity of the big car. By far the greater number of cars were of British origin, while the only representatives of America were the 10-horsepower and 20-30-horsepower Cadillacs, in classes B and D respectively. Both of these cars maintained their customary reputation for reliability, but while the latter made a perfect score, the former was delayed three minutes on the road for the fitting of a new commutator spring. This is the first stop that F. S. Bennett, the Cadillac representative, has had in any of the five annual trials in which he has driven.

After an early start at 7 A.M. on Monday, the cars were driven north to Aberdeen, but instead of the main road, a circuitous journey was taken to include the now famous Amulree and Cairn O' Mount Hills. The former of these has several pieces of reputed 1 in 4 (25 per cent) grade, and as these are found on bad hairpin corners, the drivers had a very exciting time. Nearly a dozen cars had to shed passengers or else required assistance, and these failures were by no means confined to the smaller classes, for overgearing seemed to be a general fault. The drop on the other side of Amulree was, if possible, worse, and the consensus of opinion now at the end of the trial is that this hill is the stiffest to be met with in the whole of Scotland. The Cairn O' Mount climb in the afternoon was easy by comparison, and after a dusty run the full number of cars reached Aberdeen inside the time limit.

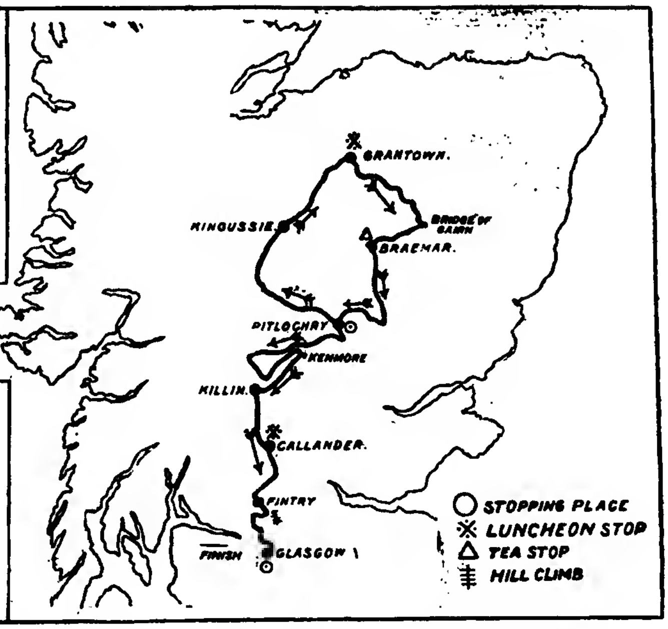
The next day's results were not so fortunate and the eliminations commenced early. Most beautiful country was traversed on the road for Inverness, which included in its course some severe climbing over Cairngorm. The ascent from the Bridge of Avon overheated the 8-horsepower Chenard Walcker so much that a cracked water jacket ensued, causing the withdrawal of this sturdy little car. Immediately afterward the 45-horsepower Austrian Daimler was withdrawn.

Austrian Daimler Out on Account of Overgearing—This car is a new production from the Neustadt works of the Mercedes Company and was expected to put up a very creditable performance, but its gearing was much too high for Scottish roads, so that on several hills outside assistance had to be called up. The smaller car of this make, rated at 30-horsepower, made a much better showing. Throughout this day overheating was prevalent to an unwonted degree and many cars hitherto blameless in this respect experienced engine and radiator troubles. The timed ascent was at Clash Hill, but on account of the comparative easiness of the grade, which nowhere exceeded 1 in 10 (10 per cent), only classes A, B, and C were raced up it. The Riley runabouts took the honors in the first two and the 10-12-horsepower Humber in Class C—a state of affairs maintained throughout the series of climbs.

In the afternoon, near the Fall of Foyers, famed for its aluminium works, the big Ariel struck a corner, but after a change of the Rudge-Whitworth detachable wire wheels, the car was



Plan of route for the first, second, third and fourth days



Plan of the route selected for the fifth and sixth days

Outline Maps Showing the Ground Covered in the Scottish Reliability Trials

able to proceed. The Gregoire and Rapid cars had lengthy stops on the road, and the 38-horsepower Knight-Minerva, which had quite come up to expectations on the hills, spoiled its record by an hour's clutch trouble.

Wednesday took the cars over new ground, right across to the western seaboard. Desolate marshes and lonely glens afforded a strong contrast to the country previously traversed, and the newness of the scene quite atoned for the execrable nature of some parts of the road. On one of the worst places the 40-horsepower Gladiator broke a front spring, quite an unusual occurrence—on this side, at any rate. On reaching the coast the cars dropped down to sea level in order to ascend the cliffs again by Gruinard Hill. After the formidable tasks of the first day Gruinard proved less trying than had been anticipated, and no failures were reported. Gairloch was the place of the luncheon stop, after which a straight run across the most beautiful part of the whole tour led back again to Inverness. Troubles were conspicuous by their absence, and, additional to the Gladiator, only the 20-horsepower Sunbeam experienced long delay. This, caused by a punctured carbureter float, was the first stop experienced by the driver, Eastmead, in the five annual trials. A like run of success was spoilt on the following day, when Bennett had a stop of but three minutes on his Cadillac.

Foreigners Win Thursday's Hill Climb—The cars headed southward again on Thursday, following the course of the Caledonian canal as far as Fort Augustus, where, alongside the ancient Benedictine monastery, a hill-climb was arranged for the bigger cars. On the previous days the British cars had been having all the awards in the climbs, but now the tables were completely changed and the Austrian Daimler and the Adler both swept the board in their classes. Many cars experienced trouble later in the day and less than half the cars finished at Pitlochry with a clean record from the commencement of the trial. Both the 20-horsepower Mass and the 30-horsepower Vinot were withdrawn, a succession of minor stoppages having robbed them of all chance of success.

From Pitlochry a circuit of 160 miles was made on Friday over the stiffest country that could be found. The Bridge of Avon and the other severe hills of Tuesday were taken in the reverse direction and the ascents and descents were universally reported to be much worse than previously. Fortunately the weather remained good—quite a record for the Scottish Trial, which has usually been run in a continuous downpour from start to finish. On this route the brakes of the cars were tested by the officials at a surprise control, and despite the fact that, by a wise dispensation, free time was daily allowed for brake adjustment, three cars were penalized for failing to come up to the required standard. No timed climb was held on this run and stoppages were less in evidence, so that 40 cars managed to make a non-stop for the day. The fates were less propitious on Saturday, and during the final portion of the run back to Glasgow the Argyll and the S. P. A. were put out of the running by a broken connecting rod and a stripped differential pinion, respectively, both cars by chance having had a perfectly clean record up to this point.

Of the 65 starters no less than 58 completed the trial, a highly satisfactory result when the unusual severity of the test is considered. Forty-three non-stops were recorded for the last day and for the total distance the following 19 cars had no penalties against them:

Class A—None.
Class B—12-horsepower Adler, 12-18-horsepower Riley.
Class C—10-12-horsepower Humber, 14-16-horsepower Miesse.
Class D—15-horsepower Mass, 20-30-horsepower Cadillac, 15-horsepower Straker Squire, 14-16-horsepower Argyll, 15-horsepower Star, 16-horsepower Singer.
Class E—20-horsepower Vauxhall, 16-horsepower Humber, 20-horsepower Lancia, 15-horsepower Rover, 12-horsepower Talbot.
Class F—18-horsepower De Dion, 14-20-horsepower Sunbeam.
Class G—30-horsepower Adler, 24-30-horsepower Albion.
Class H—None.

For the final awards the results of all the climbs are taken into account, as well as the fuel consumption, so that the placings will not be known for another week. The formula used was: Total Marks =

$$\text{Marks for reliability} + \frac{\text{Total Marks for Hill Climbing.}}{\text{No. of Hill Climbs.}} + \frac{\text{Lowest fuel consumption per ton mile in Class} \times 100}{\text{Fuel consumption per ton mile}}$$

Maximum marks for reliability were 850; for each climb, 50.

Kennels on Autos for Canine Travelers—An English automobile firm, according to *Popular Mechanics*, has built a car with a body which opens at the back, revealing a roomy kennel for carrying dogs. It is the idea that the cars run too fast for dogs to follow on foot, or to trot contentedly along between the rear wheels of a carriage, as when the horse was supreme. The general impression, however, is that the dogs will not be at all satisfied with being cooped up at the rear, for those seen in autos generally insist on having the seat of honor—next to the driver.

EDGE IMPRESSED WITH AMERICAN AUTO INDUSTRY

LONDON, June 29—Selwyn F. Edge, the well-known British autoist, has returned from his trip to the United States enthusiastic over the progress of the industry there. That he was evidently impressed by its development has been shown by the statements made by him in interviews, and his opinions have considerably surprised English manufacturers. It has not been generally accepted that the production of the American factories for 1909 of cars that are really serviceable would reach the sum of probably 80,000. Nor has it been thought that the increase predicted to perhaps 175,000 automobiles for 1910 was anything but publicity. Mr. Edge, however, has assured his fellow-makers that these reports are correct, for he has seen evidences of them. He says:

"Nearly everybody in America is going in for some sort of car and the fever has reached the remotest villages in the farming regions. Many farmers have learned that the automobile is not only a great machine for pleasure, but an even more important means of pushing modern business. Gasoline, sooner or later, in large measure will supersede the horse in hauling grain to market and drawing heavy plows. American manufacturers of cars are close students of the demands of public conditions in the country. They are also ingenious, inventive, and immensely enterprising. The finest cars made in America are equal to the finest made in the world, and the cheaper American cars are without equals in any other country. They give more value for their cost, weight, and size than any other article of manufacture on wheels. Unless the European manufacturers wake up to the importance of the cheap-car market, and produce more cheap cars; and better ones, the Americans are going to sweep Europe with these machines as they are now sweeping America.

"The Yankees have lots of bad roads, but they are finding out the best way to negotiate them in automobiles. Moreover, they build cars that go after bad roads and hills like a hungry boy after popcorn."

BRITISH PRESSITES "SENT FROM COVENTRY"

LONDON, June 22—Newspaper representatives of the British Empire, attending the Imperial Press Conference, were given an especial treat on June 15 as the guests of the Daimler Company of Coventry. A beautiful ride in thirty-three of the newest of English Daimlers through the Shakespeare country, an impromptu hill climb, and lunch at Warwick Castle featured a memorable day. The journalists assembled on a special train which reached Coventry at 11.30, and at the immense works of the automobile builders a reception was tendered them by the Mayor and officials, including C. Y. Knight. After inspecting the factory the party took possession of the automobiles and were conveyed to Warwick Castle, via Kenilworth and Leamington, where Lord and Lady Warwick entertained at luncheon.

The famous Sunrising Hill was an interesting part of the route and the Daimler Company had arranged a telephone system to insure safety. All machines went up with little difficulty and the journey continued to Cromwell's Tower, where a beautiful view of the Avon valley is obtained. Tea was served at the White Lion, in Banbury, and the run to Oxford made in the evening, the delegates spending the night in the university town. The Daimler Company not only furnished the cars but in many small ways cared for the comfort of the tourists.

Press Delegates Visit Warwick Castle

What the Clubs Are Doing These Days

MINNESOTA PLANS "LITTLE GLIDDEN TOUR"

MINNEAPOLIS, MINN., July 3—A "Little Glidden Tour" is now being arranged by the officers of the Minnesota State Automobile Association and will be held on August 26, 27 and 28. It is proposed to make the event a strictly amateur event run under the same rules as the Glidden tour. The St. Paul *Despatch* has given the principal trophy, a $500 silver cup, which is to be contested for annually, and Col. F. M. Joyce and H. S. Johnson have each given a $100 trophy, to go at once to the clubs whose cars win in the runabout and in the toy tonneau classes. Three routes are projected, one to Fargo, N. D., and return; another through Southern Minnesota, visiting 15 towns and cities where there are live automobile clubs, and the third route to Duluth and return. Each club in the State association, of which there are 25, will enter one and possibly more cars, and in all at least 40 cars are expected. H. S. Johnson, chairman of the tours and contests committee, will have associated with him on that committee one representative from each of the clubs.

SPRINGFIELD, MO., CLUB A REALITY

SPRINGFIELD, MO., July 5—For the past two years the Springfield Automobile Club has been an organization in name only, but a number of the automobile owners have set about to resuscitate it. The following officers have been elected: President, W. H. Horine; vice-president, Holland Keet; secretary, J. E. Atkinson; treasurer, Robert L. Pate. Two matters of immediate interest brought about this movement: first, to determine, if possible, upon the persons who have been stretching wire across the National boulevard, causing two accidents to autoists: and second, to organize a tour to Kansas City to meet the Glidden tourists. It is probable that a number of local cars will leave this city on July 26 to see the finish of the big contest.

HARTFORD HAS PARTIAL ORPHANS' DAY

HARTFORD, CONN., July 3—There seems to be something always interfering with the Automobile Club of Hartford's celebration of orphans' day. It had been planned to hold it during the national week, but rain prevented. The following week the children had some other function, and ever since then the club and the institutions have been unable to set mutually favorable dates. The club members have decided to let the orphan asylums name the day for the outing. About 50 of the children from the St. Patrick Orphan Asylum were given an afternoon diversion on Wednesday, when they were taken to Cromwell, where refreshments were served in a cool, shady grove.

BAY STATERS DECLINE UNION

BOSTON, July 3—The latest attempt to consolidate the Bay State Automobile Association and the Boston Motor Club, under the name of the Bay State Motor Club, has come to naught. The members of the Bay State Association at a special meeting this week refused to accept the terms agreed upon by the directors of the two organizations.

ROCHESTER AUTOISTS ASK POLICE POWER

ROCHESTER, N. Y., July 5—The Automobile Club of Rochester has decided to assist the local police authorities in stopping speeding, by watching its own members. It is planned to have ten members with police power to report those who drive too fast. The latter will be asked by the club to desist or be reported to the police.

GOOD ROADS CONCERT IS A NEW ONE

LANCASTER, PA., July 5—Agitation in favor of good roads has assumed many forms, but the Lancaster Automobile Club has discovered the newest one, that of giving concerts in behalf of better highways. In different localities out through the country, semi-monthly entertainments are held with the best musical talent procurable, and a nominal admission fee charged. The event is widely advertised in advance as "for the benefit of the good roads movement in Lancaster County," and a split-log drag is kept in front of the concert hall for several days previous to the musicale. At the most recent of these affairs, held in the Borough of Mount Joy, club members attended from all over the county, and the farmer element was proportionately strong. About $100 was cleared for future expenditure in conducting the good roads campaign. As a result of the work already done the county clay roads are in splendid condition, in some places being much better than the old pikes.

CHARLESTON, S. C., AUTOISTS ORGANIZE

CHARLESTON, S. C., July 5—For many months the automobilists of this city have talked of and much desired an automobile club, to foster their interests along lines of legislation, good roads, and sports. On Wednesday evening a number of them met and formed what will be known and incorporated as the Charleston Automobile Club. The following officers were elected: President, Wilson G. Harvey; vice-president, E. W. Durant, Jr.; secretary, Lane Mullally, M.D.; treasurer, F. G. Davies; solicitor, J. N. Nathans, Jr. These officers, with C. Norwood Hastie, Julian Mitchell, and E. W. Hughes, will form the charter members and take the first steps toward increasing the membership, determining the amount of dues, and considering any other immediate questions. At an early meeting it is planned to elect a board of governors and appoint a number of committees. Inasmuch as there are over 175 automobilists in the city a representative number is expected in the new organization.

NEW CLUB FORMED IN DETROIT

DETROIT, July 5—The Detroit Motor Club is the latest addition to local automobile organizations, having been launched last Thursday evening. Over 100 members have already been secured and it is predicted that inside of two months the list will have been increased to a thousand. Officers elected for the ensuing year are: President, Joseph F. Stringham; vice-president, J. S. Haggerty; secretary, John Gillespie; treasurer, George S. Lawson. The board of directors consists of these officers and Herbert J. Flint, Frank Briscoe, W. F. V. Neumann, Robert K. Davis, Charles Grant, Robert Kuhn, and T. W. Henderson.

All owners of motor cars are eligible to membership and it is planned to give Detroit an automobile club on a more practical and comprehensive basis than it has ever had.

SPRINGFIELD HAS SECRET TIME RUN

SPRINGFIELD, MASS., July 2—For a genuine good time, and a contest feature that gave every man an equal chance, whether his car had a single cylinder or six, the reliability run of the Automobile Club of Springfield went far ahead of anything the organization has ever fostered. Carrying about 100 people, 26 automobiles participated in the event on Monday, but the findings of the committee were not announced until last evening. In reality the competition was a side issue, as compared with the good fun expected and found by those who entered. A route of 37 miles in length had been selected, over which the cars were to be driven at an average speed of 15 miles an hour, and there were secret checking stations to see who came nearest to this. Principally, however, there was a clambake at the finish, at the Auto Inn, North Wilbraham.

When the scores of the cars had been carefully examined it was found that Henry Cave had taken his Stevens-Duryea through on the best schedule, his total time off at the various stations being 3 minutes and 38 seconds, thereby winning the Fisk Rubber Company's silver cup. This must be won three times in succession by the same person in order to secure it as a permanent possession. George L. Aikey, in an American roadster, took the second honors, and was awarded the Stevens rifle donated by the Stevens-Duryea Automobile Company. James Duckworth, in a Knox, won third prize, the Knox Automobile Company's gold medal; and a basket of lemons and carnations was given to J. C. Burke as a consolation. Mr. Burke drove his Cadillac with little regard for the time, and was almost two hours off. Only bona fide club members in good standing were allowed to compete.

The start was made from the club headquarters in the Worthy Hotel at 9 o'clock in the morning, an hour after H. S Sterns, in the confetti car, had left to mark the crossroads and turns. The first car away was that of Harry Fisk, and the others followed at intervals of three minutes. When 19 had been sent off there was an intermission of half-an-hour. Then the remaining contestants proceeded, also with the three-minute separation, Dr. F. C. Collins bringing up the rear with a large American flag, in his Cadillac, to mark the end of the caravan. The police closed Worthington street during the preliminaries to prevent confusion. The machines swung away from the checker toward Brightwood, out Chicopee street, over the State road, through Aldenville, Williamansett, Holyoke, South Hadley Falls, Granby, Belchertown, Ludlow reservoir, Boston road, Nine-Mile Pond, and to the Auto Inn, at North Wilbraham. Stop watches, odometers, speedometers, and dash clocks received the most critical inspections of their existence, even more so than when police traps abound. This was no more than reasonable, since in the one case an error meant little while in the other case it was sure to disqualify the owner from the contest. Some of the results obtained in this way were truly remarkable.

The first checking station was between Granby and Belchertown, with Ernest J. Dexter in charge: and the second was at the 30½-mile mark, near the Ludlow reservoir, presided over by Frank W. S. King. The contestants had all checked in between 11 and 12 o'clock at the inn, and while the clambake received its finishing touches, picked teams amused the crowd by playing "at" baseball. By the time the non-contestants had arrived the entry list for the clambake had increased to about 140. The committee in charge of the entire outing was comprised of Dr. C. S. Murless, T. B. Gilbert and H. S. Stearns.

AUTOING GROWS IN WESTERN CANADA

WINNIPEG, CANADA, June 26—The present year has seen a wonderful growth in automobiling throughout Western Canada, and dealers have found it impossible to fill orders which have been placed for cars. The vigorous selling campaign which was carried on throughout the prairie provinces during the Winter and early Spring months resulted in numbers of cars being sold in all the small towns, some of which, with a population of less than 500, now having seven or eight automobiles to mark the general prosperity which resulted from the harvest of 1908.

In Winnipeg, the great distributing centre of Western Canada, the phenomenal increase of business has made it necessary for some of the dealers to increase their garage facilities, the McLaughlin Carriage Company, Ltd., of Oshawa, Ontario, having erected a fine new building in Winnipeg as headquarters for its western business. The construction throughout is of reinforced concrete, making the building practically fireproof. Accommodation is provided for upwards of 100 cars, and the repair shop is equipped with the most modern plant. A new concern under the name of the Canadian Western Electric Automobile Company, Ltd., has been incorporated with a capital of $30,000, and will manufacture storage batteries, dry cells, and a small electric vehicle, the design of which has not yet been settled.

The good-roads movement has received considerable support, and a joint committee of representatives from the city of Winnipeg and neighboring municipalities has been appointed to arrange a combined method of carrying out the improvements. The provincial government has signified its intention to assist the movement, and it is confidently expected that when the 1912 world's fair takes place in the prairie capital, there will be hundreds of miles of good roads running into the city.

The Automobile Club has arranged for a pleasure tour commencing on or about August 7, to Regina, and W. C. Power and H. A. Aylwin have been appointed official pathfinders, and will leave Winnipeg early in July to map out the route. Immediately following the tour, the annual reliability run will be held over the same route as in 1908, for the Oldsmobile trophy. The speed events for the Dunlop trophy will be held on the Kirkfield track, but no definite date has yet been fixed for the event.

Commercial vehicles are gradually coming into use, the Canadian Pacific Railway Company having three big Argyll trucks; the Canadian Northern, three Packards; the Central Dray Company, a "Rapid" light van. The Maple Leaf Renovating Company has a small delivery machine which is making a good showing for quick delivery of small parcels, and attracting the attention of the retail merchants toward modern means of transportation. If this year's harvest is satisfactory, the sale of cars next year will far outrival even the present season's record.

In this way a few are converted each year to the commercial cars, and they, in turn, convert their neighbors, so that the number of vehicles in use grows every year.

Reliability Run of the Automobile Club of Springfield, Mass., at the Auto Inn, at North Wilbraham

THE AUTOMOBILE

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AN EPOCHAL TYPE OF ENGINE

History has it that all pioneers were poorly treated, and in this one American trail-blazer named Brayton was no exception. Brayton was, however, always given credit for the fundamental work which he did in connection with the development of a new type of internal combustion engine. Now that much interest is being manifested in the efficiency of motors as well as in the larger question of fuels, the time for a revival of the type fathered by the Philadelphia inventor is as particularly well chosen as Brayton's own attempt was badly timed.

This form of engine, described somewhat in detail in this issue, as revived in an improved form, is likely to receive very good support from all those who have sought a more efficient, more flexible engine adapted to burn any kind of fuel and do so economically. In the constant pressure type of engine now given some notice, all these much-desired results are attained and, what is seldom the case, without a consequent sacrifice of something else. This holds unless the mere matter of number of parts be considered a positive detriment or come in the "sacrifice" class, which, to say the least, would be far-fetched.

When it is considered that the constant pressure engine, as constructed by Stilz, is in addition self-starting, any possible objection which might be raised on the score of number of parts, loses force, for is not the ordinary engine, with the addition of a self-starting device (where that is possible) complicated and composed of many parts?

So it is that Stilz, taking up Brayton's thirty-five-year-old engine, but with improvements of his own which make it a commercially feasible proposition, is due for all of the credit that usually goes to a pioneer with a meritorious or apparently worthy invention.

* * *

REVIVAL IN BLOCK TYPE OF MOTOR

Not infrequently it happens, in the introduction of something new and decidedly different, that the scorn and ignominy heaped upon the introducers is out of all proportion to the value of the device fostered. And not infrequently it also turns out, in conjunction with a change of this sort, that the merit recognized tardily by the original critics is ultimately adopted by them.

So it was with the style of engine in which the cylinders, two, three, four, or six in number, were cast in a unit. Formerly these were spoken of using the French phrase *en bloc*, but now it has been Americanized and we say the "block type." This type of engine was a prolific source of discussion from a year and a half to a year ago, following its adoption by the foremost French constructors. After much discussion and an endless amount of criticism, the subject was dropped under a blight, perhaps.

Now, one year later, it is a noticeable fact that all of the new-model, small-sized cars are so equipped. Not only this, but in the interim, many makers have quietly adopted the same form of construction, so that to-day the American makers, taken as a whole, present as many sterling examples of the block construction as do the originators of it, the French.

From the point of view of the man who buys a medium priced machine, the block construction representing the extreme of simplicity, means less sources of trouble and also lower first cost. By reducing the cost, this construction has placed the automobile within the reach of an increased number of people.

Considering the simplifications which this form allows and, in fact, fosters, it will be a great surprise if in the long run it does not displace the small-sized twin-cylinder casting, as well as the individual-cylinder type, so that ultimately for all motors of four-inch bore or less, the block casting will displace all others.

* * *

AND NOW THE YEAR'S BIG TOUR

Never before have the participants in the big annual tour of the A. A. A. been asked to travel such a distance, and this under rules more exacting than in any previous year. But it is with no doubt as to the outcome that the prediction is freely made that the 2,600-mile journey will redound to the reliability credit of the American automobile industry as a whole.

The territory traversed, with slight exception, will experience its first "Glidden tour," which means that housands will gaze in wonder at the dust-covered cavalcade, and be impressed with the ability of the motor-driven vehicle, despite the inevitable dishevelment of the participants, for in the Middle West clothes count for less than wholesome manners and man's belief in mankind.

The Gliddenites of 1909 will have pleasant recollections to revive along with the memories of hardships and dusty roads, for the welcomes will be innumerable and genuine.

SEPT. 6 AND 8 FOR LOWELL'S NATIONAL STOCK RACES

LOWELL, July 6—The dates and character of the national stock car races to be run on the Merrimac Valley course were practically decided last week when Chairman Hower of the A.A.A. contest board, President L. R. Speare, Harry Knights, Boston representative of the board, and Fred J. Wagner came here for a conference with President Heinze of the Lowell Automobile Club and others interested in the automobile carnival, and to inspect the course.

Monday, September 6—Labor Day—there will be a sweepstakes race with four classes at distances varying from 110 to 250 miles.

Wednesday, September 8, the race for large cars will be held at a distance of from 300 to 400 miles.

These are the dates now agreed upon and probably there will be no change. The exact distances will be settled a little later. A $5,000 trophy will be offered for the Wednesday race and suitable trophies for the different classes in the sweepstakes event.

Chairman Hower was well pleased with the course and believes that the ten-mile circuit will provide some of the sportiest racing ever seen in America. Fred Wagner is confident that cars can be started easily at 30-second intervals, which will permit a field of 20 cars in each event. That both races will have plenty of entries the officials are certain, and they will include the fastest of American and foreign cars.

An elaborate special invitation to President Taft to attend the races has been prepared and will shortly be forwarded to him. It has been signed by the governor, lieutenant governor, president of the senate, speaker of the house, Congressman Ames of the Lowell district, Mayor Brown of Lowell, President Speare of the American Automobile Association, and President Heinze of the Lowell Automobile Club. It is thought that at the time of the races President Taft will be at his summer home in Beverly, and it is hoped that he may decide to accept the invitation to attend the national stock car events.

QUAKERTOWN MAY INVITE FOREIGNERS TO COMPETE

PHILADELPHIA, July 2—The lack of entries which spoiled the Quaker City Motor Club's State-highway run to Pittsburg and return, and which compelled the abandonment of its proposed 24-hour race and the substitution therefor of a one-day meet, has made that organization's contest committee wary to a degree. Both of those affairs, before their details had been made public, had been assured sufficient entries to make them successful. When the time came for a showdown two-thirds of the promised cars failed, for one reason or another, to materialize. Chairman Ross will take no chances on a similar throw-down for the club's second annual 200-mile Fairmount Park stock chassis race, scheduled for October 7 next.

The contest committee originally decided—and, indeed, prefers—that the race should be limited to American built cars; but having in hand several bona fide foreign entries, Mr. Ross prefers not to refuse them until every home manufacturer shall have had a chance to come in. There is only room for a score of cars, and if, within a reasonable time, American builders have not sent in a sufficient number of entries to complete the list, the door will be thrown open to the foreigners.

The committee has sent out notices to all American manufacturers of fast cars to get in early.

ACTIVELY PREPARING FOR ALGONQUIN'S CLIMB

CHICAGO, July 3—Sixteen events, five more than last year, are upon the program for the Chicago Motor Club's annual hill climb at Algonquin. This will be held August 5 and really consists of 32 events, for the affair is held on two hills—one in the morning, a standing start effort, and the other in the afternoon, when the cars tackle another grade with a flying start. Both hills count, however, in deciding the winners. Six of the classes will be decided under the Chicago Motor Club formula, in which the cylinder capacity is multiplied by the time, and that result divided by the weight of the car with driver. The classification is to be by piston area, the program adopted at yesterday's meeting of the contest board being as follows, subject of course to the action of the A.A.A. contest board, which has been asked for a sanction:

DIVISION 1—HANDICAP

Class A—One or two-cylinder cars with piston area under 50 square inches.

Class B—Four or six-cylinder cars with piston area under 50 square inches.

Class C—Four or six-cylinder cars with piston area over 50 and under 65 squaer inches.

Class D—Four or six-cylinder cars with piston area over 65 and under 90 square inches.

Class E—Four or six-cylinder cars with piston area over 90 square inches.

DIVISION 2

Class F—Free-for-all, open to motor buggies, wheels 36 inches or over, solid tires.

Class G—Free-for-all, open to electrics.

Class H—Western amateur handicap championship, for four or six-cylinder cars, winner to be decided by the club formula.

Class I—Amateur free-for-all, touring cars or roadsters of any power.

DIVISION 3

Class J—Free-for-all, any type of stock car with piston area under 65 square inches.

Class K—Free-for-all, touring cars, five or seven-passenger, with piston area under 65 square inches.

Class L—Free-for-all, any type of stock car with piston area over 65 and under 90 square inches.

Class M—Free-for-all, touring cars, five or seven-passenger, with piston area over 65 and under 90 square inches.

Class N—Free-for-all, any type of stock car with piston area 90 square inches or over.

Class O—Free-for-all, touring cars, five or seven-passenger, with piston area 90 square inches or over.

No change has been made in the entry fee, it remaining at $30 per car, with half of this sum refunded in case of a start. There must be at least three entries to a class to make a contest. The entries will close at midnight, July 30, with Charles P. Root, 1806 Michigan avenue.

TOUR THROUGH NEW YORK'S LAKE REGION

ROCHESTER, N. Y., July 6—The touring committee of the Automobile Club of Rochester has made definite arrangements for the first annual tour. The committee is composed of W. W. Dake, chairman, A. J. Cunningham, R. A. Hagen, and President H. G. Strong and Secretary Bert Van Tuyle, ex-officio. The tour will start from the Hotel Seneca July 22, at 9 A.M. The route passes through some fine sections of the State, and nearly all of New York's inland lakes are touched in the trip. Secretary Van Tuyle will start July 8 on the pathfinding trip, and will be accompanied on the journey by Karl W. Hibbard.

1910 WINTON MARKED BY FOUR-SPEED TRANSMISSION

As Mr. Winton himself has aptly put it, the Winton changes for 1910 are only incidental, not radical, barring the four-speed transmission and enlarged clutch. It has been found in the experience of the past and previous years that the engine was more powerful and had more speed than the high speed of the old transmission would allow the use of. So a new top gear has been added to the transmission to allow the owner, if he so desires, to turn the engine loose with the assurance that every possible turn of the crankshaft will be utilized in the speed of the car. Coupled with this change, there was a necessity for or advisability of a larger clutch than heretofore, which would handle the higher power and speed. So the diameter of the multiple disc clutch was enlarged 50 per cent. without changing the number of discs. A minor change was in the number of springs, the newer use of four allowing very slight foot pressure to engage or disengage the clutch.

While the motor remains exactly the same, superior fuel supply is attained by a newly perfected carbureter, located in practically the same place. This allows the full use of the flexibility of the six more than has hitherto been possible. The working parts are more closely enclosed, yet this is done without any sacrifice of accessibility.

Lubrication is unchanged, the force feed system with a continuous sight feed on the dash being retained. Similarly the successful self-starting device is retained. Now that much accent is being laid upon the starting problem, this is of particular importance. Pressure from the front cylinder is stored in a tank, whence a rotary distributing valve furnishes it to the proper cylinders in turn. The motor is started by pressing a foot button on the dash, the air pressure doing the rest. This whole system may be used for tire inflation by a simple attachment, thus doing away with the back-breaking work.

Greater Comfort Assured by Larger Springs—An item that never fails to interest is that of comfort. An increase in this is obtained by increasing the length of the springs, the style being the same as before. In addition to long, wide springs, four shock absorbers and four rubber bumpers are fitted.

One noticeable change, which may or may not be in the nature of an experiment, is the change in the material of the front axle. This has always been made of manganese bronze, but this coming year is to be of large section pressed steel. With the change in front axle, probably strengthening it, comes an increase in the wheel base. This has been increased to 124 inches, four more than previously.

To this chassis of greater length is fitted not a longer but a shorter body. In this way the maximum amount of comfort is obtained, as the various dimensions may be made as long or as great as possible. The regular body is the four or five passenger type, with bucket seats in front and a short tonneau in the rear. A seven-passenger body is made as an extra. The new tonneau doors are unusually wide. Running boards have been widened and are covered with pressed aluminum. All bodies are of wood, built especially to Winton designs.

In moving the main gasoline tank to the rear, a move for greater safety and increased convenience has been made. The three-gallon reserve feature which has become so popular will be retained. The main tank has a capacity of 22 gallons.

Other and minor features which have been subjected to change are: radiator with longer tubes, longer filler and hard rubber cap; hard rubber steering wheel rim, movement of operating levers nearer the seat as an option, longer spark and throttle levers, increased pedal leverage, with the option of long or short pedals; larger exhaust pipe and Eisemann dual ignition. With all these changes the price remains the same—$3,000.

WINTON BRANCH MANAGERS IN CONVENTION

Cleveland, July 3—Winton branch managers and road men enjoyed a busy convention here this week. There was something doing every minute from breakfast to good-night. Baseball, field sports, a yacht ride, a theatre party, and a trip to Luna Park were only part of the doings, which included every variety of luncheon and dinner except the formal kind. The participants were: Vice-President Henderson, Secretary Brown, Sales Manager Churchill, Advertising Manager Mears, Parts Manager Smith, Engineer Anderson, Traffic Manager Baughman, Superintendent Weidig, Purchasing Agent Ranney, and the following branch managers and road men: Messrs. Hinchcliffe, of Boston; Brown, of New York; Calvert, of New Jersey; Maltby, of Philadelphia; Stockbridge, of Pennsylvania; Duck, of Baltimore; Kiser, of Pittsburg; Brockway, Sealand and Walley, of Cleveland; Henderson and McCrea, of Detroit; Davis and Roe, of Chicago; Johnson, of Minneapolis; Lewis, of Kansas City; Miller, of Seattle, and Owesney and Arbuckle, of San Francisco.

STEVENS-DURYEA GIFT FOR QUEBEC PREMIER

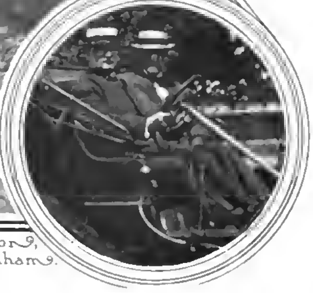
Montreal, July 5—Sir Lomer Gouin, premier of the Province of Quebec, has been presented with a six-cylinder Stevens-Duryea touring car by a number of his friends, as a mark of their esteem. The ceremony partook of the nature of a surprise at the St. Denis Club, while the big automobile stood nearby, and later in a trial showed the premier that it was well able to carry him up the hills of the city. Alderman Lavaller on behalf of his colleagues madé the presentation address. The car was sold by Managing-director L. D. Robertson of the Comet Motor Company, local distributor of the Stevens-Duryea.

PREPARATIONS FOR THE GARDEN SHOW

New York, July 5—While most automobilists who attend the annual shows in this city have not given the 1910 ones more than a passing thought, there are two bodies of men which are preparing for the great exhibitions already. For the tenth national show at Madison Square Garden, that of the Licensed Association of Automobile Manufacturers, active work is now going on. Contracts are being let, plans are practically all completed, and even the manufacturers are beginning to arrange for the machines which will compose their exhibits. The activity of the show committee, made up of Col. George Pope, of the Pope Company, chairman; Charles Clifton, of the Pierce-Arrow Motor Company, and E. P. Chalfant, of the Packard Company, has been of several months' duration.

Scores of carloads of lumber, special sheet and structural steel, burlaps, bunting, and other materials have already been ordered, and some are being manufactured. These will be used in constructing the balconies, which will be larger than usual, and for covering the walls and floors. The committee has succeeded in developing additional floor space this year, much to the wonderment of those interested, by increasing the width of the balconies. The elevated platform, which has been a feature for some years at the Seldenite exhibition, will be supported by a single series of posts, enhancing the artistic value as well as giving the necessary room, and will extend around the whole auditorium. The various corners and small rooms of the great building will be utilized as formerly, for accessory, motorcycle and commercial vehicle makers.

From the present indications the manufacturers will all have their new models ready well in advance. Some are even now preparing the cars which will be exhibited, and some wonderfully beautiful body designs are well under way.



President J L Hudson, Chief-Engineer Dunham.

SURPRISING as have been the car announcements of the past few weeks, none has excited the comment as has the announcement of the new car to emanate from Detroit, the Hudson "Twenty," by name. This will present in a concrete form all of the ideas in small car construction gained in the past season, and from a manufacturing standpoint will embody the results of twelve years of automobile construction knowledge. Starting with a staff of old experienced automobile men, concentrating its attention on a single model, and going in for a very large production, many economies are thus brought about, with the result which has aroused the automobile world, the price being but $900. This, with a Bosch magneto, top, gas tank, and extra rumble seat, being increased to $1,050.

Of the men behind this new car, most are well known in the industry, with the possible exception of the president, J. L. Hudson, one of Detroit's leading merchants. Of the others, Hugh Chalmers is president of the Chalmers-Detroit Motor Company. So, too, R. D. Chapin and H. E. Coffin are connected with the Chalmers company, while R. B. Jackson, general manager, and G. W. Dunham, chief engineer, both served many years with the Oldsmobile manufacturers.

Personnel Reflected in the Product—With such a motorwise bunch "on the job," it is not strange to find the product so meritorious. From the front to the rear of the chassis, every part has been carefully considered both for its individual ability and serviceability, and for its interrelation with every other part. Starting with the standard body, which is furnished for the single chassis to be manufactured, this is of the roadster type, with full front seat and single rumble in the rear. It is well made of selected poplar on sills of the best ash, the seat backs being poplar also. The large and roomy seats are upholstered in apple green, while the main color is a deep maroon. To set this off best, a fine stripe of old ivory is used, and black mouldings. With the maroon, black upholstering may be had, while with the green trimming, battleship gray will be furnished, if preferred by the prospective purchaser.

Taking up the real, beating, pulsating heart of the car first, the engine, this is of the four-cylinder variety, with cylinders cast in a block. In this, it follows the most modern and approved practice in small motors. The motor is of the T head type, with valves all on the right side, as used by the famous French constructor, Renault, until it is now called the Renault type. The cylinders, with 3¾-inch bore, are of the best grade of gray iron, with water space between the cylinders and of a very generous size around the exterior and at the ends.

Preference Given to Long Stroke—In the length of the stroke, 4½ inches, is shown another very modern tendency, the preference for the long stroke, slow speed engine. This gives for this car a ratio of bore to stroke of 1.2, which should make for strong pulling power at comparatively low speeds. Although the A. L. A. M. rating formula would allow of calling this sized engine a 22.5 horsepower unit, the makers have preferred to give it a lower more conservative rating and so call it a twenty.

The aluminum crank-case is in two parts, the upper carrying the two large plain crankshaft bearings, and being attached to the frame by means of four large section arms. The shaft is of large diameter, made from a high grade material, having a tensile strength of 100,000 pounds, and is ground to size. Not only the crankshaft, but the camshaft, cams, pistons, piston pins, valves, and many other parts are subjected to the grinding process to insure accuracy.

Engine lubrication is of the forced circulation splash type. An oil well of three quarts capacity is cast integral with the lower half of the crank-case, with a simple plunger pump, operating by an eccentric on the camshaft, raising oil from the well and forcing it directly to the parts.

By utilizing a carbureter of the Venturi tube variety, with ball auxiliary valves, the up-to-dateness which pervades the whole car is maintained. Ignition is by means of battery and timer, the latter, of the La Coste type, being independently supported at the rear end of the camshaft. From the engine the drive is through a large diameter cone clutch, faced with leather. Under this facing a series of flat springs make for easy and gradual engagement. The clutch thrust is well taken care of by a large ball thrust bearing.

First Small Car with Three-Speed Selective Transmission—Being accustomed to think of small cars as fitted with a planetary transmission, it comes as a surprise to learn that this car is equipped with a three-speed and reverse-gear box, operating on the selective principle. Like the engine, this is mounted in a two-piece aluminum gear-case, supported upon four large arms. The transmission bearings are also plain, and are provided with oil retainer chambers on the ends.

Both engine and transmission are secured to a sub-frame of the dropped type, which is made a part of the main frame. The latter is of pressed steel, the material being best open-hearth stock, with a 3½ by 1½-inch section.

The frame has what is called a drop at the rear of 2½ inches, this allowing the car to be hung low and at the same time have adequate clearance. With this drop frame is used three-quarter elliptic springs, 1¾ inches wide by 44 inches in length. With these, the front springs of 36-inch length are fitting companions.

An I-beam section front axle and a semi-floating rear axle complete the chassis, both being mounted on roller bearings.

Double Acting Brakes on Rear Wheels—Braking, always important, whether the car be large or small, is here well cared for by two large double-acting brakes located on the rear axles and acting on the interior and exterior of large diameter drums bolted to the rear wheels. The external brakes are firmly supported on brackets, which prevent rattle. Both brakes work equally well in either direction, and both are lined with a heat-proof asbestos fabric, which is readily removable.

Steering is by means of a gear of the worm and gear type, mounted upon exceptionally large bearings. The steering post is laid over at an exceptional angle affording a very racy appearance and placing the sixteen-inch steering wheel in a very comfortable position for the driver. The control aside from this is standard in that it follows the regular practice of standard cars.

Barney Oldfield in His New National Racer, "Old Glory"

PLAINFIELD HAS FIRST HILL CLIMB

PLAINFIELD, N. J., July 6—Charter Day celebration was featured to-day by a hill climbing contest on Johnston's drive, over a distance of seven-tenths of a mile, with nine difficult turns, and an average grade of 15 per cent. There were six events on the list and there were sufficient entries, and good ones, to give a successful affair. One mishap occurred to a National car which was driven by George Weldon, accompanied by William Bolen. They were just making the last hairpin turn within a few yards of the finish, in the free-for-all, when a wheel struck a wooden culvert, the car turned turtle and went over an embankment. Both men were thrown clear, but Bolen's shoulder was fractured.

J. R. Rutherford in a Stearns and George Rankin in a Chalmers-Detroit have equal claims upon the fastest time of the day, 1:28, made in two separate classes. A four-cylinder Maxwell, driven by William Sichinger, came close to this by winning a class event in 1:28½. The event was in charge of F. J. Titus. The summaries:

Pos.	Car	H.P.	Driver	Time
	CARS SELLING FROM $2,001 TO $3,000			
1	Chalmers-Detroit	40	George Rankin	1:29 2-5
2	Palmer-Singer	60	F. C. Lescault	
3	National	35	George Weldon	
	CARS SELLING FROM $1,251 TO $2,000			
1	Marion	35	Charles Stutz	1:36 4-5
2	Herreshoff	24	George Robertson	
3	Buick	30	C. S. Dutcher	
	CARS SELLING FROM $851 TO $1,250			
1	Buick	18	Easter	1:44
2	Overland	30	George Reese	
	CARS SELLING FOR $850 OR LESS			
1	Maxwell	22	William Sichinger	1:28 1-2
2	Maxwell	22	Arthur See	
3	Hupmobile	16	K. D. Martin	
	FREE-FOR-ALL			
1	Stearns	30	J. H. Rutherford	1:28
2	Chalmers-Detroit	40	George Rankin	
3	Simplex	50	W. Heltmeyer	
	WINNERS' CLASS			
1	Chalmers-Detroit	40	George Rankin	1:28
2	Maxwell	22	William Sichinger	

CABLES CREDENTIALS TO CHAIRMAN EVANS

NEW YORK, July 3—Powell Evans, in representing the A.A.A. at the London convention of the League Internationale Association des Tourists, will also be the real official delegate of the United States. Because of a hurried departure the necessary credentials on behalf of the government were not obtainable, but this week these were cabled to Mr. Evans from Washington. Secretary Elliott of the national body and Secretary S. Boyer Davis of the Automobile Club of Philadelphia had a conference early in the week with Vice-President Sherman, Secretary of State Knox, and Attorney-General Wickersham relative to the official recognition, and the cable message was the result.

REGAL EN ROUTE FROM YORK TO 'FRISCO

NEW YORK, July 5—At exactly noon the sturdy little four-cylinder Regal started from Times Square on its long trip to the Pacific Coast. Fireworks were intermittently sputtering, though one of the usually busiest places in the "big town" was tenanted by only a few unfortunates who had failed to escape to some resort or other. It so happened that the weather was exceptionally inviting and ideal for the beginning of a long automobile tour.

"Snow Ball Bill" Smith was at the wheel, with George D. Wilcox alongside as the route scout, while comfortably seated in the tonneau were Marcus Allen of the Empire Tire Company, Trenton, N. J., and R. P. Byrne of the Regal Sales Company, Syracuse, N. Y. These two will be replaced by others later on.

This is the first trip of its kind in trying out a new four-cylinder model of the $1,250 class, and the route has been so arranged as to visit all the Regal agents from coast to coast. No record-breaking schedule has been prepared, but the trip will be comfortably covered in 30 days, this being the itinerary as at present laid out:

New York, N. Y.		July	5	North Platte	Night	July	18
Poughkeepsie, N. Y.		"	5	Sterling, Col.	"	"	19
Utica, N. Y.		"	6	Denver, Col.	"	"	20
Syracuse, N. Y.	Noon	"	7	Cheyenne, Wyo.	"	"	21
Rochester, N. Y.		"	7	Rawlins, Wyo.	"	"	22
Buffalo, N. Y.	Noon	"	8	Rock Springs, Wyo.	"	"	23
Erie, Pa.	Night	"	8	Evenston, Wyo.	"	"	24
Cleveland, Ohio	Noon	"	9	Ogden, Utah	"	"	25
Toledo, Ohio	Night	"	9	Kelton, Nev.		"	26
Detroit, Mich.		"	10	Montello, Nev.		"	27
Goshen, Ind.		"	11	Battle Mountain, Nev.		"	28
South Bend, Ind.	Noon	"	12	Mill City, Nev.		"	29
Chicago	Night	"	12	Hazen, Nev.		"	30
Clinton, Ia.	"	"	13	Reno, Nev.		"	31
Cedar Rapids, Ia.	"	"	14	Colfax, Cal.		Aug.	1
Carroll, Ia.	"	"	15	Sacramento, Cal.		"	2
Omaha, Neb.	"	"	16	San Francisco, Cal.		"	3
Grand Island	"	"	17				

Columbus, Ohio.—F. E. Avery is having plans prepared for a two-story addition, 65 by 127 feet, to his garage on Franklin avenue, between Champion and Wilson avenues. The floors will be of concrete and the exterior of brick.

The Packard Motor Car Company's Powers That Be

One cylinder of the new 3,000-horsepower engine that will supply the motive power for the Packard factory, at Detroit, and President H. B. Joy, General Manager S. D. Waldon, Manufacturing Manager C. J. Moore, and Chief Engineer Russell Huff.

NEW COLUMBIA COMPANY NOW A REALITY

HARTFORD, CONN., July 3—With the conclusion this week of the necessary formalities attendant upon the organization of the Columbia Motor Car Company, a famous automobile concern passed out of existence. It was the Electric Vehicle Company of this city, which had manufactured Columbia cars for years, held the Selden patent rights, and had been in the hands of the receivers since December 10, 1907. The entire assets of the now extinct concern, except cash in the hands of the receivers, have been transferred to the new one, and the production of Columbia cars will proceed with increased vigor. The following are the officers chosen: President, Herbert Lloyd, president of the Electric Storage Battery Company of Philadelphia; vice-president, treasurer, and general manager, Henry W. Nuckols, of Hartford, one of the receivers. The directors are Herbert Lloyd, Walter G. Henderson of Philadelphia, Henry W. Nuckols, William Hooker Atwood of New Haven, and Kenneth B. Schley of New York.

The change was made this week and the policies proposed for the coming season announced. A six-cylinder car will be added to the present line of gasoline cars, and both the output of these and of electric machines will be materially increased. The 1910 models are now in the process of building and will soon be ready for delivery. The same method of distributing—through agents—will be followed. The capitalization of the Columbia Motor Car Company has been increased from $48,000 to $3,000,000, divided into 30,000 shares. The receivers, Mr. Nuckols and Halsey M. Barrett of Elizabeth, N. J., have not been discharged by the court, and are now engaged in paying the 20 per cent dividend of the old firm's creditors.

CHANGES IN HERRESHOFF MOTOR COMPANY

DETROIT, July 5—Certain changes are impending in the organization and control of the Herreshoff Motor Company of this city. While not as yet completed it is understood that the rearrangement is made with a view to a better co-ordination between the factory and the Harry S. Houpt Company, the sales organization. The stock of the factory has until the present been held mainly by Charles F. Herreshoff and Louis Mendelssohn, but large blocks of this have been purchased by other interests. Mr. Herreshoff will remain as vice-president and chief designer, but the other officers have not been chosen. The Harry S. Houpt Company of New York retains the entire selling control and it is expected by both parties that the new disposition will be of material benefit. The output of the plant has been increased, and, it is stated, it will work at its full capacity throughout the Summer to supply the demand.

TO APPREHEND JOY RIDERS

PHILADELPHIA, June 7—Determined to bring the "joy rider" to book with a round turn, a number of prominent Quaker City Motor Club members, in conjunction with a well-known local detective agency, have formed the Auto Reporting Company, Inc., with main offices at 838 Real Estate Trust Building. L. D. Berger is president of the new company; Charles J. Swain, vice-president; Frank J. Curran, secretary and treasurer; G. Douglas Bartlett, the club's law committee chairman, is counsel, and Charles D. Sell, a prominent local detective, is the general manager; these, with George M. Costello, Thomas J. Curley and Howard W. Frame, compose the board of directors. The car of each subscriber will carry the company's emblem.

R. D. CHAPIN ABOUT TO VISIT EUROPE

R. D. Chapin, treasurer and general manager of the Chalmers-Detroit Motor Co., will sail for Europe the middle of July to spend the Summer and return in September. He expects to visit England, France, Germany, and Italy.

"Of course, I know that now one does not have to go to Europe to see good automobile races," said Mr. Chapin. "This trip is not simply for the purpose of seeing the automobile races and studying progress in aeronautics, although I shall take in a number of the big events as long as I am on the ground. I will be particularly interested in watching the speed results the foreigners are able to get with their small cars. There is no question in my mind but what the light car races held in this country have resulted in developing unusual horsepower efficiency from small bore and stroke motors."

WALTON HAS NO INTENTION OF CHANGING

H. E. Walton, manager of the Midland Motor Company, Moline, Ill., sends word to THE AUTOMOBILE that he has no intention whatever of leaving his present position and taking one with the automobile department of the St. Louis Car Company. In the news which Alfred Reeves supplied after his round of the A.M.C.M.A. factories it was stated that Mr. Walton was the general manager of the St. Louis Company's automobile department. Mr. Walton wishes it positively stated that he is perfectly satisfied with present conditions.

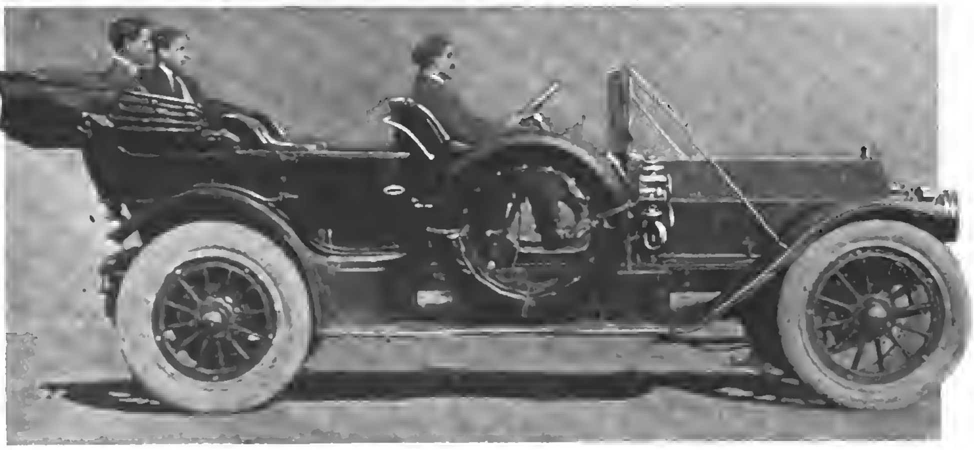
"PEERLESS" KITTREDGE SAILS FOR EUROPE

NEW YORK, July 2—L. H. Kittredge, president of the Peerless Motor Car Company, of Cleveland, sailed for Europe this morning on the Kaiserin Augusta Victoria. He took with him a 1910 Peerless touring car, and will use it extensively on the Continent. He expects to make the trip one of combined business and pleasure, and will be away about 60 days.

GENERAL MOTORS PROPOSES TO CADILLAC

DETROIT, July 6.—With a view to enlarging the scope of its activities, the General Motors Company has submitted a proposition to the Cadillac Motor Car Company. Officials of the Cadillac company admit that the proposition is under consideration, but negotiations have not been made public.

Battle Creek, Mich.—Plans for a new garage for Howard B. Sherman, to be built on Maple street, have been completed and the contract let. The structure will be of the bungalow style of architecture.



How the Largest Fisk Tires Appear on the Largest Stearns Car

The Fisk Rubber Company claims to have made the largest pneumatic tires ever built for an automobile. This photograph shows a 90-horsepower six-cylinder Stearns touring car fitted with Fisk tires and Fisk removable rims. The front tires are 40 by 5-inch ones, and the rear 40 by 6. These are made in a growing use of larger tires.

Old Way of Stretching the Fabric on the Core by Hand

TIRE MAKING BY MACHINERY

AKRON, O., July 3—For a number of years the Goodyear Tire and Rubber Company has been working to perfect a tire making machine that would turn out the right kind of Goodyear tires, and now has several machines in operation at the big plant in this city. In the old way of making tires by hand, they have been built up, first by a layer of fabric, then a layer of rubber, then another layer of fabric, and so on until the body of the tire was complete. As this fabric has always had to be stretched on by hand, by operatives skilled in tire making, the durability and longevity of a tire had been largely dependent on the skill and strength of the workman who made it.

To give the greatest mileage this fabric must be stretched to an absolutely even tension over each portion of the tire, and each alternate layer must be given the same tension as those that have previously been put on. It is self evident that this evenness of tension could not be faultlessly given when human hands were solely depended upon, and for instance, tires made in the morning, when a man is fresh, will be apt to be stretched more tightly and evenly than those made later in the day when the operator's muscles have become weary.

By the use of machinery for stretching the fabric a positively even tension is secured upon each strip of fabric used in a tire, and the Goodyear machines, shown in the illustrations, represent a marked step in advance in perfect tire making. The pictures are interesting to all users of pneumatic tires, and show both the hand and machinery methods.

How the Goodyear Tire Machine Stretches the Fabric

CARTERCAR WITH INTERESTING HISTORY

PONTIAC, MICH., July 3—Often interesting things are told, and wonderful feats are accomplished, with automobiles, but "What becomes of them after that?" is the question which is raised by R. A. Palmer of the Cartercar Company. This query was brought about by an incident which happened in connection with the Chicago agency of the company.

The twentieth car which was turned out by the Cartercar Company was sent to Hagmann & Hammerly who, like everyone else at that time, were skeptical about the friction drive which is a distinguishing feature of the Cartercar. They therefore drove the car over 800 miles through sticky Illinois mud, it being so thick on the car that the shape was all that was visible. But that was only a beginning. The machine was then put into demonstrating service. It was entered in the Chicago Automobile Club's reliability run and made a perfect score in 1906. After covering over 14,000 miles it was again entered in 1907 and took another perfect score. But that wasn't all.

After having covered a total of over 23,000 miles it was sold to H. B. Walker of Chicago. Mr. Walker now states that he drove the machine something like 4,000 miles more last season, and adds that although it has covered over 27,000 miles, it would require more than $1,000 to buy the car now.

Machine Rolling Fabric Down After It is Stretched

GROUT COMPANY IS REORGANIZED

ORANGE, MASS., July 6—A new company, chartered in this State with a capital of $150,000, known as the Grout Automobile Company, will take over the Grout Brothers Automobile Company, as a reorganized concern. The receivers of the old company will transfer the business, confident that it will be carried on even more successfully than during the recent months. The officers of the Grout Company are: President, Walter J. Gould; treasurer, E. S. Hall; secretary, George E. Dexter; and these also constitute the board of directors. The plant is well equipped for manufacturing automobiles and is capable of producing two a day. Judge Hall has had two years' experience with the factory as one of the receivers; Mr. Gould was selling agent of the former company; and Mr. Dexter is the secretary of the Chase Turbine Company, thus forming a trio well acquainted with successful manufacturing conditions.

Auto Carries Fresh Milk for Babies—The Columbus District Nursing Association is now operating a large automobile to carry fresh milk to the hundreds of babies in Ohio's capital city. The car is equipped similarly to a refrigerator freight car.

Koenig Brothers' Garage at Tarrytown, N. Y.—A Model of Its Type

WELL-KNOWN GARAGE ON HISTORIC GROUND

Tarrytown, N. Y., July 5—While the firm of Koenig Brothers, Rambler representatives at Tarrytown, has been doing business at the Old Post Road Garage for several years, it held quite a celebration recently to inaugurate its new and up-to-date garage. This is located in a historic country, alongside of what was, and still is called the Old Post Road, its name dating back several hundred years, to the times when the mail was carried by four-horse mail and passenger 'buses, called post-chaises. From the use of this road exclusively by the post 'buses came the name Post Road, which has been retained through all these years.

The garage is now housed in a new two-story, fire-proof building of reinforced concrete. The ground floor, 50 x 85, will be devoted exclusively to storage, sales and locker rooms. The latter are for the convenience of owners, not employees. When a car is brought in, it is first searched, and anything found therein is placed in the owner's locker, the garage and owner having duplicate keys. The second floor is arranged for a ladies' parlor and chauffeurs' quarters, a part of the latter space being a lecture room, in which is conducted an automobile school.

Complete describes the repair shop, located in the well-lighted basement. Aside from tools for doing all manner of repair work, there is a tire repairing outfit, consisting of tube and sectional vulcanizers, recovering plant, etc. A pair of mercury arc converters supply the necessary changes in electric current for charging storage cells in electric vehicles, and for ignition batteries as well, the two being kept separate for these uses.

On the occasion of the recent celebration, prizes were given to the first five automobiles arriving from New York City in a run organized for the occasion.

BRIEF GARAGE NOTES THE COUNTRY OVER

Milton, Pa.—The Ritter Company, an enterprising firm, has opened a garage here, well equipped and managed by experts. It is locatetd at the corner of Arch and Second streets, 64 by 66 feet in size, with front and rear entrances, machine shop, wash stands, underground gasoline storage, etc. The agency for the Jackson, E-M-F and Locomobile cars, as well as numerous sundries, is held. The members of the concern are: E. E. Ritter, who built the first automobile owned in the section, thirteen years ago, which is still in use; Thomas E. Spangler, a local business man, and W. H. Hackenberg, an attorney. The company is a Pennsylvania corporation.

Fond Du Lac, Wis.—The common council of Fond Du Lac has passed an ordinance requiring all garages to be made fireproof, present buildings rebuilt and new ones according to code. It was at first decided to condemn all garages in the business section, but this met with too strong opposition. The ordinance is the result of a recent $250,000 conflagration which is thought to have been started in a garage.

Petersburg, Va. — Plans have been completed for the erection of a fireproof garage for the Stratton & Bragg Company, on its lot on Union street, near Washington. The building will be 60x100 ft. in size, constructed entirely of concrete, brick and steel, and will be fully equipped for the garage and automobile sales business. The company also intends to build on the lot next to the garage a modern and complete brick and steel machine shop, and to install the best machinery. A traveling crane will be a valuable facility.

Fort Worth, Tex.—The Reid Auto Company has found it necessary to build an addition to its quarters at Rusk and Eighth streets, and work has commenced upon an additional story, which will give 9,500 square feet of floor space. Four taxicabs have been ordered and are now en route from the factory.

Springfield, Ill.—Glenn D. Smith is building a thoroughly modern garage at 413-415 South Fourth street, in connection with an apartment house, the latter occupying the front. The garage will be 60 by 80 feet in size, constructed of brick and stone, and fitted with a complete machine shop.

St. Louis—The Albert Sterne Motor Car Company has received permission to construct a large garage building on Olive street, west of Sarah street, with a 50-foot front and 155-foot depth. The plans show that it will be one of the most complete in the city.

Bucyrus, O.—The Bucyrus Cycle and Automobile Company garage has changed hands, Frank B. Lauck succeeding John Eberhard and son in proprietorship. They will have the agency for the Mitchell and Maxwell cars.

Fond du Lac, Wis.—Popularity of garage building has been shown in the receipt of ten bids for the construction of the Anderson garage, at the corner of West Second and Macy streets. One of $4,235 will probably be accepted.

Binghamton, N. Y.—Ellis W. Morse & Company, agent for the Overland cars, is planning to erect a handsome garage, including salesrooms and other conveniences. Several sites are now under consideration.

Vincennes, Ind.—The Johnson Auto Company has leased the old Coliseum building, and will turn it into a garage, first putting in a new front, and then making other decided improvements. A long term lease has been taken.

Los Angeles, Cal.—W. P. Bosbysell, the local agent for the Dorris car, is erecting a new garage on South Olive street, and expects to occupy it within a few weeks.

Wilkinsburg, Pa.—The Co-Operative Automobile Company has opened a garage at 605 South avenue in addition to the agency for the Moline cars.

Told in the Progress of the Industry

New York Sporting Goods Company Enlarges Quarters—Owing to a largely increasing business in automobile supplies and camp equipment, the New York Sporting Goods Company has had to enlarge its store. The present location at 17 Warren street has been increased by the addition of the store next door at 15 Warren street, with connecting archways. The automobile and bicycle supplies will be sold upon the ground floor, and the shipping facilities doubled by the use of another basement. Tents and camping outfits will be moved from the third to the second floor and the entire third used for offices. The remaining floors are for storage and repair shops. This company is now in its twelfth year, and its business has grown from a very small one to one with five departments. Each of these has a separate manager, whose accounts are individual, so that the officers can always tell how each one is being run. A large mail order trade has been built up recently.

Blue Most Popular in Pierce-Arrow Colors—The Pierce-Arrow Motor Company has recently had a table prepared to show the color schemes most chosen by purchasers of those cars. Some surprises appeared, especially for those who like to refer to automobiles as "big red ones," and for purposes of comparison the shades were not taken into account. The following is the ranking discovered: Blue, 26.57 per cent; green, 25.04; wine, 21.14; red, 10.88; brown, 6.66; gray, 4.60; black, 1.75; white, 0.31; lead coat only 2.88. The blue received its lead principally in the smaller cars, such as those of 24, 36 and 40-horsepower; while in the 48 and 60-horsepower models green prevailed. For the coming season Pierce-Arrow dealers will have choices from 32 sets of colors.

Fire Inconveniences Kemizite Manufacturers—The office, accounting department and retail salesroom of the Auto Tire Security Company, at 1231 Michigan avenue, Chicago, were slightly damaged by fire on June 30. The actual loss is reported as trivial and the retail department was doing business in a garage three hours after the occurrence. The wholesale department is temporarily located at 1221 Michigan avenue. No stock was lost and, according to the sales manager, C. L. Morgan, the manufacturing plant is intact and operating at full capacity.

Model Company Increases Capitalization—The Model Automobile Company, manufacturer of Great Western automobiles, has doubled its capitalization. The increase was entirely taken up by the present stockholders and none was offered for sale outside. It was decided at the same time to build two additional factory structures, which will give about 35,000 square feet more floor space than at present. Work will be commenced at once.

Selden Company Buys More Ground—The Selden Motor Vehicle Company, Rochester, N. Y., has purchased four acres of ground in Probert street, 650 feet long and extending between the New York Central and the Rochester, Syracuse and Eastern railroads. The details of the new plant have not been made public, but it is understood that the ground will be broken at once.

Portable, Not Portland—Under the head of "Information for Auto Users," last week was described an excellent device for holding electric lights in any position desired, when working with them in the shop or garage. Unfortunately, an error made this appear to have the trade name of Portland, which is not the case, the name being the Portable Wash-Rack Light.

Packard Company Has No Branches—Recently a report was circulated to the effect that the Packard Company would open a branch in Albany, N. Y., but this was confused with the opening of a new garage and sales establishment by the agent in that section, J. A. P. Ketchum. The Packard Company, when asked about this, stated that it has no branches.

Taxicab Factory in Memphis—The Corbitt Taxicab Company has been formed in Memphis, Tenn., to manufacture and operate taxicabs. A new factory will be obtained to employ 200 men. The cars will be of conventional type.

NEW DIAMOND DEMOUNTABLE

Carrying extra tires inflated and ready to run, a new demountable rim has been developed by the Diamond Rubber Company, of Akron, O. The rim has just been placed on the market and will have a conspicuous place in the Diamond products for 1910. In design and construction it is both simple and strong and permits the removal of the damaged tire with the application of a fresh one, pumped up and ready for running, in scarcely more time than is required to jack up the wheel.

A notable improvement over the Diamond 1909 demountable equipment is the fact that the rim can be fitted to any automobile wheel felloe of regulation construction without material alteration of the same. No machine work is necessary on the wheel band or elsewhere and any competent blacksmith can, the Diamond Rubber Company states, do the job properly and inexpensively. A further improvement eliminates the necessity of mortising out the felloe to admit the valve stem of the inner tube. A series of wedges fitting between the wheel band and the rim itself take up all possible play and make the fit tight and secure. For the same reason small irregularities, due to dinging of rim or band or other causes, cannot interfere with the rim's quick and easy operation.

Diamond Demountable Rim

The new Diamond demountable will accommodate any standard make of regular clincher tire. The Diamond Company has spent much time and energy in developing and testing this new product and the vigor with which the rim is being pushed is plainly indicative of the company's own confidence therein.

IN AND ABOUT THE AGENCIES

Times Square Branch in Kansas City—Jesse Froelich, of the Times Square Automobile Company of New York, and managing director of the Benz Auto Import Company, has established a branch of the Times Square Company in Kansas City, Mo. As in New York, Chicago and St. Louis, this new branch will handle second-hand automobiles for the Western and Southwestern territory. A site was chosen at Seventeenth and Main streets, and the business will be commenced at an early date.

Maxwell, Philadelphia—The Maxwell output will hereafter be represented in the Quaker City by a factory branch house. The Longstreth Motor Car Company, the local agent, last week transferred its affairs to the Maxwell-Briscoe Motor Company by mutual consent. William F. Smith, general manager of Maxwell district No. 3, will have complete charge of the retail business as well as the wholesale. The present quarters will be retained.

Empire Opens Philadelphia Branch—The Empire Tire Company announces the opening of a branch house in Philadelphia at 322 North Broad street, on Automobile Row. It will be in charge of E. B. Richardson, who in the past has represented the company in the capacity of general salesman.

RECENT BUSINESS CHANGES

Spare Motor Wheel Company Moves Offices—The Spare Motor Wheel Company of America, Limited, has moved its general offices to the factory in St. Anne., Ill., from 236 Michigan avenue, Chicago. The company has taken up the manufacture of standard clincher automobile and motorcycle rims, in addition to the Stepney spare wheels. It is making the Universal demountable rim for the Universal Rim Company of Chicago, and its own rims will be handled through the American Distributing Company of Indianapolis.

PERSONAL TRADE MENTION

Charles Ethan Davis has been appointed the general manager of the Warner Gear Company, of Muncie, Ind. He was formerly with the American Locomotive Company at Providence, R. I., and will take up his new work in the West on August 1.

Ernest L. Smith, of Detroit, has been made sales manager of the Grant-Lee Machine Company of Cleveland. Mr. Smith was formerly Western representative of the Standard Roller Bearing Company.

James E. Murray, manager of the automobile department of the New York Sporting Goods Company, has left the city for a two months' vacation at his camp near Wolfboro, N. H.

TAXICAB AND TRANSIT

Decatur, Tex.—To avoid a trip of 80 miles, via Fort Worth, to go 28 between Decatur and Denton, it is probable that an automobile line will be installed shortly. The traveling salesmen who enter this territory are particularly interested in the proposal and are seeking assistance from the Commercial Club of Decatur.

Carleton, Mich.—It is likely that an automobile bus line will be established between this town, Flat Rock and Rockwood, running on a schedule, and connecting with the Detroit, Monroe & Toledo electric line at Rockwood. Alexander Ropelle, of Detroit, is the promoter of the scheme.

PACKARD EXPERTS CONVENE

Detroit, July 6—Superintendents of the mechanical departments of Packard dealers throughout the country have been visiting the factory of the Packard Motor Car Company for the past two weeks. Meetings have been held daily at which all mechanical features of Packard 1910 cars have been discussed as well as the general conduct of Packard repair work and shop service for owners. The visitors also have spent much time in the factory studying Packard methods of construction and the actual manufacture of the new models. There has been road work in new cars, and the social side of the conventions has taken the form of drives into the country for frog-and-chicken dinners seasoned with shop talk and suggestions for future improvement.

At some of the meetings the executive, engineering, factory, sales and technical heads of the Packard Company have held lively discussions with the visiting experts, thus presenting all features of car design, construction and maintenance from many points of view. In fact, the meetings have been so notably successful that they will probably be made annual affairs.

Most of the Packard dealers' superintendents were taught their business in the Packard factory. It is one of the most important parts of the Packard policy to give efficient service to owners everywhere.

RECENT INCORPORATIONS

Flexible Aeroplane Company, Newark, N. J.—Capital, $100,000. To manufacture aeroplanes, automobiles, etc., etc. Incorporators: J. Formanna, J. K. Murgatroyd, H. Taylorson.

Eastern Auto Transit Company, Albany, N. Y.—Capital, $35,000. To operate stage line between Albany and Schenectady. Incorporators: W. A. Cryne, E. D. Wintersteen, C. B. Henry.

Badger Motor Car Company, Columbus, O.—Capital, $100,000. Incorporators: E. W. Arbogart, W. C. Leitsch, George C. Holtz, A. M. Bellack, E. M. Poser.

Barber Auto-Cab & Repair Company, Brooklyn, N. Y.—Capital, $15,000. To manufacture automobiles, etc. Incorporators: A. S. Barber, R. A. Rendich, William Barber.

RECENT PUBLICATIONS

Ferro Machine and Foundry Company. "Marine Gasoline Engines and Equipment"—This differs from the ordinary catalogue in many ways. Fundamentally it is a treatise on the correct design, construction, installation and operation of power boats. Being intended primarily for the man who is not a mechanic, it is written in simple, non-technical language. The first edition was issued in 1907, and the present work is that brought up to date by the additions of last year and the more important ones included within the covers for 1909. After some pages of general information on principles and historical review the details are taken up in order, beginning with the carbureter. Ignition and mechanical parts follow in order, much space being devoted to a praiseworthy attempt to elucidate the mysteries of the former. After that considerable mention is made of the shop processes, this being of value to the purchaser in that he ought to know of the painstaking care necessary to produce the ultimate result, the finished motor. The illustrations throughout are very complete and well done.

American Manganese Bronze Company, Holmesburg, Pa.—This is a small folder descriptive of the company's product which consists of bronze and allied metals. The principal product to which most of the folder is given up is manganese bronze, well known for its great strength, forgeability, ease of casting allowing complicated shapes to be cast of it, and bearing value which permits the use for bearings to a limited extent. The trade name of the metal is Spare's, and the guaranteed tensile strength is 75,000. A series of accurate test records is given in which the lowest figure reached therein is 81,500 pounds, and the highest going up to nearly 85,000 pounds.

In addition, a bearing metal of white bronze is made, this being a true bronze and not a babbitt metal. This combines with great strength a high melting point, and other valuable properties, fine anti-frictional properties. In fact, the makers are ready to promise and guarantee a coefficient of friction below .01 with properly fitted shafts and bearings.

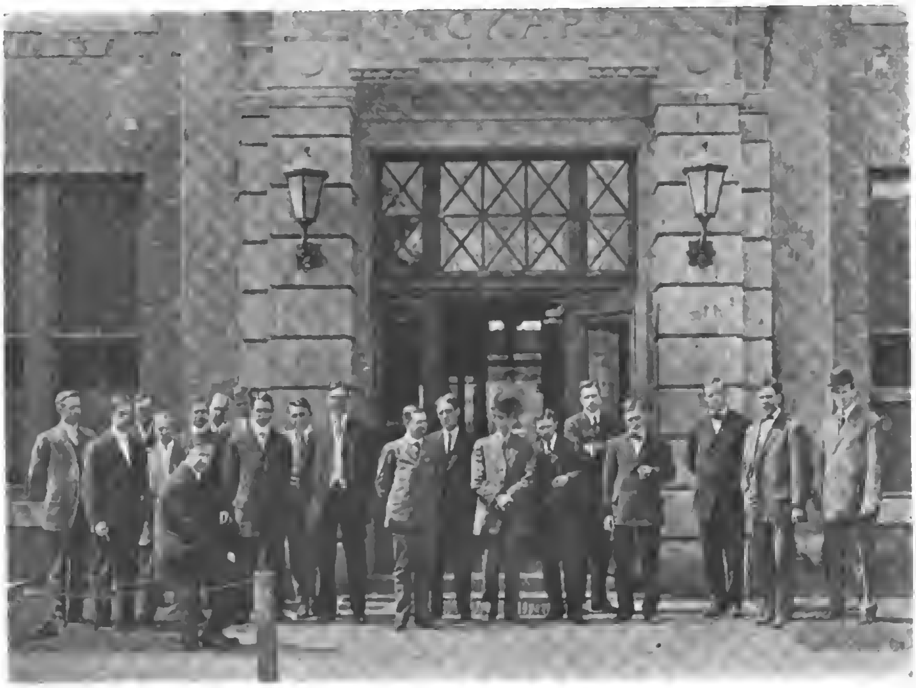
Vehicle Top & Supply Company, St. Louis—Vesco tops for all kinds of automobiles are made by the Vehicle Top & Supply Company, of St. Louis, and illustrated in the latest catalogue issued by this concern. Best known under the trade name of Vesco, these tops are made in several varieties of material and design. There are four kinds of fabrics named—Pantasote, Vesco, "Auto" rubber, and cravenette and mohair, with the advantages in respect to price of each compared and the quality described. The cravenette and mohair tops are the most expensive, with the Pantasote, Vesco, and "Auto" rubber ranging in that order. The details of lining are also described at length in regard to each style and price. The company also manufactures lines of tire covers, dust covers or hoods, lamp covers, wind shields, and makes a specialty of automobile body upholstering.

G. H. Curtiss Manufacturing Company, Hammondsport, N. Y.—Curtiss motorcycles of one, two and three cylinders are described in an interesting catalog just received. The details of the roller bearing motors, the trussed frame and fork construction, are considered, and the specifications of the five types given. Views of the flexible side car and of the rear seat attachments are shown. The single-cylinder models are fitted with 3 and 3½-horsepower engines; the two-cylinder machines with engines of 6 and 7-horsepower, and the three-cylinder, one with an engine of 10-horsepower, geared to give a speed of 90 miles per hour.

Syracuse Rubber Company, Syracuse, N. Y.—One of the most complete catalogues of automobile sundries published for the 1909 season has recently been issued by the Syracuse Rubber Company. In handy size for carrying in a pocket of an automobile, it may be used as a reference book, for practically everything in the accessory line has been listed. For the autoist who is equipping a new car or for the owner who desires new supplies the booklet will give prices and description of the various articles. Motor boat and yacht supplies are also given detailed attention.

International Acheson Graphite Company, Niagara Falls, N. Y.—A new folder just issued is known as 273 J. It is descriptive of their graphited greases, products which are designed for gear, cup and ball-bearing use. In the manufacture of their graphited grease this company uses the purest and best graphite. The graphite and grease are well blended, and it is claimed that the resultant product will show a tremendous amount of working force, great value being given the combination by the superior lubricating qualities of the graphite.

Southwestern Automobile Supply Company, Dallas, Tex.—From the far Southwest comes a complete catalogue of one of the largest automobile supply distributors of that territory. Inasmuch as automobile factories state repeatedly that the largest sales of autos are going to Texas and the States immediately bordering upon it, the supply business has taken a prodigious growth, as the book of the Southwestern Automobile Supply Company proves. All lines of accessories are mentioned with prices.



Convention of Packard Service Department Superintendents

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THE AUTOMOBILE

DETROIT GIVES GLIDDENITES ENTHUSIASTIC SEND-OFF


Mayor Breitmeyer Fires the Starting Gun

Where Start was made from, Hotel Pontchartrain.


Detroit The City Beautiful.

DETROIT, July 12—To the fanfare of trumpets (supplied by the Maxwell-Briscoe band), the booming of cannon (touched off by Mayor Breitmeyer), and the waving of banners (done by the hospitable citizens of this automobile-making town), the sixth tour of the American Automobile Association had a vociferously successful beginning at 10 o'clock this momentous July morning. Forty-two cars were soon on their way, two having preceded the main body: Pilot Dai Lewis with the confetti and Chairman F. B Hower in the pacemaker's role. Thirteen are contenders for the individual temporary possession of the Charles J. Glidden trophy; fourteen are seeking ownership of the Hower cup; and only three are rivals for the beautiful Detroit prize The remaining dozen are divided into official, press and general supply cars

A PARADE OF AUTOS THAT TOLD ITS IMPRESSIVE STORY

DETROIT, July 12—One thousand and thirty automobiles to-day took part in the greatest automobile pageant ever held—a part of the Glidden tour preliminaries—and the line extended over a course ten miles in length. Combined with this almost phenomenal turn-out were the hundreds and hundreds of touring cars and roadsters parked along the route. The owners and manufacturers of the city had promised to give a spectacle that had never been equaled, and they succeeded.

But not alone in numbers did this event surpass previous affairs of its kind, but also in the matter of decorations. The opinion was unanimous that never before has there been such a motor-driven galaxy of the wonderful and beautiful. Electrically, gasoline, and steam-driven cars participated; and cut flowers, artificial ones, ribbons, satins, birds, and all imaginable forms of decorations were in evidence. Indeed, so much painstaking labor had been put upon those who were competing for the handsome prizes that the judges, persons well able to discern harmony of coloring, were at great loss. In some cases the victor in the divisions was cause for deep pondering. Sufficient handsome rewards had been offered to make competition well worth while, and consequently the prize list was long and contenders most plenteous.

Cadillac was the fortunate one in the class for the most artistic float or decorated car in the parade, and its representative was from the factory. This was a float built to depict the landing of Cadillac. The car had been fashioned into a large boat, in the bow of which stood Cadillac, a large banner in his hand. Back in his craft sat a number of Indians in their full tribal regalia, and so deftly had the construction been planned that the driver of the car was invisible from the exterior, just this little touch giving the whole float a gliding effect. In the same general class was a "Lady's special," and, with a diamond and ruby ring to be presented, this will be awarded later.

The parade was started at about 1 o'clock, ran through the center of the city, and out to Belle Isle Park, where the actual judging took place. When the entire number of cars had assembled on the green, a view was presented which has had no equal. Impressive as was the length of the event, in passing a given point downtown, it was even more so when the machines were banked and massed, scores of rows deep. Electrics took the lead in the contesting division, although the police squad elicited no little comment. Four little Maxwell Junior runabouts, each carrying one officer in addition to the driver, cleared the streets instead of the more conventional platoon of horsemen.

The Anderson Carriage Company seemed to have turned loose a month's output, perhaps, for it was stated that the value of the half-hundred Detroit electrics was close to $125,000. The Columbus electrics were also well represented, as were other standard makes. The count of the various makes was not authenticated, but it was stated around headquarters in the evening that Cadillac and Brush led with about 80 cars each. Chalmers-Detroit, Packard, Regal, Maxwell, E-M-F, Hudson and Rapid were not far behind, however, and all had more than a dozen apiece. So many of the 400 decorated cars were so well disguised that it was almost impossible to tell at a glance just what make they were. The features of the cars are too numerous to mention, and a few must suffice.

One that attracted considerable attention was a float entitled "The Spirit of '76," and was a representation of the famous painting. Dr. E. B. Smith furnished the outfit, importing a veteran trio which could fill the parts. The local fire department was on hand with its "flying squadron," holding second place in line. The Morgan & Wright Company had a particularly comprehensive display, using four large trucks to show the details of making a rubber tire. First was a scene snatched from the tropics, with a number of boys of color gathering the

Ten Miles of Automobiles in One Picture; as the Thousand Odd Machines of the Pre-Glidden Tour Parad

Chairman F. B. Hower, of the contest board, the principal speaker of the evening, did more than spat some of his hearers on the wrist. He rapped them across the knuckles in a way that left the only sting in the entire program. Chairman Hower was disappointed at what he chose to construe as apathy on the part of many manufacturers, and he did not mince his words in giving expression to his displeasure.

"If anyone had asked me at the outset how many cars we would have in the tour this year," said Mr. Hower, "I should have guessed 125. We all guessed that. Then came the revelation. I began to receive letters from manufacturers all over the country who found that they could not enter the tour. The reason? They were enjoying too much prosperity. They couldn't see where they were going to gain anything by entering the tour when they were unable to fill the orders they had. So we have fewer cars than we expected.

"I tell you, gentlemen, that this auto business may be to the

Banquet Tendered A. A. A. Officials by the Detroit Auto Dealers' Association, at Hotel Pontchartrain, July 9

r an industry. To us who own and drive cars it is e are interested in these contests for the sport they not say those manufacturers who made excuses were e sporting chance. That would be unfair to them. not enter; and I tell you that we must keep up the of the industry if we wish to maintain the industry

criticised for what I am saying, but I do not care. e to promote the industry, but to promote the sport ests. I say that those manufacturers who did not ur hurt themselves, not us, for the Glidden tour ogress of the automobile. Those who are unwilling t progress they have made are hurting the industry,

of surprise followed Chairman Hower's remarks, inly that many of his hearers were not in sympathy mistic view he took of the situation, but no further the incident was made.

Hower was presented by Mayor Breitmeyer with a o the city. The Mayor dwelt at some length upon the industry and what it has done for Detroit, welcoming the tourists and other guests in a happy manner.

President Speare, of the A. A. A.; Charles J. Glidden, donor of the trophy which is the prime cause of the tour; George C. Diehl, of Buffalo, good roads advocate par excellence; Horatio S. Earle, former Michigan highway commissioner; Hugh Chalmers, of the Chalmers-Detroit Motor Car Company; Benjamin Briscoe, Col. Pardee and others were also on the toast list, which was an extensive and too prolonged one, and in which all the participants vied with each other in saying kind things about everybody elsse.

President George Lane, of the Detroit Auto Dealers' Association, was toastmaster, and contributed much toward making the event the enjoyable affair it proved to be. The banqueters departed with warm appreciation for the hospitality and public spirit of the Detroiters, and all joined in the wish that they might meet again in the city "where life is worth living."

DETROIT ENTERTAINS A. A. A. DIRECTORS

One of the most successful social functions preceding the start of the tour was the dinner given by the Automobile Club of Detroit to the directors of the A. A. A., the affair taking place Friday evening at the picturesquely situated country clubhouse at Pine Lake. President C. H. Hecker made a versatile toastmaster, and under his skillful suggesting the orators kept themselves in condensed form. President L. R. Speare and Chairman F. B. Hower spouted some about the A. A. A., but more about the hospitality of Detroit, to which S. A. Miles, Alfred Reeves, Col. F. M. Joyce, Thomas Henderson and A. G. Batchelder added other hunks of appreciation. Ex-President Edwin S. George said the club was glad to have such thankful guests.

Intermingled with the occasion was the formation of the Aero Club of Michigan, of which W. E. Metzger was elected president and compelled to supply a verbal acceptance. Since Charles J. Glidden is becoming a well-known aerial traveler his presence naturally brought about some words of aeronautical complexion. It was midnight before the 26-mile return to the city via autos had landed the banqueted ones at the Hotel Pontchartrain.

Little Parade All of Their Own—The 625 men of the jolly party that went down on the *Cleveland* Sunday formed lines on the return and marched to the Pontchartrain in two lines with a number of autos in the center.

Pilots and More Pilots, But No Sky Pilots—The confetti car, for the first time, was backed up by a second car for the 1909 tour. Dai Lewis, chief pilot, and Marc Reeves, second to Lewis, captained the two cars.

New Model Haynes Cynosure of All Eyes—Elwood Haynes, the pioneer of motordom as a business in the United States, ran over from Kokomo in the 1910 Haynes, which drew immediate attention.

Many Scribes on Hand—The press of the country took interest in the tour, for over sixty press men appeared in Detroit for the tour, an average of 1½ for every car in the run.

Pierce Patten Promptly Appeared—"Bob" Patten, of the sales force of the Pierce Company, could not remain away, so made the run over to see the Pierce cars well under way.

Lots of New Models Shown—Quite a number of 1910 cars, including two Packards, were seen on Detroit's streets. The Chalmers had out their models also.

Matson Gets a Job, Too—Joe Matson, winner of the Indiana Trophy race, went out as an observer for the Chalmers-Detroit team.

Yellow Kids Once More—Morgan & Wright's Yellow Kids were in evidence at every turn, and attracted general attention.

TIRE MANUFACTURERS WILL BOOST PRICES

Circular letters have been sent out by practically every tire manufacturer in the United States announcing an increase in prices of from 15 to 25 per cent., to take effect July 16. The circulars were received by automobile manufacturers and dealers in New York last Tuesday, and on the same day a number of tire dealers on Automobile Row posted bulletins in their windows calling attention to the change. According to the tire-makers, the raise is due principally to the increased price of crude rubber, which has nearly doubled within the last three months. The makers, it is said, have held several secret meetings at Cleveland and Okron, O., at which the leading men of the industry were present, and judging from the uniformity of their announcements, they have come to a good working agreement. As it has been obvious for some time that the makers' profits were being seriously cut into by the soaring price of rubber, their action did not come as a complete surprise, except that the raise is larger than was anticipated.

DELAWARE'S NEW LAW IS RECIPROCAL

Wilmington, Del., July 12—Delaware's new automobile law going into effect, the police department of this city has been instructed to arrest the drivers of all machines found on the city streets without Delaware license tags, except those having tags of States which permit visiting machines to pass through without local licenses. This will be particularly hard on the neighboring States of Pennsylvania, Maryland and New Jersey, which do not extend this courtesy to visitors. The Delaware law contains a reciprocal clause, which extends the same courtesy to other States as those States accord visitors.

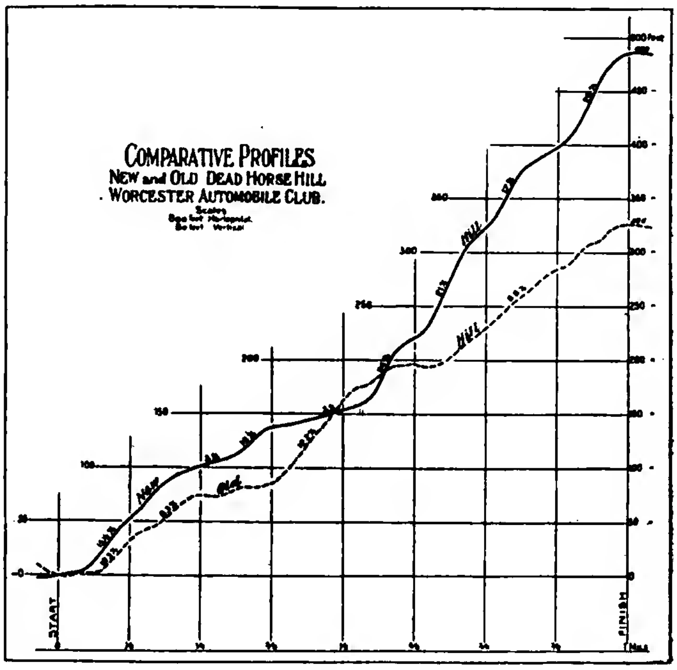
GARAGE RESTRICTION PLANNED IN OHIO

Columbus, O., July 12—Chief Lauer of the Columbus fire department has prepared an ordinance to be introduced in the city council soon for the purpose of regulating garages. It provides that no garage shall be more than one story high, and that the structure be built of fire proof material. Signs prohibiting persons from smoking in the garages must be displayed. The storage and use of gasoline as well as the care of electrical wires are to be regulated. The ordinance is regarded as too stringent by garage managers.

WORCESTER WILL BUILD A REAL HILL

Worcester, Mass., July 12—For hill-climbing contests hereafter, the Worcester Automobile Club will have a course with nearly ideal conditions, embodying some new and popular features. Principal ones are the erection of the grand stand at right angles to the road, and over it, so that the spectators can see the cars approach, and dash right under them; and another point which no other hill in the country will have is a roadway wide enough for its entire length to have two cars climbing at the same time.

The plans for the construction of this rise have been about consummated, and of the $20,000 necessary, present subscriptions amount to $6,000, and the remainder is all in sight. The course is some distance from the old Dead Horse Hill and will have to be built from start to finish. Surveyors have completed their work of laying it out and actual construction will be commenced at once. It is expected that it will be ready for use early in



October, and the hope is to have the national event here next Spring. After the grading is completed the hill will be coated with Hassam pavement, the same as on the Long Island Motor parkway. The width will be amply sufficient for starting two cars abreast, and the people on the grand stand will be able to see them for three-quarters of the mile length. The rise will be 489 feet, with grades varying from two short dashes of three per cent each to one at the finish of 25. The average is about 15 per cent, lowered by the places where the road is not steep. The ascents of 24, 21, 17, and 25 per cent will be thorough tests for the cars. The old Dead Horse Hill rises but 325 feet in the mile.

COUNTERFEIT TAGS USED IN OHIO

Columbus, O., July 12—The motorcycle brigade of the Columbus police force recently arrested one of the drivers of the Columbus Buggy Company for carrying on his machine a tag not furnished by the state automobile department. There was no charge that the motor car was not licensed, but rather the arrest was made because of the use of a fictitious tag. Some days ago the attention of an officer was called to the tags used which were made by the company, the same number as that on the state tags being used. The driver claimed that he could not use the state's tag on the automobile. A similar state of affairs exists in Dayton also and the state automobile department is determined to eradicate the evil.

Functions and Frailties of Motor Cylinders

By Thos. J. Fay

DESIGNERS take advantage of the properties called "chill," in connection with cylinder work, by the simple expedient of limiting the thickness of "finish" as shown in Fig. 15, so that the dense material, as indicated in the sectional drawing, Fig. 16, of a cylinder is not all cut away in the finishing process. The strength of a cylinder, if dense material is left on the inside, as well as the "skin," on the exterior, will be greater than when the cylinders are finished all over to a depth sufficient to uncover the gray iron section; gray iron, with a covering of white iron, which is very possible to realize, if the charge in the cupola is well regulated, and if the depth of finish is adequately limited.

Some Properties of Gray Cast Iron—Gray cast iron, in the sense that it is referred to here, is a remelt, in a cupola, of suitable grades of blast furnace pig iron. The gray variety of cast iron is that holding such an excess of graphite as to conceal the iron from view in the fracture. It is a foundry problem to arrive at the desired result by suitably mixing the material for the charge in the cupola. The components in cast iron are iron, silicon, sulphur, phosphorus, manganese, combined carbon, graphitic carbon and more or less "slag."

Unlike in steel, sulphur and phosphorus are held at a fairly high limit, although, as in steel, these elements have a weakening influence on the strength and endurance of the product.

In general, the limits to be put on the elements entering into castings for cylinder work may be set down, viz.:

Combined carbon, maximum, 0.75 per cent.
Silicon, maximum, 1.20 per cent.
Sulphur, maximum, 0.085 per cent.
Phosphorus, maximum, 0.50 per cent.
Manganese, maximum, 0.75 per cent.
Slag and oxides to be almost completely eliminated in practice.

It will be understood that, in practice, the components range at variance with these maximum values, and in fact silicon generally exceeds the limit set, notwithstanding the lowering of tensility, but it also affords fluidity, which is a much needed quality in cylinder irons, in view of the thin walls.

In fairly good castings the silicon content is likely to run about 1.60 per cent., but even this value will show a decline of the tensile strength, although good sound castings must rank first, and it is customary to assume that cylinders should have a minimum value of the tensile strength of 18,000 pounds per square inch, which value may be exceeded with silicon at 1.60 per cent.

Right here it may be well to point out that claims of even 35,000 pounds per square inch are frequently made for cylinder castings, and few will admit that the strength should be less than 26,000 pounds per square inch. At all events, it matters not what the strength may be in isolated cases, since none will guarantee every casting, and safety demands that the minimum value realized be taken as the maximum to figure on in practice.

If in gray cast iron the total carbon is upward of four per cent, it is at once plain that graphite will be present in considerable excess, because, in the nature of the product, combined carbon will be far below the point of chemical absorption of all the carbon present. The graphite present is indirectly an indication of softness in proportion as the amount shows in excess, but it is something of a fallacy to attribute this softness directly to graphite. Softness and ability are due to a small amount of cementite and relatively a large amount of ferrite rather than to a large excess of graphite. If, then, the total carbon is a constant, the soft iron will show a large excess of graphite because the total combined carbon will be low, and if this condition obtains, the ratio of ferrite to cementite will be more nearly in

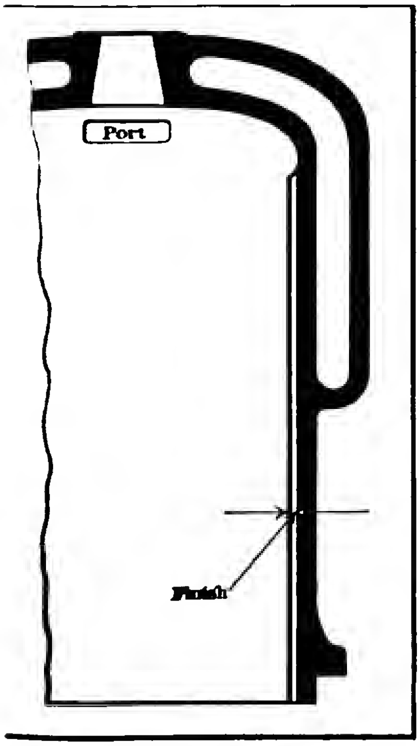


Fig. 15—Section, showing the finish allowance in the bore of cylinders stopped off at end of stroke

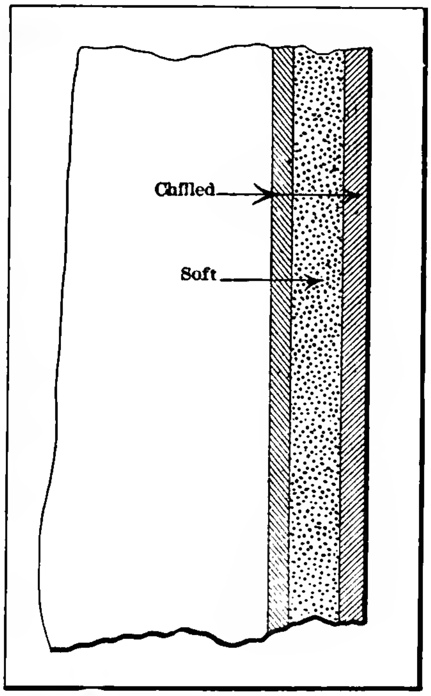


Fig. 16—Section, indicating the hardness of exterior, and soft interior of gray cast iron with slightly chill surface

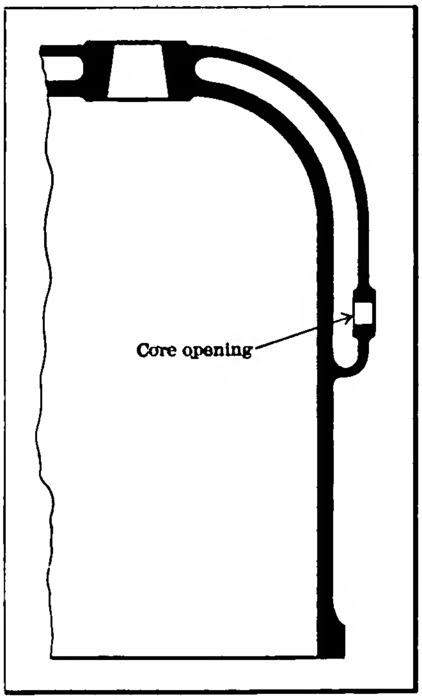


Fig. 17—Section, showing core-hole, by means of which the core is suspended in the process of casting

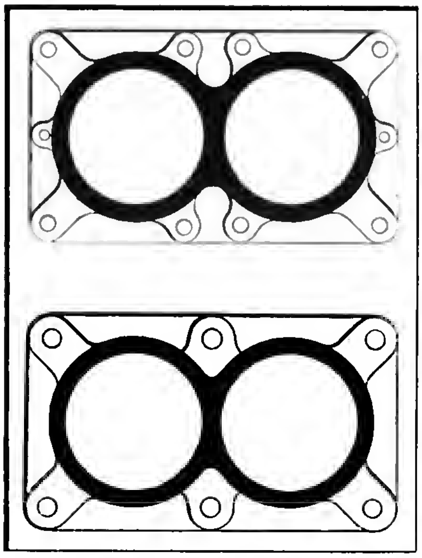


Fig. 18—Sections, showing bolting plans twin-cylinder construction

accord with the best requirement. True, graphite itself is of low strength, and an excess of graphite enmeshed in the matrix must have its weakening effect, but the difference between cast iron and steel lies in this fact.

Fixed carbon in cast iron for cylinder work should not exceed 75 points, and any increase in the fixed (combined) carbon above this point will be at the expense of excess ferrite, because this excess decreases as the total combined carbon increases, which to illustrate an example may be taken involving, say, 75 points, combined carbon.

Hence:

$.75 \times 15 = 10.25$ cementite.

And

$10.25 \times 6.4 = 65.60$ ferrite.

Therefore:

$65.60 + 10.25 = 75.85$ pearlite.

And

$100 - 75.85 = 24.15$ per cent. = excess ferrite.

At a glance it may be seen that by increasing the combined carbon to 75 points the excess ferrite fell off 24.15 per cent., whereas with the 45 points carbon the excess ferrite was 50 per cent.

The effect of graphite will best be illustrated by making a comparison, with combined carbon on a common basis, as follows:

TENSILE STRENGTH IN POUNDS PER SQUARE INCH

Fifty carbon steel, 105,000.

Fifty combined carbon cast iron, 25,000.

True, the tensility of the respective products might vary over broad ranges for various specimens and reasons, but the relation hold, nevertheless, for both products can be varied equally. Cast iron, holding about 10 points of combined carbon, would have a tensile strength of not far from 15,000 pounds per square inch, if the total carbon be the same as in the case of the 50 points of combined carbon above cited. In this an illustration of the ills of excess graphite is quite apparent, since a loss of 2-5 of the tensile strength is a good approximation.

Any attempt, then, to solely attribute good qualities and softness to excess graphite must be regarded as on slim grounds, nor would low combined carbon be a desirable condition. What seems to be best is that quantity of combined carbon holding excess ferrite about equal to pearlite, and if this contention can be substantiated, carbon (combined) should not exceed 50 points.

Phosphorus causes lack of ability to combat shock loads, which is more apparent with high combined carbon than with low, so that decreasing phosphorus should be the rule with increasing combined carbon.

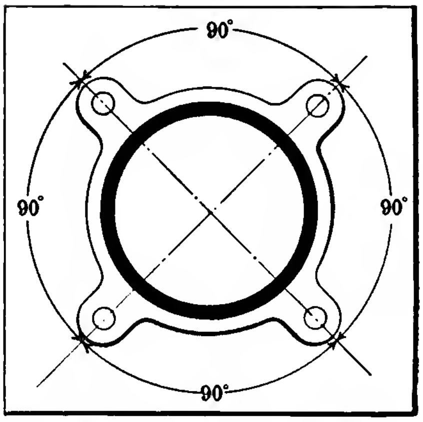


Fig. 19—Section, showing bolting plan of individual cylinder construction

Sulphur usually ranges between 0.04 and 0.16 per cent. It should not exceed 0.085 per cent. in the class of castings under discussion, and would be better at a limit of 0.06 per cent. Sulphur tends to hardness and hot shortness. Fortunately, sulphur is bound to be low with any considerable amount of combined carbon. Increasing silicon, as well as holding the combined carbon up to a fairly high value, aborts the evils of sulphur, as well as limiting the amount. If the pig and scrap and perhaps the fuel are high in sulphur, the carbon and the silicon are likely to diminish, and on this account, with high sulphur, low carbon and silicon may follow, although silicon, notwithstanding this fact, generally ranges higher than the limit put upon it from the purely strength point of view. "Chill" and a tendency to whiteness comes with high sulphur and without high silicon to match, and the castings with such characteristics are likely to be inferior.

The hardening tendencies of silicon are not rendered apparent unless it is in excess, because the softening effect of the lowering combined carbon exceeds the hardening tendency that silicon exerts. An excess of silicon favors an increase in shrinkage, since shrinkage increases with hardness.

Manganese increases the saturation limit of carbon in the molten mass, masks sulphur, and is itself a mild intensifier as compared with carbon. In automobile cylinders this element seems to be valuable above 0.75 to 0.80 per cent., while on the other hand it rarely reaches 0.80 per cent. in cylinder castings.

The saturation limit of iron for carbon may not exceed 4.5 per cent., and it is generally less. One would expect, then, a low total carbon with low manganese, and an inspection of numerous determinations bears out this fact as follows:

Total carbon, 3.00, 3.50, 4.00.

Manganese, 0.20, 0.40, 0.80.

These values are not invariable, because other conditions alter the stability of the composition, but they do illustrate the point, *i. e.*, low manganese denotes low total carbon and vice versa.

The tendency of manganese is to produce brittleness, and while chill is not due to manganese directly, it is likely to induce a condition of hardness that will result in excess chill under certain conditions; shrinkage is also increased in the presence of excess manganese.

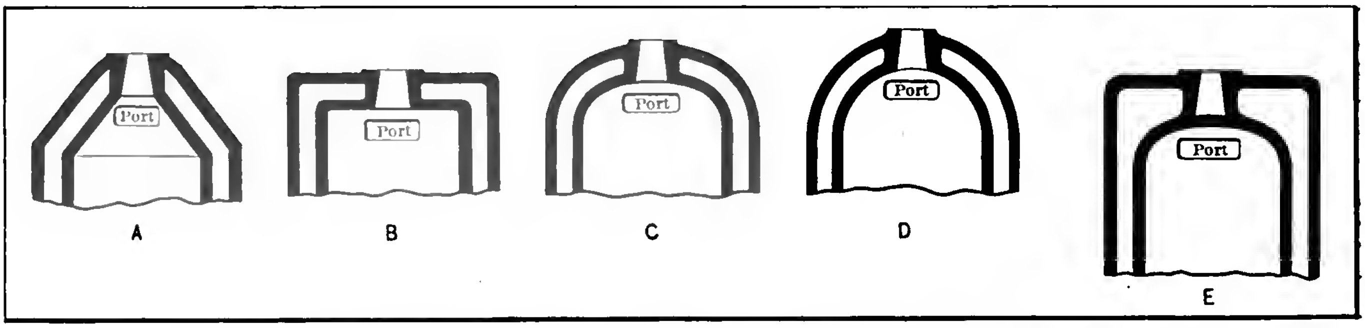


Fig. 20—Illustrating several conventional shapes of cylinder domes, as used in automobile motors

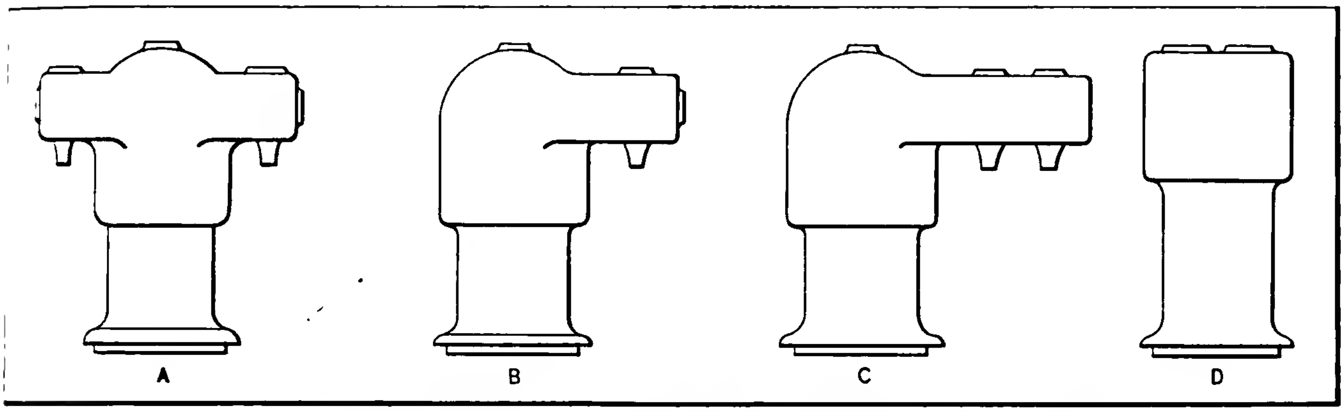


Fig. 21—Depicting the several forms of cylinders as distinguished by locations of valves

Influence of Quality of Castings on Dimensions—The precision demanded in cylinder work, and the lightness desired, tend strongly to the conclusion that no design involving a nicety of proportions will be a round success unless the quality of the material is definitely fixed upon. The discussion as here indulged in is with the idea of suggesting the formidable nature of the problem, if the designing effort is limited to dimensions and shape of parts, without considering the characteristics of the material to be used. If shrinkage is not approximately up to the figures assumed in making the patterns, the walls of the cylinders will not be of the thickness figured upon; if the metal is brittle, high compression will result in disrupted cylinders, especially if thin walls are made, on the ground that light weight is sought for.

In an attempt to realize lightness, and to avoid shrink holes and other defects, the bosses are reduced to the lowest possible mass, and the danger is in the direction of leakage, from lack of bearing of plugs, covers, etc., as illustrated in Fig. 17, of a core holes, of which there must be a certain number disposed at advantageous points around the cylinder, for the purpose of holding the cores in place.

Flanging at the Bottom Demands Secure Bolting—When cylinders are cast in pairs the flanges have to be faced off, and centering is accomplished by approximate methods by the workman rather than by having a bottom extension fit into a recess in the crank case. The flanging is in the nature of a bottom connection between the cylinders, and unless the bolting scheme is well thought out there is danger of deformation, with possible rupture of the cylinders. Fig. 18 shows two schemes of bolting, one of which with six holding points and the other with ten holding bolts; the latter is to be preferred if the cylinders are large, and the diameter of holding bolts should be adequate for the purpose, having in mind the nature of the stresses that may be put on the section of the bolts by the mal-use of big wrenches rather than the pull due to working pressure, and the desire to abort deformation of the flange connection between cylinders. Fig. 19 illustrates flange bolting when cylinders are individual, and if the bolts are 7-16 inches in diameter the plan leaves little to be desired. On the bolts of a cylinder six inches in diameter, if the maximum pressure is 300 pounds per square inch, the total pressure will be equal to:

$$P = d^2 \times \frac{\pi}{4} \times p = 6^2 \times \frac{\pi}{4} \times 300 = 8{,}481 \text{ pounds.}$$

If four 7-16 inch bolts are used, the pressure per square inch on the section of each bolt, in tension, will be:

$$s = \frac{p}{4 \times 0.1503} = \frac{8{,}481}{4 \times 0.1503} = 13{,}940 \text{ pounds per square inch.}$$

and,

P = Pull in pounds, exerted by the cylinder, on the holding bolts.

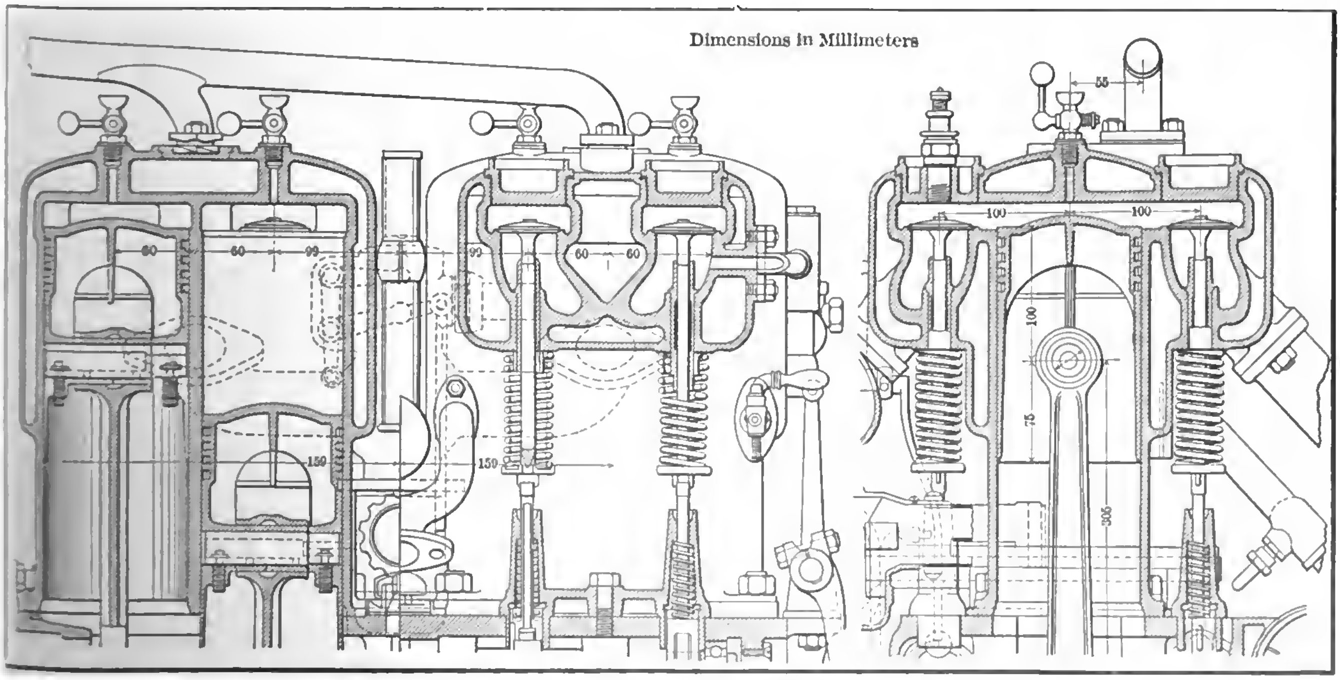


Fig. 22—Four-cylinder motor, in cross and longitudinal section, showing proportions and location of T cylinders

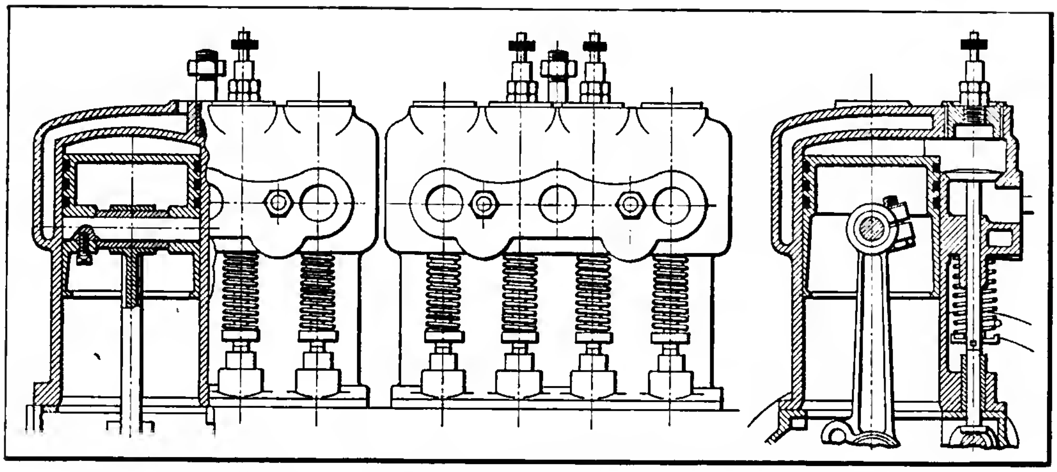


Fig. 23—4-cylinder motor, in cross and longitudinal section, showing L cylinders in place, and spacing between them

p = maximum pressure per square inch of the gas in the cylinder.

d = diameter of cylinder bore **in inches.**

s = strain on the section of one bolt, in pounds per square inch, in tension.

0.1503 = sectional area of one 7-16 inch bolt, counting from the depth of the thread; if the thread cuts below this diameter, the difference must be taken into account. The ability of the material of which the bolts are to be made must be considered, and if it falls below the value found for the strain, it will be necessary to add to the number of holding bolts; as a rule, materials for this work will sustain under 16,500 pounds per square inch as a low limit, which includes an adequate factor of safety, assuming the ultimate strength of the bolt stock to be 65,000 pounds per square inch.

Shapes of Domes Influence Results—It has been found, as a result of many tests, that the mean pressure in cylinders—considering a given fuel, equal methods of cooling and other conditions on a constant basis—will differ, depending upon the shape of the dome of the combustion chamber. Fig. 20 illustrates the several shapes in vogue, and referring to A it is to note a truncated cone, offering great strength, and relatively little surface between the combustion chamber and the water, or other cooling medium, on the exterior surface of the cylinder wall; B depicts a flat head, the surface of which is rather more than in that of curved shapes, and the strength of the head is the least of all; C represents an elliptic curvature, frequently adapted in high compression motors in order to restrict the volume of the combustion space; D is of a semi-sphere, offering the advantage of minimum surface to the cooling influence and strength to the greatest possible extent; E is offered for the purpose of showing that the exterior shape may be different from the interior, providing that adequate water volume is allowed for, which is one of the advantages attending this particular design.

On account of the influence of the valve ports, especially when they are located at the side, it is difficult to determine the relative surface for the several shapes without first considering the surface that follows the contour of the valve ports. As a primary consideration, it is necessary to establish the clearance volume, in view of the desired compression, and then the shape of the dome will work in, with influences for efficiency, depending upon the surface offered, remembering that decreasing surface is in the direction of increasing thermal efficiency. Mean pressure, hence power, increase with an increase in thermal efficiency also.

Considering Conventional Shapes of Cylinders—Referring to Fig. 21, A represents the T type of cylinder; B, the L type, with valves in the axle plane; C is of the L cylinder, with inlet and exhaust valves in the lateral plane, and D represents a cylinder with valves in the head, thus eliminating offsets. T cylinders are much used, and Fig. 22 shows this type in position, indicating relative proportions, as they obtain in good practice involving a four-cylinder motor. Fig. 23 depicts an L type of cylinder, showing the arrangement and relative proportions, in a four-cylinder motor, according fairly with present practice.

The T type of cylinder, having inlet and exhaust valves on opposite sides, demands the use of two camshafts, and offers the advantage of symmetry of the cylinders, with attending advantages. In the L type of cylinders but one camshaft is required, since the valves are on one side only, and lack of symmetry of the casting is one of the conditions to be tolerated. With valves in the head it is the custom to use but one camshaft, and in notable instances the camshaft was superimposed. Noiseless performance is more difficult of attainment when camshafts are so placed, due to lost motion to some extent; and to lack of muffling following the exposed position.

(*To be continued*)

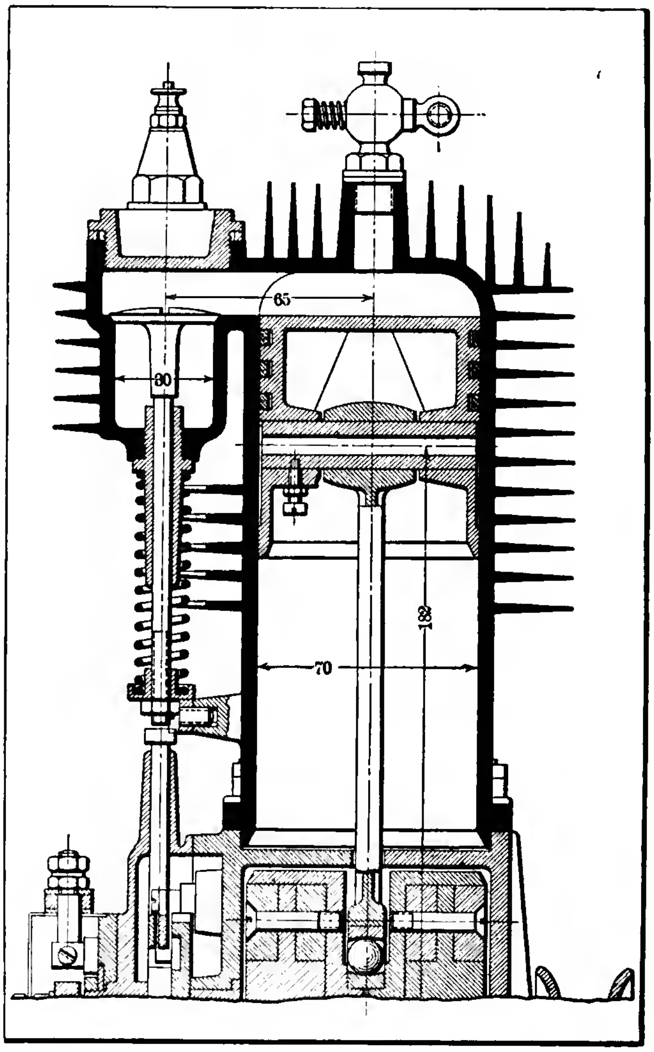


Fig. 24—Section of an air-cooled cylinder, with flanges integral, showing proportions possible with good foundry work

NEW NICKEL-IRON BATTERY WITHSTANDS TESTS

EDISON, the inventor, has promised a storage battery that would revolutionize the industry so many times, each one on trial being marked by a failure that the people have begun to be skeptical of any Edison battery. However, the new type of nickel-iron battery is out and, says *The Commercial Vehicle*, for nearly two months past the Edison battery, for which electric vehicle users have been waiting so long and impatiently, has been undergoing tests in the regular daily service of one of the leading department stores and one of the largest drygoods establishments of New York City, the two largest users of commercial vehicles in the city with the possible exception of the Adams Express Company.

R. H. Macy & Co., who own and operate thirty-one electric delivery wagons and trucks, had a Lansden wagon fitted with one of the new batteries for three weeks, since which time it has changed hands, being in the service of the pioneer dry goods house, a house that to-day maintains forty-one commercial vehicles, both gasoline and electric, but which as a matter of policy declines to allow the use of its name. By all who have had anything to do with the new battery it is spoken of in the highest terms of approval. But the best presentation of its efficiency will be made by telling exactly what has been accomplished with the battery in an ordinary electric vehicle.

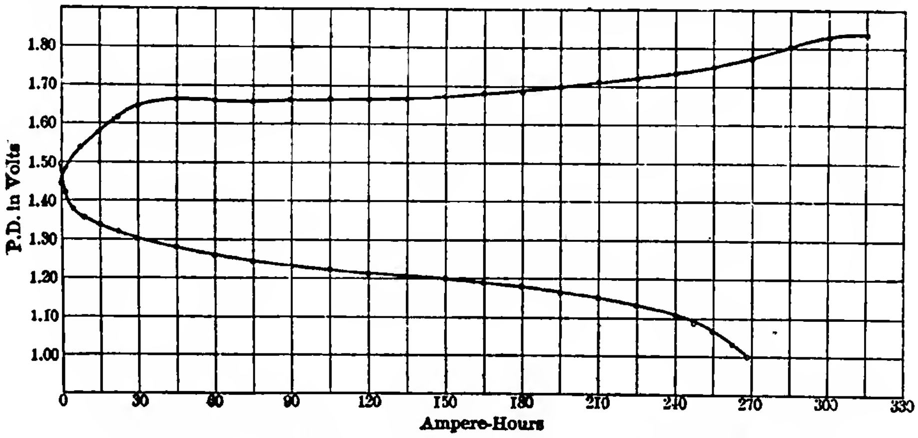
Details of the Two Sizes Made—The new battery is made in two sizes, designated A 4 and A 6. The former is of the same capacity as the earlier type E 27 Edison battery, rated at 150 ampere-hours discharge. Type A 6 has the same number and size of cells as type E 27 and is of about the same weight, but has nearly double the capacity, giving 260 ampere-hours discharge. It requires a charge of 300 ampere-hours, but the users say the loss is much more than counterbalanced by the work it does and by other points of practical excellence. The smaller size battery weighs about 700 pounds and the larger size 1,200. Size A 6 is installed in a demonstration wagon of Lansden make which has been christened the *Greyhound*, for reasons that will become obvious. At the time an investigation of the performance of this outfit was made, up to June 21, it had been running in the service of the drygoods store for nearly a month.

Upon being received it was given a special test, in which it was run three consecutive days without recharging, and made a total mileage of 93 miles. On the first day it left New York City at 8 o'clock in the morning, crossed the ferry to Jersey City and covered the Bayonne route, going all the way to Bergen Point, making approximately 100 stops for delivery of packages. It returned to the garage at 6 p. m. The same route was covered on the second day, starting at 8 a. m., making about the same number of stops, and getting back at 5 p. m. On the third day it traversed the regular Staten Island route for the store, embracing nearly all the towns on the north end of the island, which is very hilly, and making about one hundred stops. It left the store for this trip at 8.30 a. m. and got back at about 8.30 in the evening. During this entire period the battery received no "boost" and was not recharged. At the end of the test, the voltmeter reading showed 60 volts.

Unusually Severe Route Traversed—Following this initial test, the *Greyhound*, with battery A 6, was put on the Coney Island route, which is claimed to be the longest and hardest covered regularly in one day by any dry goods house in the city. It is from 63 to 67 miles long and averages 150 stops for deliveries, sometimes running up to nearly 300 deliveries.

In covering this route, the *Greyhound* leaves the store in New York City at 8 o'clock in the morning, crosses the Brooklyn Bridge, and thence runs out Fourth avenue to Sixtieth street, where deliveries begin. From there it goes to Fort Hamilton, making deliveries along the way, returns to Dyker Heights, then does part of Borough Park. From Borough Park, it delivers all the way down to Bath Beach, taking both sides of the main line, thence through Bensonhurst to Ulmer Park and on down to Coney Island. It covers Surf avenue, in Coney Island, all the way to Sea Gate, at the westerly end. Returning, it goes to Brighton Beach, then cuts over to Sheepshead Bay and starts on the homeward trip, coming back through Flatbush, where it finishes its deliveries, and re-enters Manhattan by way of the Williamsburg bridge. The wagon usually reaches the garage at 7 p. m.

If there are an unusual number of deliveries to be made the driver is accompanied by a boy to carry packages, but otherwise he is alone. It is an enormous day's work to be done week after week, but the driver likes it because he gets back from his work about three hours earlier than when horses were used. One reason why it is possible to make so many deliveries on such a long route in so short a time is because, unlike the city routes, there are no stairs to climb to upper floors of flat buildings.



Characteristic Curves on Charge and Discharge of Nickel Iron Battery

When this route was covered with horses, two teams were used every day and hampers full of packages were shipped by express to Bath Beach, about midway of the delivery route, where the wagons called for the packages and began their deliveries. Very often the wagons could not start delivering until 10 a. m.

Details of the Car with Which the Test Was Made—The *Greyhound* is a one-ton wagon of the regular Lansden type. It weighs 2,460 pounds empty, without battery, and 3,660 pounds with battery; that is, the type A 6 battery weighs 1,200 pounds. The wagon averages about 11 miles an hour actual running time.

The smaller battery, type A 4, has been in use by the same house in one of its two-year-old Lansden 1,000-pound wagons since June 1. In order to test it out, it was first tried on the Coney Island route, already described. It covered 45 miles over heavy, muddy roads, making 175 stops for deliveries, before the battery charge gave out. This showed that it was incapable of serving this route, however, so it was put on the Bayonne route, running down to Bergen Point. It has regularly served this route ever since, covering an average of 43 miles a day and making 125 stops. The voltage reading of the battery after the day's work shows that it is capable of doing 50 miles a day under the same conditions. The wagon leaves the store about 8 a. m. and gets back to the garage at 5 to 5.30 p. m. It is not given any boost during the day—in fact, the drivers are not allowed to boost the batteries in any of the cars. This small battery contains 65 cells and weighs very close to 700 pounds.

Various characteristics of the new battery are commented upon by the superintendent of the garage and others connected with the management of the store under whose direct observation the work of the delivery service comes. The most important is the uniformity of discharge capacity regardless of the age of the battery as shown by the curves and table on this page. This is the chief characteristic, perhaps, of all Edison batteries, as the dry goods house has one of the early ones (type E 27) that has been in its service for nearly five and one-half years and is to-day regularly doing 35 miles a day. Practically no other work has been done on it in that period except to recharge it with potash every six months, and of course to keep the cells filled with distilled water. This quality, it is pointed out, is of great value, as it relieves the superintendent of deliveries of the mental effort of remembering the capabilities of each battery according to the time it has been in use, so that a battery capable of doing, say, 20 miles, will not be put on a route 30 miles long and get stalled.

EDISON CELL—TYPE "A 6"

Weight, 19.5 pounds

Charged 7 Hours at 45 Amperes		Discharge at 45 Amperes
Ampere-hour input.........	315.0	Ampere-hour efficiency..85.2%
Ampere-hour output........	268.5	
Average P. D. of charge...	1.692	Volt efficiency...........71.1%
Average P. D. of Discharge.	1.202	
Watt-hour input...........	533.0	Watt-hour efficiency.....60.6%
Watt-hour output..........	322.7	

Output per pound.....16.54 Watt-hours.

Another quality is that the battery does not heat up much in charging, resulting in lessened evaporation and less frequent refilling. There is no testing with a hydrometer daily, and no use of acid, all that is required being the filling of the cells with pure water, as the potash does not evaporate. The reason for the lessened heating during the charging operation is said to be due in part to the large air space between cells.

Facts from Three Weeks' Service—During the three weeks that the Macy department store has the *Greyhound*, it was given severe tests over a number of different routes into the suburbs. For example, on April 16 it went to Coney Island, making about fifty deliveries, and on the same day, without recharging, it ran to Woodlawn and back. Then, to completely discharge the battery, it was run about 10 miles in nearby deliveries in the neighborhood of the store. The distance covered during the day was between 87 and 90 miles. The charging plug had been taken out at 8 a. m. and was not put in until 3.30 a. m. the following day.

On May 5 the wagon was sent to Morristown, N. J. Leaving the store at about 8 a. m., it covered 72 miles out and back, up hill and down, over macadamized roads, making forty-five stops, and returned to the garage by 9.30 p. m., or two hours before a team of horses would return to the stable in Newark after serving the same territory in Morristown.

On another occasion the Staten Island route was served, including Tottenville, at the extreme southerly end of the island. Owing to the hilly nature of the roads there it is asserted by the manager of the garage that 50 miles on the island is equivalent to 80 or 90 miles over level, smooth roads. Yet the wagon covered the route, making sixty stops, and returned, running strong, in five hours' less time than the same deliveries could have been made with teams of horses.

During the three weeks that Macy's had the wagon fitted with the new A 6 battery the machine was regularly put on the longest routes, serving suburban territory that is usually handled by horses or express. Besides the Tottenville route, which is 56 miles long, there was covered the trip to Richmond, also on Staten Island, 48 miles; Scarsdale, in Westchester County, north of the city, a round trip of 43 miles; Coney Island, and others, in regular rotation.

The wagon was regularly worked from 14 to 18 hours a day, according to the chief engineer of Macy's, and averaged from 56 to 57 miles a day on one charge, returning regularly still good for ten miles. It was regularly recharged at night for six to seven hours at a 40 ampere-hour rate.

Delivery experts state that the battery is easily capable of serving the longest and hardest route operated out of New York City and of surpassing the physical endurance of the driver; that is, no driver even with the aid of a boy, could drive the machine, day in and day out, over a longer route and make more deliveries than the *Greyhound* is capable of.

Those who have supervised the work of the battery are more than enthusiastic over it. They admit that the first cost is high, but to offset this, point out the low cost of mainenance

The Battery Details and Mechanical Make-Up—While the improved Edison battery has been under test for a long time in vehicles connected with the maker's laboratory, the sample batteries here discussed were put into commercial service so that the performances could be verified under the conditions of trade. Edison's new A type differs from the older Edison battery in the mechanical construction of the positive plate and in the substitution of pure nickel for the graphite formerly used. The general form has not been altered and the negative plate is still composed of nickeled steel boxes of rectangular section filled with oxide of iron. In the new positive plate, however, the active material is contained in nickeled steel tubes, about the thickness of a lead pencil and four inches in length. These are formed spirally out of strips of perforated ribbon steel, nickeled, and are reinforced by nickeled steel rings spaced 1-2 inch apart. The tubes contain alternate layers of nickel oxide and pure metallic nickel, loaded under pressure. The ends of the tubes are crimped, forming a flat at each end which is held fast to the frame of the positive plate by notched strips on the plate. The result is a very stiff plate which could be thrown across a battery room with very slight chances of even bending it. The electrolyte is composed of a 21 per cent solution of caustic soda as before. Aside from the cells, a new form of crate has been adopted with bent corners instead of dovetailed, making a very light and stiff construction.

EFFECT OF MOTORS ON LONDON STREETS

London, July 2—An anti-motorist member of Parliament has questioned the president of the Local Government Board as to the "greatly increased" cost of road maintenance in London since the advent of motor traffic. The official reply silenced the questioner and clearly shows up one of the big advantages of horseless traffic. The following figures were given:

	Cost of Maintenance and Repair	Cost of Cleansing, etc.
1901-2	£745,461	£738,195
1903-4	771,490	724,213
1905-6	820,267	757,182
1907-8	745,601	723,790

The total length of roads here referred to has increased from 2,088 miles in 1901 to 2,162 miles in 1908. The substantial decrease in both maintenance and cleansing costs since the general introduction of motor vehicles some two or three years ago is so marked as to be well worth recording, placing the automobile, as it does, within the reach of a greater number of people.

CITY OF THE STRAITS FIRST ON THE LIST

Detroit has more automobiles in proportion to its population than any other American city, with the possible exception of Los Angeles. Supremacy in this respect is a mooted question, but there is no chance for argument when the natural advantages of the two cities are considered. Detroit has broad, well-shaded, well-paved streets that offer every inducement to motorists. Traffic regulations are liberal because of a keen appreciation of what the automobile means to the city. The parks and boulevards are always open to owners of machines, and if there ever comes a time when the motorist tires of riding around town he can drive out into the country in any direction and for a sum so small it would make a New Yorker gasp with astonishment enjoy a chicken dinner, feast on Detroit River whitefish, famous wherever epicures are found, or gorge himself on frog saddles such as only Detroit produces, and which have been eulogized at length by Eastern writers on more than one occasion.

ON DRIVING A CAR AT NIGHT

By D. R. Hobart

UNLESS one has had considerable experience in driving by night, and no matter how well he may know the road by daylight, he is often utterly at a loss to recognize familiar objects and will even pass the place to which he desires to go without being aware of it, when traveling over the same road after dark. Objects by the roadside have an unnatural appearance and seem out of proportion; what appears as a dark patch in the road may be either a pool of water or a depression, and light colored objects by the side of the road may even be taken for the road itself. The road, too, apparently disappears a short distance ahead and the autoist sets the brakes, only to find himself deceived. Due to the combination of deep shadows and strong lights with the general gloom of the night, all sorts of objects created in the imagination seem to spring up, causing doubt and anxiety. For comfortable night-driving as well as for the safety of the car and its passengers, powerful lamps are an absolute necessity.

Practice Essential to Proper Night-Driving—Recognition of familiar objects and accurate judgment of road conditions can only be acquired by practice. It is not necessary, to accustom one's-self, to drive night after night for periods of from six to eight hours on a stretch, as such long periods give rise to a high-strung and nervous state on the part of the driver. The first drive should not take over an hour and the autoist should be accompanied by a companion familiar with night-driving and the roads that are to be traversed. This companion should point out deceptive appearances and explain their true character, and in general act as an adviser. Unnecessary talking should be avoided by both as tending to distract attention from the work in hand. Subsequent drives can be of greater duration and on some of these the companion should not give instruction allowing the driver to take care of himself but acting when an emergency arises. As a general rule, no matter how experienced an autoist is in night-driving, there should be someone in the seat alongside to watch the road and the majority of drivers are only too glad to have such assistance.

Effect of Street Lights—Running in city streets or on lighted roads is of course much easier than running on dark roads, but in such cases the eyes are constantly accommodating themselves to the changes in light as the car approaches and passes a street lamp. With the powerful arc lights in use in many cities, the view will be obscured for a short time as the car passes out of the circle thrown by the light and a feeling of blindness will result, soon passing off, however, as the eyes adjust themselves to the change in quality of the light. It is due to this effect on the eyes that a number of the minor accidents occur at corners, not only to autos but to horsed-vehicles and foot-passengers. When emerging from light into what seems total darkness, as when leaving the last light of a city and going along the unlighted road, an involuntary sensation of being lost is experienced and even with powerful headlights the feeling of blindness occurs for a short time.

Goggles Not to Be Used Because of Reflections—Except when absolutely necessary, goggles should not be worn nor should the wind-shield be raised when driving at night, as the reflections from street-lamps or other sources of light on the glass surfaces of the goggles and shield appear as direct lights and obscure objects on the road, with unhappy results. A hint in this direction can be taken from the locomotive engineer who drives at night with the cab windows down to prevent any possibility of reflection, the only light in the cab, the gauge lamp, being placed directly in front of the gauge where no angular reflection is possible. Objects outside of the area illuminated by the lamps are almost invisible, so that care should be taken in making a turn or when passing a road-crossing. It would be well to have a movable searchlight fitted and this should be played on road crossings in both directions as the car approaches them, and on the road into which the car is to turn in order to illuminate objects not shown up by the headlights. Otherwise the searchlight can assist the headlights in illuminating a greater vertical area and give warning of dangerous objects at a distance.

Speed and Courtesy—Only a very reckless driver or one under the influence of liquor would drive a car at extreme speed at night. Not only would he endanger the other occupants of the car in so doing, but all other road users, especially those whose lights are not as powerful as his own. To be on the safe side and to accord fair treatment to all others on the road, a car should never be driven at such a speed as will necessitate the use of goggles or a wind-shield. Courtesy on the road does not disappear with the sun and because one has a powerful car and large lamps he is not justified in causing annoyance or injury to less fortunate users of the road. To the credit of the majority of autoists, most of the violations of courtesy are on the part of horse-drivers or other road users, a striking example being the moving-van driver who persistently occupies the crown of the road, thus preventing others from passing him, or who picks out the narrowest part of the highway as a suitable place to breathe his horses. The cattle driver with his herd occupying the entire width of the road and without any lights at all is another offender who constitutes an element of danger, in addition. Both of these must be watched for on summer nights and in localities where market wagons or herds are driven from one place to another by night, moderate speed is all that can be indulged in with safety. As in the daytime, the same courtesy should be extended to all other road users at night and it should be remembered that in case of accident, it will go harder with the autoist at night than if the trouble occurred by daylight.

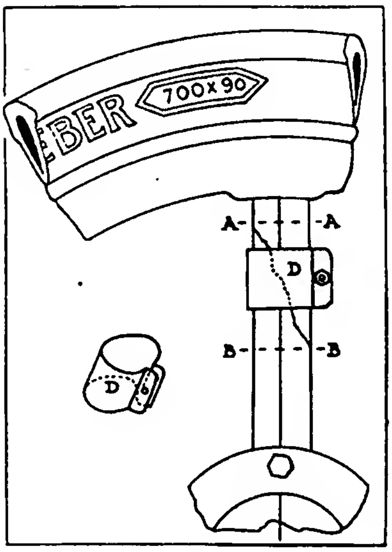
The Lights of Traffic—Traffic on our roads is, unfortunately, noticeable in the main by the absence of lights of any description. Though nearly all States specify that all vehicles shall carry lights, the laws are honored more in the breach than in the observance. Most of the mishaps on the road at night are rear-end collisions, or as a result of endeavoring to avoid such collisions. When horse traffic carries any lights, they consist of either a pair of oil dash-lamps or a lantern slung under the running-gear, and none of these lights can be seen for any considerable distance. So whenever a faint light is seen ahead, the autoist should drive cautiously until the nature of the object bearing the light and its direction of travel if it has any is ascertained. In the majority of cases, the object will be a vehicle, although road repairs are often marked by a white lantern instead of a red one. As the autoist becomes experienced in driving at night, he will soon be able to distinguish the characteristics of the different forms of traffic; a large dark blotch signifying a wagon, small whitish spots in the near distance the faces of pedestrians, and a dancing "wil-o-the-wisp" effect a cyclist, the intermittent flashes being due to the reflection of the headlight on the plated parts of the machine. It is of course easy to know the direction of travel of a vehicle when red lights are seen on it as it is then moving in the same direction as the autoist. The absence of any light does not necessarily indicate the fact that no vehicle is present and this should be borne well in mind at all times.

Lamp Equipment and Its Proper Positioning—For properly illuminating the road and objects surrounding it, the lamp equipment should consist of one or two headlights, a pair of side-lamps, a tail-lamp and a swivelling searchlight, although the latter is not absolutely necessary in some cases. The headlights should be carried low down and well forward, not only to better illuminate the road but to cease to dazzle other road users. Each lamp should be set on the forks or bracket so that its principal rays will be thrown horizontally, and should be pointed directly ahead, especially if only one headlight is fitted, as the autoist unconsciously follows the beam of light in driving. The searchlight is usually mounted on a swiveling bracket on the dash where it can readily be moved by the hand. Side lamps rest in brackets on each side of the dash and act as auxiliaries to the headlights in illuminating roadside objects outside of the beams thrown by the headlights. In cities where the use of search- or headlights is forbidden, the side lamps must be depended on alone, and when any driving is done in cities fairly powerful lamps should be used. Side lamps are valuable in case of tire or other trouble, as they can be readily removed from the brackets to light up the work. The tail lamp should be placed out of the path of the exhaust so that the light will not be mysteriously extinguished and the fact called to the autoist's attention by the police, as is usually the case. An electric tail-lamp with a small bulb wired in series therewith so that the extinguishing of this bulb will indicate that the tail lamp is also extinguished is far better than the use of an oil light.

Benefits Derived from Driving by Night—When not indulged in to too great an extent, driving by night is beneficial in a number of ways. After the day's work it clears the mind and fills the lungs with fresh air. The rapid passage of the car gives rise to a sense of buoyancy and the reaction therefrom causes a feeling of drowsiness which makes the autoist sleep like the proverbial top. Especially is this the case with nervous persons or those whose occupation keeps them indoors for the greater part of the day. Driving at night should be indulged in in the warmer months of the year, as in the winter, driving in an open car is far from pleasant and may subject the riders to neuralgia or rheumatism. Driving in a closed car prevents the thorough enjoyment of the air currents, and while the mind may be cleared, it is, in the writer's estimation, but little superior to riding in a train or closed street-car.

LITTLE THINGS WORTH REMEMBERING BY THE AMATEUR

Temporary Repair to a Broken Spoke—Haste or carelessness in driving usually results in marring the paintwork, tearing the tires or damaging the fender, as when shaving a corner or making too short a turn and colliding with other objects in so doing. Sometimes more than paint and fenders are affected, a spoke in one of the wheels being broken or split so that safe progress is impossible. Where the autoist is unprovided with detachable wheels, as is usually the case, recourse must be had to some temporary binding or splint so that a repair—or wheelwright—shop can be reached. Such a break and a splint for keeping the broken ends in their proper relation to each other is shown in the sketch. A brass water connection collar, D, was bent into the approximate shape of the spoke by hammering it around the corresponding portion of another spoke, and after the broken ends were joined, the collar was put in place and the nut and screw set up. The collar held for some miles with careful driving, and in the opinion of the autoist who applied it, would have continued to keep the parts together for some time afterward. Where no such connection is at hand, steel wire wrapped around between AA and BB will answer for a very limited time, and very careful driving is necessary at that.



Clamp to Hold Broken Spoke

Recipes for Cleaning Leather Gloves—Ordinarily, soap and water are unsuitable for cleaning leather gloves more than once, as the scrubbing necessary destroys the dressing of the leather and causes a fibrous and untidy appearance which results in the deterioration of the article. An excellent solution which will clean with practically no deterioration consists of one drachm of sodium carbonate in one quart of milk, keeping these proportions only, however, as it is not often necessary to use such a quantity of mixture at any one time. The glove to be cleaned is put on the hand or on a wooden form and the solution applied with a piece of flannel, cotton or a wool brush such as comes with patent shoe dressings. After the stains or spots have been removed, the glove should be rubbed dry with a clean, soft cloth. Another method of cleaning employs Castile soap and milk, a cloth being dipped in the milk, rubbed on the soap, and the glove cleaned as before. Coarse soaps or those having considerable alkali should not be used on leather on account of the destructive action of the alkali and the effects of scrubbing as mentioned above. Under no circumstances should the cake of soap be rubbed on the glove, and it should be borne in mind that no dirty cloths nor rags whatever are permissible.

Cleaning Rubber Mats—Cars are frequently seen on which the brass and nickel plated parts are brilliantly polished but the rubber floor mats are dingy and greatly detract from the general appearance of the car in consequence. An excellent method of keeping the mats bright is to give them an occasional coat of white or gray paint. Frequent scrubbing with soap and a brush is another means often employed, but while this cleans the mats the worn places look patchy, which is not the case when paint is used. White shoe dressing or pipeclay gives a smart appearance, but in wet weather the dressing gets pasty and is trodden into the floor-boards and cracks, where it is difficult to remove. If the mats can be cleaned daily, scrubbing with soap will answer unless they are badly worn.

A Deadener for Noisy Gears—When metal gears are run unhoused, the ringing noise which they make is quite noticeable, and if the gears are set too closely the noise becomes objectionable. As it is often inconvenient to stop and reset the gears, the noise can be deadened by rubbing the teeth and the grooves between the teeth with beeswax which has previously been warmed or well kneaded with the fingers. In a short time after applying the wax the noise will cease. The wax coating will remain on the gears for a considerable period of time, but the gears should be set properly in preference to applying another coating. Common bar soap, which contains a large percentage of wax, can also be used as a deadener.

Roadside Puncture Detecting Wrinkle—Small punctures in inner tubes are usually located by partially inflating the tubes and either immersing them in water or smearing them with soap lather, the puncture being indicated in either case by bubbles. On the road, the autoist is sometimes unable to procure a vessel suitable for testing the tube, but the tube can be laid in the dust and the puncture will be indicated by the blowing away of the dust at the point where the air leaks from the tube. This method requires no preparation, and is as sure as either the lather or water immersion methods, besides taking considerably less time.

Letters Interesting and Instructive

HAS NUMEROUS TROUBLES

Editor THE AUTOMOBILE:

[1,940]—Will you please inform me through "Letters Interesting and Instructive" on the following points:

(1) Why does my 1903 opposed engine, 16-20 horsepower, under the body, on car which is chain driven, use up four gallons of water on a 16-mile run? Pipes do not leak more than two or thee drops per minute.

(2) Why does this same car, although the engine runs smoothly, seem to have a jerk or surging motion at irregular intervals? This begins as soon as the car gets under way and occurs at intervals of from fifty feet to a hundred yards and continues throughout the run, although it gets no worse, it gets no better. Brake bands and transmission bands do not drag, engine is lined up, and all bearings are oiled before starting. Chain also is not tight.

(3) Why does this motor, which is equipped with a popular carbureter, not give more power when the throttle is wide open than it does when almost closed? On the other hand, it is very sensitive to a slight spark advancement, with the throttle partly open.

(4) Why does this motor after being run three miles under normal conditions, continue to run after the plug is pulled out. This is apparently on one cylinder and will continue for a long time, after which it will reverse a couple of times before stopping. This condition prevailed both before and after the cylinder and piston had been scraped free from carbon. It also occurs before the water gets to the boiling point as well as after. Water circulation is by gear pump.

(5) What causes this car to make a tapping sound when speeded up with spark not too far advanced? Also, while going down grade and coasting with the clutch out the same noise is heard. If I take the clutch out while running along on a level road at a 15-mile clip, it is heard and also when the engine is shut down after running at good speed. SUBSCRIBER.

South Braintree, Mass.

(1) You say two or three drops as if you are not sure. In that case, might not the right figure be twice as much? It would seem as if this small leak accounts for the loss of water. Since hot water flows more freely than cold, might not your five or six drops per minute (cold) become even twice that when the water gets up to 190 degrees? Of course, there may be the possibility that you have a trapped passage in one or both of the cylinders in which steam forms, thus preventing the circulation of water, with the result that more steam forms and the water boils away very rapidly. This latter fault can readily be detected in the overheating of the engine.

(2) If your car were shaft-driven, a misplacement of one of the universal joints would account for the surging. As it is, a single stretched link in the chain might cause the effect you have noticed, or even an irregularity in one of the sprockets. The fact that it continues throughout a day's run without increasing or diminishing would seem to account for the trouble as located in either chain or sprockets.

(3) Your carbureter and power trouble sounds very much as if the spray nozzle had been raised too high, resulting in starving the engine at wide-open throttle and high speeds, while at low speeds and partly open throttle an excellent mixture is obtained and the engine runs very well and delivers lots of power. This is explained in full, with a drawing to illustrate the point, in the June 17 issue of THE AUTOMOBILE, in answer to letter No. 1919, which you would do well to refer to.

(4) In this case, you have one cylinder in which there is a projection. This collects the heat and ultimately becomes red hot. It then acts as an igniter and fires the charge, so when the regular source of ignition is cut off it continues to fire until the fuel is used up or until it loses its heat. As a very small projection will often cause this you will have to look closely to find it.

(5) The tapping sound might be caused by so many things that any suggestion we might make based on the facts that you have sent in would be in the nature of a guess. Being right on the ground and with the machine before you, you ought to be able to make a better guess than we could.

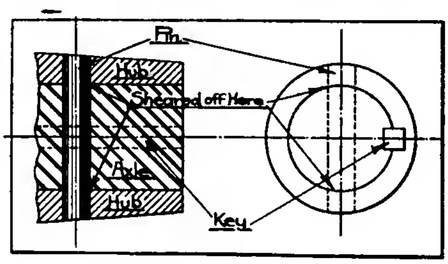
STAGGERING REAR WHEEL

Editor THE AUTOMOBILE:

[1,941]—Can you advise me through "Letters Interesting and Instructive" what would cause this trouble: The right-hand rear wheel "staggers" over rough pavement and very frequently I find the hub pin broken into three pieces. The key also wears very rapidly. The car is a Reo runabout. All other wheels are tight and as good as new. A. A.

Cleveland, O.

Your trouble, very apparently, is that the hub is loose on the axle, allowing it to move slightly in one direction and then in the other, when running over rough pavement. This alternate back and forth movement shears off the pin and makes the key loose. The remedy is to have the hub bored out large enough to allow of pressing a bushing into it. Then the latter should be rebored to axle size, allowing *not over* two-thousandths of an inch for clearance. This will be tight enough so that a few light blows with a hammer will be required to put it into place. Then a new key should be made which is a driving fit. As to the pin, have a new one made of a superior material, say, nickel steel. Then be sure that this is a tight fit also, and drive it into place yourself. If everything is tight, there can be no "wobble" or "stagger," which results in the sheared pins.



Showing How Hub Pins Break

ABOUT GARAGE FLOORS

Editor THE AUTOMOBILE:

[1,942]—I wish to garage a car in a stable which has a plank flooring. Owing to the fact that there is a cellar beneath the floor, it is not deemed advisable to lay concrete or any similar material thereon. Can you suggest any floor covering? H. R. FOLLETT.

Norwich, Conn.

The mere fact of there being a cellar below should not deter you from using concrete, which will make the best floor in the long run. Contrary to the usual idea, this need not be made very thick, an inch of neat or nearly neat cement being sufficient. This much cement will not be very heavy, so you need have no fear of the wooden floor standing up under the load.

Metal could be used, but has several very apparent disadvantages; it is heavy, expensive, noisy and hard to handle, which means a lot of hard work if you plan to cover the floor yourself. If metal was objectionable, and you did not mind adding a few inches to the thickness of the floor, brick laid on the side in cement could be laid cheaply and would make an excellent floor. Should you object to this thickness (2-inch), tile could be used in a similar manner, although this has the disadvantage that anything heavy dropped on it will break a tile or a couple of tiles. This means a nasty job replacing them.

There is a floor covering which is an asbestos paste, and can be put on in any desired thickness, one-half inch being recommended by the makers. This is sold under the trade name of Crown Sanitary Flooring by Robert S. Keasbey Company, 102 N. Moore street, New York City. It has the advantage of being easily and quickly applied, is water, oil and fire proof, can be had in any desired color, is seamless and practically indestructible. Probably this would answer your purpose.

NOISY TIMING GEARS

Editor THE AUTOMOBILE:

[1,943]—Perhaps some of your readers who have had experience with Ford runabouts of the 1908 type, or years previous, can suggest some way for lessening the noise of the timing gears. There may be some way of enclosing them, even though the arrangement would not be oil-tight, which would do away with the ringing noise. J. R. ZECKWER.

Philadelphia.

Just as a suggestion you might try the use of a fiber or rawhide gear in place of one of the metal gears now on the engine. This will doubtless eliminate some of the noise. This, too, would be an advantage in case you tried to enclose the gears with some form of sheet metal cover, as in the use of rawhide or fiber oil cannot be used, so the problem of covering the gears would be simplified. Readers who have been bothered in this same way are invited to write in and tell how they avoided the noise.

SARATOGA TO NORTH CREEK

Editor THE AUTOMOBILE:

[1,944]—Will you kindly publish in your columns a suitable route from Saratoga to North Creek. G. J. R.
Albany, N. Y.

Complete running directions from Saratoga to North Creek have not yet been compiled, but a fair idea of the route can be had by reference to the New York State volume of the 1909 edition of the "Official Automobile Blue Book" (page 3).

The route from Saratoga to Lake George, which was traveled and written new by the Blue Book Car in the Fall of 1908, will be found complete on pages 431-433.

As one leaves Lake George for the Adirondacks the road to North Creek is noted on the left. This will probably be traveled and written new for the 1910 Blue Book.

THERMAL EFFICIENCY

Editor THE AUTOMOBILE:

[1,945]—In your esteemed paper dated June 10 appeared an article entitled "Thermal and Combustion Efficiency of a Motor," by Prof. W. Watson.

In the paragraph headed "High Efficiency Very Noticeable" are given some figures on which I would like to have some enlightenment, as my own work gives me the following results:

HEMISPHERICAL COMBUSTION CHAMBER

	A	B	C
V	11.23	12.39	14.20
A	19.25	20.50	22.45
Ratio	1.72	1.65	1.58

These results I have reduced to cubic inches for convenience instead of using centimeters as Prof. Watson does. Now these differ very widely from his results, which were:

Ratio	.99	.94	.88

Will you kindly try to explain this wide difference? A. P. PLANT.
Los Angeles, Cal.

Professor Watson states that his is "a rough estimate of the surface area," so that it is possible that the area was not calculated as carefully as in your case. Even this would not account for the large discrepancy, so we are forced to conclude that your hemispherical combustion chamber is not a true hemisphere, but contains valve pockets and other extensions which increase the area relative to the volume. That this has some basis in fact you will notice from a review of the table in question. In the first part of his table, Watson gives the measurements of the engines under test, and for these finds ratios as follows:

A	B	C
2.01	1.86	1.69

It is with these that the hemispherical chamber is compared, and in his comparison, Watson says: "That this ratio could be very materially reduced is shown by the numbers given for a combustion chamber having no valve pockets, a hemispherical top, and a flat-topped piston. In such an engine the ratio of surface to volume would be only *one-half* what it is actually."

To repeat, your figures, coming midway between the figures for an actual engine and a theoretically perfect hemispherical chamber, lead us to think that you have not a true hemisphere, but incline more to the enlarged shape, which is more usual. All this, of course, providing that your arithmetic is correct.

Another idea is this: the area of the surface of a cylinder is greater than that of a hemisphere of the same diameter and equal volume. So any tendency toward a cylinder and away from the hemisphere adds to the surface area and consequently to the ratio. So it is barely possible that you have an engine of very low compression as compared with those used by Professor Watson. Lower compression means, of course, greater volume in the compression space, but this in turn means a greater departure from the spherical shape, with accompanying increase in the area. The last, in turn, raises the ratio. So, it may be that the only difference is that you have a motor with low compression.

It might not be thought that the compression pressure would influence the amount of area of the combustion chamber, and with it the ratio of volume to area, in this manner, but a few moments' thought will convince the most skeptical that this actually is the case. The above explanation, then, is the true one, and Plant will have to increase compression to improve the ratio.

ROTARY MOTORS

Editor THE AUTOMOBILE:

[1,946]—Can you inform me of any rotary or turbine motor such as is or can be used for aeroplanes or balloons, and if so, the names and addresses of the manufacturing companies?

What style of motors are used for the above purposes and what lengths of propeller blades are used? L. WOLFLEY.
Los Angeles, Cal.

As yet there have been no gas turbines perfected to the point of use in aerial craft. The engines used come in one of two classes, either they are of the V type or of the rotary type. If you will consult the back numbers of THE AUTOMOBILE you will find these treated very extensively. Thus in the January 14 issue the two types of engines are discusssed and compared, while the following rotary engines are described in detail: Eight-cylinder Farcot, seven-cylinder Clement-Bayard, seven-cylinder Gnome, and others. In the February 25 issue there is an article on a revolving type of two-cycle motor, which has but four rotating cylinders.

Then in the April 8 issue will be found a complete description of the work being done in England in the aeronautical line. Following this, the issue of April 15 gives the details of the seven-cylinder revolving Gnome engine, a French production.

Nearly all of these articles also treat of the sizes of propellers used, but as a general statement the size varies from 5 feet to 7 feet in diameter. The lower figure is seldom if ever surpassed, while the upper limit is usually not reached, either. The usual size of propeller blades, considering the difference in the various uses, is not far from the average of the sizes given above, namely, 6 feet. This is the exact size used by Curtiss on his aeroplane, described in THE AUTOMOBILE of July 1.

DIFFERENTIAL AGAIN

Editor THE AUTOMOBILE:

[1,947]—I notice your answer to No. 1,915. He asks about the effect of puting the slip joint of the propeller shaft on a quarter turn wrong. I gather that you assume the slip joint to be on the final driven member, in which case your answer would be correct; but I think from the surging he describes and from the very common custom of having the slip joint on the intermediate shaft that he has misplaced the slip joint on this shaft. The driving and the final shafts should be in parallel positions so the angles with the intermediate shaft will be the same at each end.

But there is a rather more necessary requirement than this. And single joint drives cannot get rid of it. This is the requirement that the forks at the opposite ends of the intermediate shaft, commonly called the propeller shaft, should lie in the same plane. If they do not there is uneven driving and the surging effect he mentions would likely follow.

This is readily seen if we consider the first figure you published in the article. It will be easier if we assume the distances between the two parallel shafts to be much greater so as to increase the angularity of the intermediate B. The fork ends of A describe a circle about the axis of A and their motion, being steadied by the flywheel, is of a steady, angular velocity. The fork ends of B describe a circle of same size about the axis of B but with relation to A this is an ellipse. In a line at right angles to a plane through both shafts the two circles cross each other and at this point we find the long axis of the ellipse. Certain it is that when the fork ends of B are at this point they are moving as fast as the fork arms of A. But when they are in the plane of the two shafts, they are closer to the axis of A than at other times and are moving relatively slower. If the short axis of the ellipse is but half the length of the major axis, then at this point (the position shown in the figure) the fork ends of B will be moving but half as fast as the fork ends of A. Thus it will be seen that the speed of the shaft B at this point of a rotation is a matter of the angle between the shafts and is always slower than that of the shaft A. A quarter of a turn later and the fork ends of B are in a line where the connecting cross is squarely across the axis, and the ends of all four of its arms are moving at the same speed. At this point the shaft B must be moving with the same angular velocity as the shaft A. Therefore we find the shaft B accelerating for a quarter of a turn, then retarding for a quarter turn.

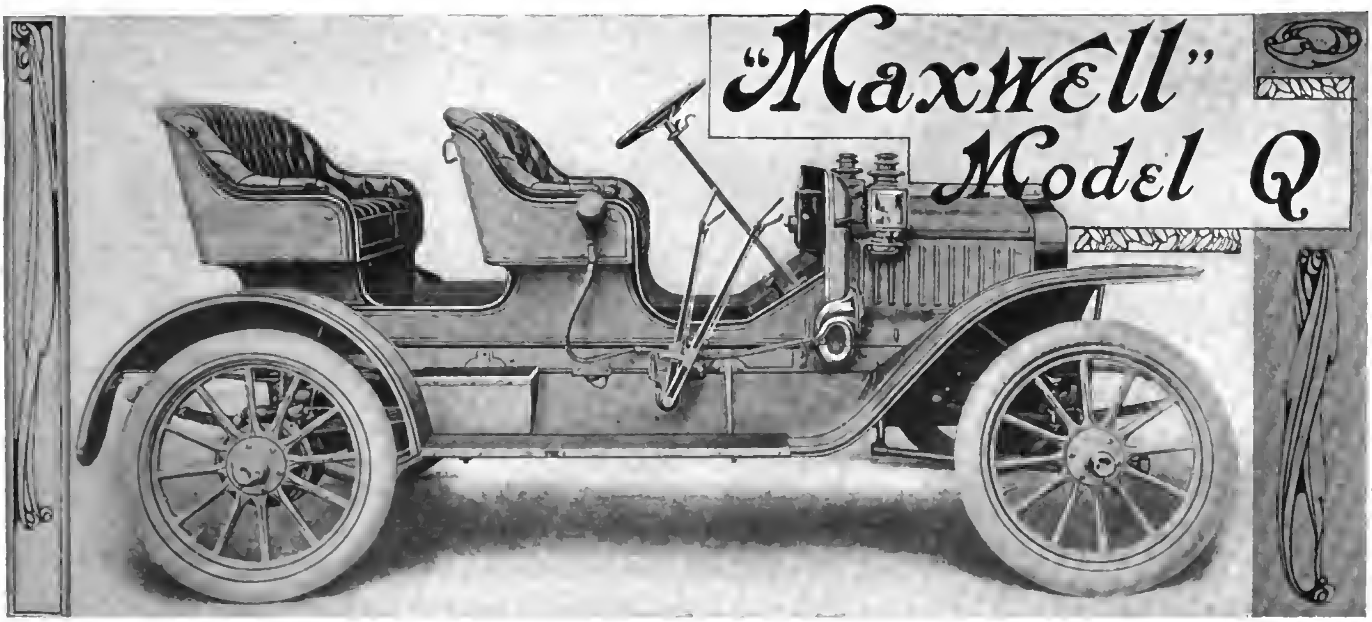
Now it should be apparent that the lower joint of B acts as a driver and has the same effect on the shaft C. That is if the angles are the same, as you correctly state. It should also be apparent that we can make the lower joint retard C while the upper joint is accelerating B. If we do this we get C rotated at the speed of A and the only irregularity of speed is found in the shaft B. This is very light and can vary its angular velocity quickly and without surging or grinding anything.

But if B accelerates C while being accelerated by A we get a doubled irregularity in C. This is decidedly bad. Twice in a revolution the engine is trying to force the wheels forward and twice it is trying to retard them. The flywheel is heavy and not easily stopped and started. The body of a heavy auto is still harder to move. The engine probably gets the effect most. It is a wonder that the gears and shafts will stand it. I have no doubt that many cases of defective gimbal joints and broken gears are due to this irregularity. And that the variation in engine speed can effect the mixture and firing is not too great to believe. The variation in motion becomes very perceptible if the angles are great. Yet many makers seem to ignore this matter as if it did not amount to much. Joint makers, who ought to know better, send out propeller shafts with the joints fitted wrong and no means for turning them right. Multiple drills are to be seen with this wrong arrangement although how drills can stand up at the fast speed if they are running at full speed when going slow I do not know. This is surely a case of going "steady by jerks."

With a single joint there is no remedy except to use a long shaft and so keep the angle slight as possible. The engine shaft should be as near in line with the propeller shaft as possible when under load.

Reading, Pa. CHARLES E. DURYEA.

As all of the matter above, or at least most of it, has been covered before, no comment is necessary. To those who find it difficult to follow the above, the figure will be found on page 987 of the June 17 issue.



WITH the gradual reduction in the price of small automobiles which came in response to the popular demand, has come an increase in the standard of material, construction and external appearance of these cars. The result is that a prospective buyer receives very much for his money. With this continuous "upward revision" of quality, accompanied by downward revision of prices, the buying public has begun to scan with care the details of each and every new model announced. So it is with the feeling of offering something out of the ordinary that the details of the new Maxwell model are made public.

This is a four-cylinder car, rated at 22 horsepower, equipped with runabout body, and in its mechanical features including all of the pronouncedly Maxwell ideas, such as three-point suspension, thermo-syphon cooling and unit engine, clutch, and transmission construction. In fact, the new car, called Model Q, follows closely after the larger and more powerful Model DA.

A special feature of this new runabout is that it is equipped with a sliding-gear transmission giving three speeds forward and one reverse. This type of transmission, while used almost exclusively on large cars, has been considered heretofore too expensive to put on an automobile selling for less than $1,000. Heretofore runabouts selling at approximately this price have been fitted with planetary transmissions.

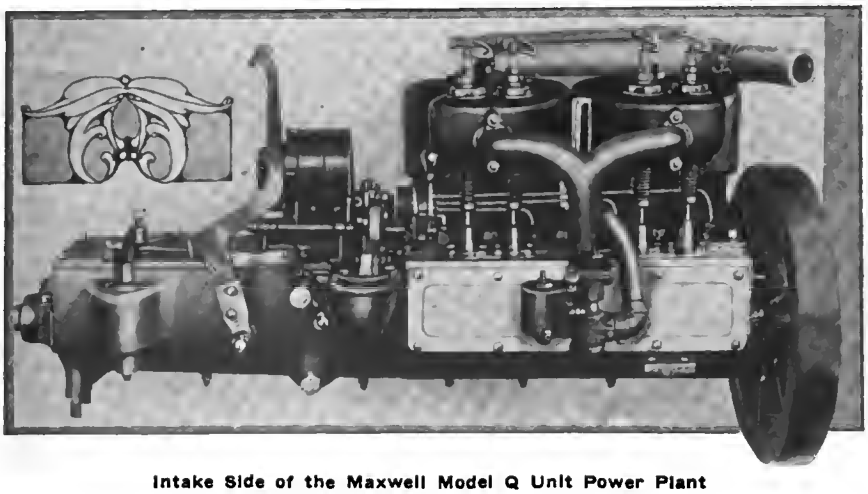
This new Maxwell Model Q will be equipped with a magneto, a set of dry cells also being provided for emergency use. The new car is put out in three styles of body, namely, the standard runabout type, having individual front seats with tool and carrying box in rear; with a rear seat for one; or with a rear seat for two. It is probable that this new model will be ready for delivery around the first of August.

What the New Motor Shows—The engine is of the four-cylinder vertical type, of 3¾-inch bore and 4-inch stroke. The cylinders are cast in pairs, the motor developing 22 actual horsepower at a normal speed of 900 R. P. M. The water jackets are cast integral with the cylinders. The valves, located on opposite sides, are interchangeable and exceptionally large. Both inlet and exhaust valves are mechanically operated. The tappet rods are of special steel, hardened and ground. The guides are of phosphor bronze. The cams are hardened and ground, and enclosed within the crank case, being thus fully protected and lubricated by splash. Three large bearings are provided for the camshafts, the shaft itself being hardened and ground. The crankshaft is of a special steel drop forging and finished by grinding. The connecting rods are of steel drop forgings, the bearings are a special grade of compressed babbitt. Throughout the entire motor simplicity and strength are the dominant features. The means of access to the connecting rods is provided on each side of the crankcase by plates which are quickly removable, thus exposing the rods for inspection or adjustment.

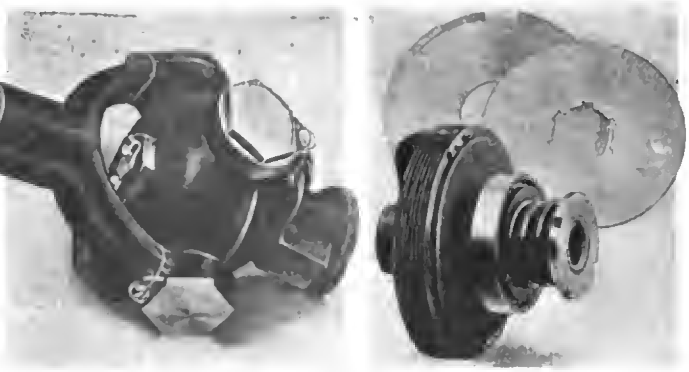
The lubricating oil is carried in a tank located under the hood; from this it is forced through a single sight feed located on the dash, whence the oil is distributed to each cylinder and to the clutch compartment. A nice feature in connection with this oiling system is a glass gauge which shows through at the dash so that the operator can at all times see the amount of oil contained in his oil tank. In connection with the lubrication of this new model is a positive oiling device for each cylinder. An oil ring is fitted at the bottom of each. This ring is constantly supplied with oil by the mechanical oiler. Into this ring the end of the piston dips at each stroke, carrying with it enough oil to lubricate freely the cylinder. This device prevents flooding of the cylinders with oil and eliminates the tendency to carbonize. This particular feature is similar to that used on the larger and more expensive cars manufactured by this company.

Natural Cooling System Utilized—The thermo-syphon cooling system which has always been a feature of these cars has been retained in practically the same form as that used on the 30 horsepower, four-cylinder model.

The carbureter is of the constant-level



Intake Side of the Maxwell Model Q Unit Power Plant



Universal Joint and Disc Clutch Used on Maxwell Car

float-feed type. The needle valve adjustment regulates the amount of gasoline, the air being controlled by a simple adjustment at the top of the carbureter.

With the simplicity and compactness of the multiple disc clutch, together with its freedom from the usual run of clutch troubles, this form has been growing in popularity steadily. It is not surprising then to find this new model fitted with an all-metal multiple disc clutch. It consists of 15 saw steel discs, each disc being concaved about 1-32 of an inch, a construction which causes the clutch to engage very gradually, without undue slipping.

Suspension from three points, allowing as it does freedom for slight twisting, is used, allowing the frame of the car to be warped or twisted by the road inequalities without injuring the vital parts of the mechanism. By using the unit construction it is possible to enclose the clutch in an oil-tight compartment, the steel disks running continually in a bath of oil. This not only eliminates wear, but permits of the slipping of the clutch without injury to the plates. The thrust from the clutch spring is taken up by a large ball thrust bearing.

Transmission Is Included in the Unit—Not only are the engine and clutch included in this unit construction, but to make it complete the transmission also is made an integral part. This transmission is of the sliding-gear type giving three speeds forward and one reverse, direct drive being on third speed. Roller bearings of the latest improved type are used throughout. Gears are drop forged from special steel carefully cut and hardened. A feature of this transmission is the positive gear lock which prevents the shifting of gears when the clutch is engaged. This safety device precludes the possibility of gear stripping, as it is impossible to change from one speed to another without first releasing the clutch.

The drive is by a propeller shaft fitted with two self-oiling universal joints. The rear axle is of the bevel gear type and the gears are drop forgings made from special steel, carefully cut and hardened. Both the main drive gear and the drive pinion are exceptionally large. The drive pinion bearing consists of two roller bearings of the latest improved type. The models, which have been driven thousands of miles, have failed to show any perceptible wear on these bearings. These bearings are lubricated by a large self-feeding grease cup. The second feature in connection with this rear axle is a special thrust roller hardened and ground and fitted against the main bevel gear. This device holds the main drive gear firmly against the drive pinion.

The frame is of pressed steel and hot-riveted throughout. The springs are exceptionally long, the front springs being 32 by 1¾, and the rear springs being 36 by 1¾. Strut rods are placed between the rear axle and the frame so as to take the driving effort off the rear springs. The wheels are of the artillery pattern and of selected second growth hickory. The tires are 30 by 3½, standard clincher, wheelbase 93 inches; tread 56 inches.

Two sets of brakes of the internal expanding and external contracting type are mounted on the rear hubs. The internal brake shoes are of cast iron expanding on a steel drum. The external shoes are lined with a special asbestos lining and contract on the same steel drum. The brake dimensions are 1½ inches wide by 9 inches in diameter.

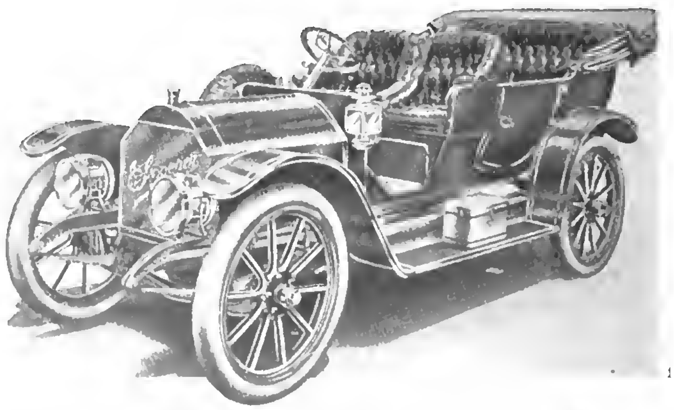
A single lever controls both the clutch and the external brake. The emergency brake also automatically releases the clutch. The spark and throttle are located on opposite sides and immediately under the steering wheel.

Metal Underpan Protects Vital Parts Efficiently—Thorough protection to the engine and transmission from mud and dust is afforded by a pan extending from the radiator to the rear end of the transmission. Metal extensions are also provided from the frame to the running board and from the frame to the fenders, so that the car can be driven through deep mud without splashing the body or the passengers. It is not generally conceded that this full underneath protection is as needful for the comfort of the passengers as for the working parts.

The body is made of sheet steel with moldings. This new model will be supplied with three styles of body: Runabout, rear seat for one, and rear seat for two. Upholstery is of high-grade leather and the best quality of curled hair. All cars will come ironed for top. The price of this new Maxwell model will be $850 for the standard runabout, $875 with rear seat for one, and $900 with rear seat for two.

PARTICULARS OF THE SPOERER FOR 1910

BALTIMORE, July 12—The new Spoerer 1910 demonstrating car, manufactured in this city by the Carl Spoerer's Sons Company, has proved substantial. Already it has been taken over all kinds of roads, up mountain sides and through stretches of mud, sand, clay, etc., for thousands of miles and no repairs have been necessary. The motor is four-cylinder vertical, rated at 30 horsepower. The cylinders are cast in pairs and are 4 7-8 diameter and 5 1-2 stroke. This is an increase over the size of the cylinders of last year, which were 4 1-2 by 5. The clutch is cone with leather face. The transmission is selectively operated and of the sliding-gear type. It has three speeds forward and reverse and is equipped with Hess-Bright bearings. The front axle is I-beam section, low drop, with Timken roller bearings, while the rear axle has a pressed steel housing, is clutch driven and of the floating type. The frame is of pressed steel of ample section. The powerful brakes are internal and external on each rear wheel. There are two separate systems of ignition, both battery and magneto. The lubrication is positive gear driven and the oil goes direct to bearings. The tires are 36 x 4. Goodrich q. d. rims. The springs are semi-elliptic front and full elliptic rear. Steering column, worm and sector, with mahogany wheel. The side levers are of manganese bronze I-beam section, while the radiator is of the honeycomb type, Mercedes pattern. The cars are made with limousine and landaulet bodies as well as touring car and runabout types. The wheelbase for the five-passenger car is 117 and for seven-passenger vehicles 124 inches. The car has a gasoline capacity of 18 gallons with pressure feed. The equipment includes side and tail lamps, horn and tool kit, together with the foot rail, robe rail and mats.



Spoerer Car Is Modeled After the Mercedes (German)

SIXES seem to have the call in the line of big cars now; at least, the number of announcements of this type seem to be in greater number than those of any other, unless it be the small car with the block motor. This being the case, one cannot help but think that the Munch-Allen Motor Car Company, DuBois, Pa., has shown wisdom in deciding to adhere to that style to the exclusion of all others. This is the case, however, and the builders of the Keystone Six announce two models, both sixes, for the season.

These include a large and a small model. The former is equipped with a sixty horsepower engine, the cylinders being cast individually, with the valve on opposite sides. This form of construction allows the use of an unusually large valve, the advantages of which are too well known to require additional comment. In this particular engine they have a clear diameter of 2¼ inches, and are operated by means of harmonic cams. These permit of an unusual range of speeds, from the lowest, 125, up to the highest, which is 2,000 loaded. Even this may be exceeded as a speed of 2,318 revolutions has been obtained running the engine light. A range of speed like this gives a similar range of speed to the car, without changing gears, and aptly illustrates the flexibility of the six.

Nickel steel is the material of the crankshaft, 1⅞ inches in diameter and running on seven long and large bearings. These are of die cast bearing metal and are positively lubricated.

Two Distinct Ignition Systems—To make certain of always getting a spark, two separate and distinct ignition systems are fitted, the magneto, a Bosch high tension, and a timer as well. They fire the compressed charge in the cylinder through the medium of twelve spark plugs, all set into the inlet side of the engine. This position was selected as likely to reduce the chances of fouling the sparking points.

The engine is water cooled, with the water circulated through integral jackets by means of a large gear pump, gear driven as well. A large radiator of the tubular type, with square tubes, and of a very pleasing shape is employed to cool the water. Back of this is placed the rapidly rotating fan of six blades, belt driven from the camshaft. The whole comprises an unusually efficient cooling system, and one that is dependable as well.

Following the best foreign practice, a multiple disc clutch is used to transmit the engine power back to the transmission. This is enclosed in a drum bolted to the rear side of the flywheel. Thirty-two conoidal discs are used, and run in a bath of oil. The enclosing of the discs gives this desirable feature of oil bath lubrication at all times, and by making the case dust proof an additional point is gained.

Highest Grade of Materials Used—The material of the transmission parts is symbolical of the material of the entire car, which is of the very highest grade obtainable. Thus, the gears and shafts are of chrome nickel steel, and are mounted upon Timken roller bearings of ample size. The gear box affords three speeds and reverse, operating on a selective quadrant. This gear shifting means is so interlocked with the clutch control that gears can only be changed while the clutch is out. This is a positive and perfect preventative of stripped gears, the bugaboo of many an amateur. Moreover, the interlocking is retroactive in that the clutch may not be let into engagement unless the gears are in mesh—that is, it prevents clutch engagement when the gears are out of mesh.

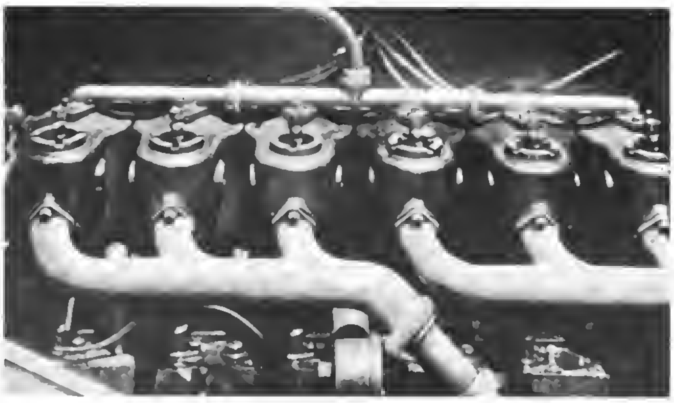
From the transmission the drive is through a single inclosed universal joint, and then through enclosed propeller shaft to the final reduction. This is a pair of bevel gears, of large diameter to insure smooth and quiet running. They are of four pitch and two-inch face. The differential is of the bevel style. Steering is effected by means of a worm and complete gear. The steering post is inclined at a small angle with the horizontal which gives the car a low, fast appearance. To this is fastened the steering wheel, 18 inches in diameter, constructed of aluminum, webbed for strength. On the steering wheel, upper side, are mounted the spark and throttle levers, these working on a stationary quadrant. Three foot pedals and the usual two side levers complete the control.

The right foot operates the service brake pedal, and the left the clutch, both pedals being made with adjustable pads, so that their height may be arranged to suit the physical convenience of the driver. A small toe pedal operates the accelerator, but this is only intended for use in close traffic and on rough roads. The inside lever controls the gears, and the outer, the brakes.

These last are of the internal variety, 14 inches in diameter by 2 inch face, working on large diameter drums bolted to the rear wheels. They are actuated through equalizers, which secure an equal pull on both brakes, regardless of road or other conditions. These also allow of unequal adjustments without disturbing the equality of the braking pulll.

With a wheel base of 122 inches the cars have a very long, roomy appearance. Large tires are used, 36 by 4 all around. The frame is of pressed nickel steel, narrowed at the front. Complete the six-sixty sells for $2,250, and is guaranteed for one full year against defects in material or workmanship.

The company is also placing on the market a light six-cylinder car of the same high-grade materials and workmanship. This is equipped with a 35-40 horsepower motor, magneto, disc clutch, selective gear box, and will have 117-inch wheel base and standard tread, with 34 by 3½ inch q. d. tires on all four road wheels. The weight of the little car is but 1,900 pounds.



Keystone Six Engine Has Two Separate Exhaust Pipes

QUARTER MILLION FOR AVIATION PRIZES

PARIS, July 7—A shower of gold—no less than $240,000—has fallen on the aviation movement. Henry Deutsch de la Meurthe, who joined with Ernest Archdeacon in offering the $10,000 won by Henry Farman in 1907, is responsible for $100,000 of the amount just donated to the University of Paris. The gift has been made for the purpose of founding an aeronautical institute in France, under the control of the University of Paris. To this amount the donator has added an annual subvention of $3,000, and the University has supplemented this by a further subvention of $2,000.

M. Deutsch de la Meurthe

In addition to these amounts, a rich Greek, Basil Zaharoff, has offered the sum of $140,000 to the University of Paris, the revenue from which shall be devoted to maintaining a professor of aviation at the University.

The two generous donations do not please everybody, for a certain group of aviators have for some time been harboring the scheme of making an appeal to the French nation for several million francs to found a national aeronautical institute. Deutsch de la Meurthe and Andrew Carnegie were to be approached for large sums with which to head the list, and the public was to be appealed to immediately after the aeronautical races at Rheims next month. By these two donations to the University the public appeal practically becomes impossible, to the disappointment of those responsible for the larger movement, for they declare that the amount given is insufficient to do any real and lasting good.

ENGLAND'S BUGABOO NOT A GERMAN CRAFT

LONDON, July 7—Stories concerning a mysterious air craft that was seen by night in various parts of England, notably in Suffolk, have turned out to be true and the ship a reality, it belonging to Dr. B. M. Boyd, the managing director of a firm of motor engineers. The first time the ship was seen was on May 18, at Belfast. The doctor now admits that he crossed the Irish sea on that date. While the craft has not been examined, it is said to be a dirigible balloon 120 feet long with a cigar-shaped gasbag divided into three compartments and driven by a 300-horsepower motor. The doctor has submitted plans to the War Office and will increase the length to 200 feet and the power to 500 horsepower before giving any exhibition. Experiments in this direction have been going on since early in March, and Boyd says he has made a trip of over 300 miles without stopping. The recent scare concerning the unpreparedness of England in aeronautical matters has been mollified by this announcement.

NOTED AMERICANS TO ATTEND AERO RACES

PARIS, July 6.—Jefferson de Mont Thompson, former chairman of the A. A. A. racing board, after spending a week in Paris, has now left for an automobile tour through Germany, Austria and Holland, returning to France in August to be present at the Gordon Bennett and other aeroplane races to be held at Rheims from the 22d to 29th of that month.

Cortlandt Field Bishop, president of the Aero Club of America, is also in Paris at present, but will leave shortly for Rheims in order to occupy himself with the necessary arrangements for the reception of the Herring-Curtiss aeroplane to compete at Rheims and elsewhere. Mr. Bishop, who is interested in the Herring-Curtiss Company, declares he will enter the machine for every race in Europe, including the crossing of the English Channel.

LATHAM PREPARING TO CROSS CHANNEL

PARIS, July 7—Twenty miles of water seyarate France from England—twenty miles which will doubtless be crossed by a gasoline engine and a couple of artificial wings before the month is out. There have been numerous aviators possessed with a desire to connect the Continent with John Bull's tight little island, but up to the appearance of Hubert Latham none have gone from desire to acts.

The Frenchman with an English name—for Latham though descended from British stock is a fully fledged Frenchman—took lessons on an Antoinette monoplane a few months ago. He was possessed of extraordinary daring, and after a few flights he held the French record, only being eclipsed by Wilbur Wright in ability to stay in the air. While Wright, however, is the embodiment of caution, and would not attempt to cross the Channel under any conditions, Latham sees no danger in such a hazardous trip. Instead, therefore, of continuing his training over the plains of Chalons, he has shipped his machine to the neighborhood of Calais, and as soon as everything is in readiness and the weather is right will take his flight from the high French cliffs with the object of settling on the shores of England.

The machine he will use is a monoplane, built by the Antoinette Company, and engine by the same firm, the power plant consisting of a 50-horsepower, eight-cylinder, water-cooled engine. At Chalons the machine has shown itself possessed of remarkable speed and stability, its pilot performing evolutions with it that have never been attempted since Wilbur Wright demonstrated at Le Mans.

To cross the Channel it is only necessary to remain in the air 35 to 45 minutes, according to the strength of the wind. The distance, however, is not the greatest difficulty, Latham having already flown distances equal to three crossings of the narrow strip of water. It will be impossible to make the trip in a dead calm, even if advantage is taken of a calm for the start, while it remains to be seen if the aeroplane can battle against the strong winds which usually blow in the English Channel as successfully as the more moderate breezes in which it has flown over land. A service of motor boats will follow the aviator, while the French government will allow torpedo boat destroyers to lend assistance.

Comte de Lambert, the first of the Wright pupils, intends to make an attempt to fly the Channel, but will not begin the construction of his shed until July 15, flights, therefore, being impossible before the end of the month or early in August. Since the Wright brothers returned to the United States very little has been done with their machines, the only flight of importance being made on Wilbur Wright's old machine by Paul Tissandier, who remained in the air a little over an hour.

AERONAUT SAILS OVER NEW YORK CITY

New York City enjoyed a free circus stunt Monday morning. The star performer was Frank W. Goodale, assisted by his dirigible balloon. Goodale has been giving exhibition flights at Palisade Park, a resort on the New Jersey side of the Hudson, and on this occasion, the weather being favorable, he decided to visit the city. He crossed the Hudson at a high elevation to escape the cold air currents, and then, descending to about 100 feet, followed Broadway down to Times Square, racing with the trolley cars. What is more, he got back to Palisade Park under his own power, without having to call in the services of a ferryboat. That afternoon Goodale started for the Polo Grounds, hoping to see the ball game without paying admission, but a strong wind turned him back. Goodale is a pupil of Roy Knabenshue, who several years ago sailed from Central Park around the Flatiron building and back.

Glenn Curtiss, with the aeroplane which he flew successfully for the Aeronautic Society, made three short flights of two or three minutes each on the grounds at Mineola, L. I., Tuesday.

NAZARRO'S RECORD ATTEMPTS FRUITLESS

London, July 2—The race meeting at Brooksland on Wednesday proved unsuccessful in its main featuré—the record attempts by Nazarro on the big red Fiat. This monster, whose cylinders are said to exceed 190 mm. in bore, is far and away the most powerful car yet turned out from the Turin factory, and speeds in the neighborhood of 130 m. p. h. were anticipated. During trial spins a 120-mile an hour gait was recorded for several laps, but a defective cylinder prevented 110 miles an hour being exceeded at the record attempts. The car was therefore withdrawn, but Nazarro, who certainly is not one to boast, states his confidence in the car's capabilities.

The Montagu Cup race brought out several Grand Prix cars, but finally a newcomer in the shape of a 70-horsepower Bianchi won with ease at an average speed of 84 miles an hour.

Both novelty and excitement were combined in the Taxi race, in which a score of the best-known British motorists were mounted on 12-14-horsepower Fiat taxicabs. The race was a close thing right through, Harvey du Cros, of Dunlop fame, beating Chas. Jarrott for first place by a couple of yards.

The Grand Prix sweepstakes proved another disappointment, for of the four entries Astley's Napier came to the line too late to start and Stirling's Brasier was stopped in mid-career with a fractured fuel pipe. The other Napier, driven by Baker White—who also owns the monster Fiat—won after a lengthy struggle with Rose's Weigel.

Several other handicap races were run off, one of these being won by an old De Dion voiturette which had been a contestant in the ill-fated Paris-Madrid race years ago.

Curiously enough, while the race meetings themselves have been singularly free from accidents during the past year, two unfortunate occurrences have taken place since Wednesday. Immediately after the last race of the day, Cook, riding an N. L. G. 7-horsepower motorcycle, was thrown off when traveling at over 70 miles an hour down the finishing straight. The pneumatic skull cap which he was wearing saved his life and his injuries were confined to a broken arm and sundry bruises.

The other accident occurred yesterday and was more seriouus. An amateur driver was trying the paces of Astley's big Napier and after coming along the finishing straight attempted to turn the sharp corner leading back to the main track. The car promptly rushed up the banking and overturned. The driver was almost unhurt, but the passenger was very badly injured.

GUINNESS STILL RUNS 8-CYL. DARRACQ

London, July 2—Speed trials on the various beaches of the eastern and southern coast lines, once most popular, have lately been of rare occurrence, so that special attention was paid to the meet promoted by the Yorkshire A. C. at Saltburn, on Saturday last. The numerous races for touring cars were well patronized, but, as usual, interest was centred on the performances of the racing cars. Of the "four-inch" cars, Colmore's Darracq did extremely well by averaging 67 miles an hour for the kilometer. Tate won the race for Grand Prix cars, his speed being just under 95 miles an hour. Finally came Lee Guinness, alone in the "free-for-all" class, with his eight-cylinder Darracq of Florida fame. The best of four runs over the kilometer averaged 120 1-4 miles an hour, the mean speed for the four attempts being 118 miles an hour. This is a European record, although not equal to the 122 miles an hour speed recorded by Guinness at Saltburn last year, but which was not recognized by the R. A. C.

SCOTTISH TRIAL AWARDS ANNOUNCED

Glasgow, June 30.—The Trials committee have awarded the efficiency gold medals as follows:

Class A	10 H.P.	Riley	990	marks.
" B	18 "	Riley	977	"
" C	10-12 "	Humber	996	"
" D	14-16 "	Argyll	986	"
" E	16 "	Humber	995	"
" F	24 "	Vauxhall	995	"
" G	30 "	Adler	977	"

Total marks were 1,000 in each class.

The Scottish Cup, awarded to the car showing least fuel consumption for the whole distance, was awarded to the 38-horsepower Knight Minerva, with a consumption of .0224 gallons per ton-mile, equal to 44.6 ton-miles per gallon. In car miles this is approximately equal to 25 miles per gallon.

MONTREAL RACE ENDS FATALLY

Montreal, July 12—The danger of automobile racing on horse tracks was again exemplified at the second annual meet of the Canadian Automobile Club on the Blue Bonnets track last Friday. The victims were C. K. Batchelder, of Newport, Vt., and J. Twohey, of Montreal, driver and mechanician respectively of Lorne Hale's Stearns in the 10-mile open race. On the eighth mile the car swerved through the fence in attempting to pass a contestant, and both men were killed. The exact cause of the accident cannot be determined. Burman, on his Buick, won four of the nine events, and De Palma, after an ineffectual attempt to beat the mile record with the Fiat Cyclone, won the free-for-all. The track was in good condition, and there was a large crowd.

Orville Wright made two unsuccessful flights Tuesday evening at Washington, neither lasting more than a few hundred yards. The wind was unfavorable, and he could not get sufficient speed or elevation to direct his course satisfactorily. The second flight started more favorably than the first, but again Wright came to the ground rather than attempt the turn. This time, however, he did not stop the motor quickly enough, and the aeroplane came down with some violence, breaking the left runner. The injury will not delay the trials.

Competing Cars Awaiting the Call of the Starter at the Speed Trials on the Saltburn Sands, Yorkshire, England

THE AUTOMOBILE

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GREAT REVIVAL IN USE OF ELECTRICS

Of late a gradual tendency back to the electric vehicle for city use has been very noticeable. This was evident from the increasing number in use in the larger cities, in the returns from manufacturers, from the increasing number of communications dealing with the subject, and from other sources, none the less well-defined, though perhaps small.

Considering this, then, the reappearance of the "improved" Edison battery is probably very well timed, since the claims for this, less preposterous than some of its predecessors, are simply increased discharge per unit weight. Even this is admitted to be obtained at a rather large loss between the total charging and the discharge current. However, since tests of this battery, technically known as the nickel-iron cell, have shown a very superior output over the old cells, it may be well to look into the fact that this will have a large and favorable effect upon a branch of the automobile business now experiencing a marked revival. At the very least this should add impetus to that revival, and as time proves the truth of the first tests, and, perhaps, improves upon them, it may become a stepping stone to a greater electric vehicle business, both pleasure and truck.

The fault with the electric has always been limited range or the inverse, excess dead weight. The new nickel-iron battery, if it doubles the output for the same weight, will alter one of these. For limited distance use this will reduce the useless dead weight to one-half, and in cases where the weight is not so objectionable, placing it at the same figure as before, places the radius of obtainable action at double the previous mileage. Inasmuch as this has upon numerous occasions been set up to over 100 miles, doubling it would bring the figure up to about the maximum ordinarily obtained in a day's travel. This, then, would place the electric vehicle upon a par with its gasoline rival, a state of affairs long sought after and never obtained.

It is with bated breath, then, that the manufacturers and well-wishers of the electric car await future tests of the new nickel-iron Edison battery.

In so far as the electrical car, at best, must so conserve its energy as to attain the maximum result either of speed or mileage from a given weight of battery, anything which will conduce to an extension of that conservation is of immediate interest. So, it is that a new type of tire especially designed for use of electrical vehicles is worthy of mention. These are made with very thin walls and are of the single tube type, popularly called "hose pipe." They may now be had in the detachable form. The low speed, comparatively, at which electrics operate allows the use of these thin-walled tires with very satisfactory results. A combination of the low-wattage tires with the new nickel-iron battery should give to the business as a whole such an impetus as it has not received in many years, if ever. Both instances just go to show that the work being done upon electrical cars is of great value to the person who uses them.

FRANCE STILL LEADS IN AVIATION

While the Signal Corps officers at Fort Myer are anxiously waiting for the Wright brothers to impress on Congress the practicability of their aeroplane in the hope of securing a reasonably generous appropriation, word comes from France that the University of Paris has received endowments amounting to a quarter of a million dollars for the purpose of encouraging progress in aviation, and that, still unsatisfied, certain leaders in the new science hope to obtain an even larger sum from the government for the foundation of a special institute. Truly a contrast!

The sceptical attitude affected by Congress is fast making that body ridiculous. Years ago, when the Wrights were called indifferently "cranks" or "bluffers," the War Department laughed to scorn their proposals; yet it cannot really be blamed. To-day, after they have abundantly proved every claim and made themselves famous the world over, Congress still doubts. The incredulity of the War Department cost us the exclusive use of the Wright aeroplane. Congress may well profit by their lesson and save us what is left.

The United States has far more need of an aeronautical institute than has France. With the exception of the Wrights, who belong no more to us than to any other country, our inventors who have succeeded in lifting themselves off the ground by mechanical means might be counted on the fingers of one hand. In France they are numbered by scores, and, far from being copyists, they are constantly evolving new types and experimenting in new directions. For once Yankee ingenuity seems outdone, and Congress, instead of helping us regain supremacy in the science of the future, discusses the tariff on collar buttons.

DATE SELECTED FOR GOOD ROADS CONVENTION

MOST important to all concerned over the progress of good roads was the conference recently held in Cleveland. At this meeting of the American Automobile Association officials and the members of the Good Roads Board, the dates September 21 to 23 inclusive were selected for the Second Annual Good Roads Convention. This will also be held in Cleveland.

The United States Government has shown its keen interest in the beneficial results to be accomplished through the convention by delegating as its official representative Logan Waller Page, director of the U. S. Office of Public Roads. Co-operating also with the A. A. A. will be the National Grange, the American Road Makers' Association and all of the automobile organizations representing the various manufacturing interests.

Chairman Geo. C. Diehl, of the A. A. A. Good Roads Board and the National Convention Committee, Lewis R. Speare, president, and F. H. Elliott, secretary, of the A. A. A., and W. F. Bonnell, president of the Cleveland Automobile Club, were among those present at the conference. Among the other members of the National Convention Committee are James H. MacDonald, president of the American Roadmakers' Association; S. D. Waldon, president National Association Automobile Manufacturers; Alfred Reeves, General Manager American Motor Car Manufacturers' Association; Robert P. Hooper, ex-chairman A. A. A. Good Roads Board; Charles Thaddeus Terry, chairman A. A. A. Legislative Board, and N. J. Bachelder, president of the National Grange.

Governor Harmon of Ohio has consented to represent his State at this convention, and he will speak on the Good Roads in Ohio. Mayor Thomas L. Johnson, of Cleveland, will deliver the address of welcome. Congressman R. P. Hobson, of Alabama, will deliver an address on "National Aid and Post Roads." Among the other speakers selected for the tentative programme with their subjects are:

The National Grange and Good Roads—N. J. Bachelder, Master of the National Grange.

State Aid—James H. McDonald, State Highway Commissioner of Connecticut.

Economics of Road Building—Samuel E. Hill, President National Goods Association.

Road Situation in the United States as Compared with Foreign Countries—Logan Waller Page, Director U. S. Office of Public Roads.

Macadam Roads—A. B. Fletcher, Secretary Massachusetts Highway Commission, or some other speaker to be selected by the Massachusetts Highway Commission.

Bituminous Road Materials—Provost Hubbard, Chemist of the U. S. Office of Public Roads.

The closing day of the convention will be devoted to a series of important tests on macadam roads to determine the best methods of counteracting the dust problem, and there will also be practical demonstrations with different materials of road building conducted by Director Logan Waller Page. The Cleveland Automobile Club will take the delegates on a tour of inspection over the improved roads in the vicinity of Cleveland.

PREPARING BRIGHTON BEACH TRACK FOR RACES

BRIGHTON Beach race track had a hairbreadth escape from being parceled out into building lots this Summer. A gang of workmen were already busy tearing down fences when the Motor Racing Association, of New York City, announced that it had signed a lease for the property. This association, it will be remembered, conducted two successful meets on the track last Summer. For this Summer's events the turns will be banked and the homestretch widened, and the entire track will be rolled hard and treated with a dust-laying compound. A new field stand will also be erected.

The first meet on the restored track is scheduled for Friday and Saturday, July 30 and 31. It will include a twenty-four hour race, limited to sixteen entries. More than half this number have already been pledged, although the entry blanks have not yet been issued. On the opening day, July 30, a number of short events will be held, and also, if it can be arranged, a 200-mile race for cars not eligible for the twenty-four hour contest. Opportunities will be provided for cars of all sizes and descriptions to show their mettle. The long race will start Friday evening, ending Saturday in time for the usual half-holiday crowd. The management will endeavor to have an elevated express station established at the race track, to give convenient transit.

A. B. Cordner, of the Cordner Motor Car Company, will be chairman of the race committee, and will have as his assistant T. F. Moore, organizer of the Briarcliff race and manager of the races at Brighton Beach last year. Their headquarters are now open at 1540 Broadway, New York. Mr. Cordner intends to have the work of reconstructing the track pushed forward as rapidly as possible, so that entrants may have an opportunity for practice before the opening meet. The membership of the Motor Racing Association includes C. F. Wyckoff, handling the Stearns; A. B. Cordner, Acme; E. R. Hollander, Fiat; C. H. Page, Chalmers-Detroit; H. A. Lozier, Lozier; W. B. Hurlburt, Thomas; Paul Lecroix, Renault; H. S. Houpt, Herreshoff; C. A. Singer, Palmer-Singer; W. F. Sykes, Zust, and W. C. Allen, Allen-Kingston. The makes handled by the members are expected to form a nucleus and insure a good field, but the entry list is to be open to all without favor.

ATLANTA TO HAVE A TWO-MILE TRACK

ATLANTA, GA., July 12—Without the usual blare of publicity, a body of Atlanta men have for some time been working on a two-mile automobile race track, which it is expected will be one of the finest in the country. The Atlanta Automobile Association is in charge of the enterprise. According to Secretary E. M. Durant, $300,000 has been raised, and 500 men, with three steam shovels and 200 teams are now busied on the excavation.

The plans call for a track two miles in circumference, one hundred feet wide on the home stretch and sixty feet elsewhere, the turns to be scientifically banked. The track will be opened with a series of international races on November 9, during the week of the Atlanta automobile show and the New York-Atlanta endurance run.

PRESIDENT TAFT INVITED TO LOWELL

BOSTON, July 12—An invitation has been extended to President Taft by Governor Draper and other prominent officials of Massachusetts and the officers of the American Automobile Association to attend the automobile carnival at Lowell, Mass., during the week of September 6. President Speare of the A. A. A., whose home is in Boston, was one of those who signed the invitation.

COLUMBUS, O., ENCOURAGED BY SUCCESS

COLUMBUS, O., July 12—Because of the success of the races of the Columbus Automobile Club on July 2-3, it has been decided to hold another meet some time in September. The racing committee of the club is now at work on the details.

INCREASING POPULARITY OF AUTOMOBILE CONTESTS

By BENJAMIN BRISCOE, President, Manufacturers' Contest Association.

At no time in the history of the American Automobile Association has there been such a demand for sanctions as this year. These sanctions cover every conceivable kind of tests, such as reliability tests, fuel economy tests, hill climbs and track races, both at long and short distances. The mere fact that an unlimited number of sanctions are being granted is not so interesting in itself, but it brings to mind the fact that there is a widespread demand for competitive events.

Each local event held is under more strict regulations than its predecessors, which goes to prove that each season's product is better than the last or else the cars could not make the wonderful showing which they do. Never has the self-propelled vehicle been given such rigid tests and exacting mechanical scrutiny. When an event is held the technical committees are made up of men who thoroughly know the car from the motor back to the differential, and the car of to-day must be mechanically right before it can stand an examination such as is given to the cars nowadays.

It seems to be the desire of the public to see all the competing cars "killed off," or, in other words, have rules so rigid that none can finish with a perfect score. This not only means more for the cars themselves if given a high percentage, but it encourages competition inasmuch as that no discredit falls on the maker if his car fails of a perfect score. Misery always likes company, and if there are not any perfect scores or few high percentages, those with lower scores do not regret entering, as would be the case if the rules were so lenient that several finished with no demerit marks.

With so many events being sanctioned from the Atlantic to the Pacific and from the Great Lakes to the Gulf of Mexico, it is evident that the motor car industry is in an unusually flourishing condition and that the public is interested in and believes that road and track events are good barometers for getting an idea of what the present-day car can do in competition with rival makes.

Judging from the interest taken in the various road and track events, it is evident that the public care more for fuel and reliability tests than it does for track racing, or, at least, track races at short distances. Any car can travel a distance of five or ten miles on a track at a good rate of speed. The public do not buy cars as a rule for speed, but for power and durability. Track events, unless those of 100 miles or such as the 24-hour race, do not bring out the staying qualities and endurance of the machine as do road events such as the Glidden tour or the three-day run of the New York Automobile Trade Association through the Catskills and Berkshires.

While thousands will flock to the racetrack to watch short distance racing, it is because of the fascination of seeing the racing cars whirl around the track at a great burst of speed. I doubt, however, if there are many purchases made on the strength of the speed developed in track races. There is no question but that sales are made through the results of fuel and reliability contests, as a car which can stand up under the exact mechanical examinations, both before and after the test, demonstrates to the public that if they can endure under the rigid regulations of the contest they will answer every purpose for touring under general conditions.

It seems to me that makers and the public should encourage and support all wholesome road endurance contests, as it not only demonstrates to the public what the car can do, but each event teaches the maker wherein he can make his product stronger and more durable.

FAST RACING IN SOUTHERN CALIFORNIA

Santa Monica, Cal., July 12—Two of the fastest stock car races ever run in this country were brought off here last Saturday in the presence of more than 50,000 spectators. They were held over a course 8.4 miles to the lap, and the good condition of the road is vouched for by the phenomenal times recorded. An Apperson "Jack Rabbit," driven by Harris Hanshue, won the $1,000 Dick Ferris trophy, covering the 202 miles in 3:08:03, at an average of 64.2 miles an hour. Bruno Seibel's Chadwick took second place, and a Stearns third. In the small-car race, at the same distance, Bert Dingley brought his Chalmers-Detroit across the tape in 3.38:35, winning the Leon Shettler cup.

MILWAUKEE PLANNING A SEPTEMBER MEET

Milwaukee, Wis., July 12—The Milwaukee Automobile Club has been advised that it cannot have the use of the State Fair Park track until after September 17, the closing day of the fair, and all plans for a meet before that date have been dropped. The annual meet, which will probably include Milwaukee's third twenty-four hour race, will be one of the biggest in the Northwest, as the club's racing board will hang up big purses and invite the leading drivers of the country.

BALTIMORE HAS TWO EVENTS SCHEDULED

Baltimore, July 12—As many Baltimoreans and Washingtonians are away from town during July and August, the Motor Car Racing Association of Maryland has decided to postpone its twenty-four hour race at Benning, D. C., from July 16-17 to September 10-11. The program will be as originally planned, including on the first day six stock-car races at varying distances and a ten-mile record trial, and ending with the long event.

RACES AT OAKLAND, CAL., WELL ATTENDED

San Francisco, Cal., July 12—In the races of the Oakland Athletic Club on the Emeryville race track last week Buick, Mitchell, Cartercar, Comet and Detroit electric carried off the honors before a large holiday crowd. Inefficient policing caused the death of a spectator who attempted to cross the track, with the usual result. The driver of the automobile was stunned, but not seriously hurt. Although the racing was not of the record-breaking order, it satisfied the crowd. The best event of the day was the ten-mile free-for-all, which Christianson on a Buick won from Cooper's Comet after a close and exciting contest.

STRANG CUTS THE FIFTY-MILE RECORD

Springfield, Ill., July 12—At the Illinois State fair grounds last Saturday Lewis Strang, driving a Buick, broke the world's fifty-mile circular-track record which he established at Columbus, O., recently. The new record mark is 52 minutes, 48 seconds, a reduction of nearly a minute. His fastest mile was made in one minute, one second. Strang, however, lost his five-mile race with Chevrolet, the latter's time being 5:51. The stock car races also provided some interesting contests.

COLUMBIA, S. C., SEES A HILL-CLIMB

Columbia, S. C., July 12—A good crowd turned out for the annual Fourth of July climb on Monticello Hill, and saw some close racing. In the event for cars under $1,500, McMaster's Ford carried off the prize, with a Buick and a Ford tied for second. An Aerocar driven by Gibbes won the free-for-all, a White taking second. An unusual and highly commendable feature of the day was that the trials were started on time.

FRANKLIN WINS BUFFALO'S ONE-GALLON ECONOMY

BUFFALO, N. Y., July 12—Howling success best describes the one-gallon fuel economy contest held by the Buffalo Automobile Club recently, for in this not only was a distinct winner evolved in each class, but a contest winner as well, the latter, the Franklin 1910 model, breaking all economy contest records at the same time. There were four classes, with a professional or manufacturer's division and an amateur's division in each.

These drew twenty entries, all starting, and all but one finishing, this one being so delayed by a puncture that it was impossible to finish within the scheduled time. A fine course had been laid out by the club officials, 16.5 miles in length, straight out Main street from the club headquarters to Williamsville. This made the round trip 33 miles, but in this they reckoned without their host, for six of the competitors started on the third trip, while the winning Franklin came within 4 miles of starting back over it a fourth time.

Driver Averell and the Winning 1910 Franklin Car

There were four classes, divided according to the new price classification, but Class B, $1,000 to $2,000, was the only one that filled properly, and it was in this class that the real contest was found, this furnishing the winner as well.

The latter was S. G. Averell, driving a 1910 model G Franklin, and when this car, weighing all told 2,498 pounds, went 46.1 miles on the allotted one gallon of gasoline, it broke the record held by the same driver with a 1909 model G Franklin, made in New York exactly two months previous. In the latter case Averell went 35.8 miles with a weight of 2,880 pounds, giving a score of 103,104 pound miles, or 51.55 ton miles. In the Buffalo run this record was 135,902 pound miles, or 67.95 ton miles.

A single-cylinder Brush made the second longest distance of the day, but owing to its very low weight, 1,432 pounds, the smallest in the contest, it was beaten in its class by Parkhurst's Reo, which went 5.8 miles less but scored 12,368 points more, equal to 6.19 ton miles.

Figures for the run compiled by John M. Satterfield, of the Buffalo club, show that the total ton miles were 646.5, which with gasoline at 15 cents per gallon makes the average fuel cost 4.4 mills per ton mile, and the lowest figure 2.2 mills per ton mile. The total passenger mileage was 1,785.2 on 19 gallons of fuel, which works out to an average cost of 1.59 mills per passenger mile. All of the cars were water cooled except the winning Franklin, and all had special tanks for the fuel.

WASHINGTON-BOSTON RELIABILITY CONTEST

WASHINGTON, D. C., July 12—The chain of newspapers owned by Frank A. Munsey, the publisher, is the prime mover in a reliability contest scheduled for the week of September 22-29. The event will be known as the Munsey reliability contest, and the route will be from Washington, D. C., to Boston and return, taking in Baltimore, Philadelphia, New York, Albany and Springfield. The contest has been sanctioned by the A. A. A., and the officials of that organization have expressed the belief that it will prove an important Eastern event, filling the gap caused by the running of this year's Glidden Tour in the West. Entries are now being solicited by the representatives of the Munsey papers. Two were secured in Detroit last Friday—a 1910 Chalmers-Detroit, which Joe Matson, winner of the Indiana trophy, will drive, and a 1910 Hudson roadster, entered by the makers. The pathfinding car will be the Chalmers-Detroit flag-to-flag car, which has just returned to Detroit from its strenuous trip.

CALIFORNIA CLUBS PLACING ROAD SIGNS

RIVERSIDE, CAL., July 10—Through the energy of the automobile club here in starting an energetic campaign to place legible signs on all the popular touring roads in its locality, the board of supervisors of the county lately became imbued with the same spirit of progressiveness and appropriated $1,000 for road signs. The Riverside Automobile Club will contribute another $1,000.

Rating	Make	Body	Class	No. Passengers	Driver	Weight Loaded	Weight Empty	Live Load	Av. Wt. Pass	Time Started	Time Stopped	Elapsed Time	Dist. Miles	Mi. per Hour	Score	Ton Miles	No. of Cyls.	Rated H.P.	Carburetter	Piston Displ.	Ignition	Tires	Trans. Ratio High Gear	Observer
1	Franklin	Touring	B	4	Averill	2948	2156	792	198	2:04	6:04	4:00	46.1	11.5	135,902	68.0	4	18	Franklin	143.13	Bosch Mag.	Goodrich	3-1	Sherwood
2	Oakland	Touring	B	3	Bauer	2360	1984	376	125	2:14	4:48	2:34	36.7	14.3	86,612	43.3	2	20	Brush	159.04	Battery	Goodrich	4-1	McDonald
3	Overland	Toy Tonn.	B	5	Poppenberg	3216	2334	882	176	2:01	3:47	1.46	26.5	15.0	85,224	42.6	4	30	Shebler	226.18	Remy Mag.	M. & W.	3-1	Quinlan
4	Rambler	Touring	C	5	Carter	4023	3146	877	175	2:03	3:10	1:07	19.3	17.3	77,644	38.8	4	34	Shebler	288.27	Bosch Mag.	Fisk	3½-1	Caughtry
5	Mercedes	Touring	E2	5	Steinbrunner	4330	3456	874	177	2:20	3:12	0:52	16.8	19.4	72,744	36.4	4	30	Steinbrunner	298.62	Bosch Mag.	Michelin	3-1	Landsheft
6	Reo	Runabout	A	4	Parkhurst	2016	1420	596	149	1:59	4:50	2:49	35.4	12.5	71,366	35.7	1	12	Reo	106.32	Stor. Batt.	Michelin	4-1	Geyer
7	Cartercar	Touring	B	5	Engle	3190	2410	780	156	2:09	3:40	1:31	21.8	14.4	69,542	34.8	2	24	Shebler	213.75	Battery	Goodyear	Friction drive	Sherman
8	Cadillac	Touring	B2	4	Baker	3380	2792	588	147	2:15	3:47	1:32	20.2	13.2	68,276	34.1	4	30	Cadillac	226.18	Battery	Goodyear	3½-1	Bennett
9	Thomas	Touring	C2	5	Gortch	3966	3176	790	158	2:13	3:05	0:52	16.2	18.7	64,249	32.1	4	40	Holly		Battery	G. & J.	3½-1	Denny
10	Interstate	Touring	B	5	Sherman	3411	2611	800	160	2:10	3.38	1:28	18.7	12.7	63,785	31.9	4	35	Stromberg	283.72	Eisman Mag.	Diamond	3½-1	Leonard
11	Brush	Runabout	A	2	Dussault	1432	1120	312	156	2:16	5.56	3:40	41.2	11.2	58,998	29.5	1	7	Brush	56.54	Battery	Ajax	4½-1	Brooks
12	Hupmobile	Runabout	A	2	Jones	1600	1270	330	165	2:02	4.03	2:01	36.8	18.3	58,880	29.4	4	16	Breeze	111.98	Bosch Mag.	G. & J	3½-1	Strong
13	Buick Mod. 17	Touring	B	5	Whiting	3806	2968	838	168	2:16	3:15	0:59	15.4	16.0	58,612	29.3	4	30	Shebler	318.06	Remy Mag.	Michelin	3½-1	Guggenheimer
14	Buick Mod. 10	Runabout	A	3	Lacy	2190	1717	473	158	2:05	3:28	1:23	26.1	19.0	57,159	28.6	4	16	Shebler	134.68	Remy Mag.	Michelin	3-1	Gannon
15	Maxwell	Runabout	A	2	Chittenden	1781	1430	351	175	2:07	4:03	1:56	31.6	16.3	56,280	28.1	2	10	Maxwell	100.52	Battery	Ajax	3½-1	Schalleau
16	Reo	Runab. Extra Seat	A2	4	Weiss	1968	1400	568	142	2:24	4:35	2:11	28.4	13.0	55,891	27.9	1	12	Reo	106.32	Battery	Michelin	4-1	Winegar
17	Maxwell	Small Tonn.	B	4	Munro	3124	2454	670	167	2:08	3:08	1.00	17.7	17.7	55,294	27.6	4	30	Maxwell	241.16	Splitdorf Mag.	Continental	3-1	How
18	Rambler	Touring	B2	3	Longnecker	2861	2468	393	131	2:00	3:15	1:15	17.1	13.7	48,923	24.5	2	18	Shebler	274.89	Battery	Diamond	3½-1	Schoenthal
19	Ford	Runabout	A2	2	Williams	1544	1240	304	152	2:19	4:24	2:05	30.9	14.6	47,709	23.9	4	15	Steinbrunner	120.76	Battery	Dunlap	3½-1	Engle
20	Overland	Runabout	B2	4	Frey	3025	2405	620	155	2:06	Did	Not	Finish	–	–	–	4	30	Shebler	226.18	Remy Mag.	M. & W.	3-1	Chesley

Table of Results and Details of Cars Competing in Buffalo One-Gallon Economy Contest

NEARLY 20,000 REGISTERED IN MASSACHUSETTS

BOSTON, July 12—All previous records for automobile registration in Massachusetts have been broken, for during the first six months of this year, ending June 30, more cars were registered than during the whole of last year. The total registration last year was 18,025, and on July first this year 19,322 machines had been registered with the Highway Commission. And the rush for certificates continues so strong that the commission is about 500 behind in the issuance of number plates, though its clerks are working nights. There has been little abatement in the demand from owners of cars, the number registered on the last day of the month being 121, while for the last two weeks in June the registrations averaged 86 daily.

It is figured that under the new law with the sliding scale plan of registration, the revenue from the same amount of business that has been transacted since January 1 of this year would be $100,000 greater. The Highway Commission estimates that about 54 per cent of the cars will pay the $5 fee, 25 per cent the $10 fee, 13 per cent the $15 fee, 6 per cent the $20 fee, and 2 per cent the $25 fee. On this basis the 19322 machines registered so far this year would pay $171,005 instead of $96,610. In addition there will be greatly increased revenue from licenses as they become annual.

The receipts of the automobile department have shown a corresponding jump and for six months are ahead of the total of last year, and nearly $23,000 ahead of the receipts for the first six months of 1908. Up to last Thursday morning there had been turned over to the State Treasurer by the Highway Commission for road maintenance fees aggregating $127,913.50, against $105,201 on the same date last year. In motor cycle registrations, manufacturer's and dealer's registrations and licenses to drive the figures are much ahead of last year, as shown in the following comparison for July 1, 1909, and July 1, 1908:

Registration	1908	1909
Automobiles	14,547	19,322
Motorcycles	1,492	1,872
Manufacturers and Dealers	359	461
Licenses		
Private Operators	3,212	4,855
Chauffeurs	3,444	5,037
Receipts	$105,201	$127,913.50

It is estimated that since 1903, when the first automobile law was passed, and in which the private operator's license was made perpetual, about 30,000 people have been licensed in Massachusetts to drive automobiles. There are approximately 7,000 licensed chauffeurs. Many tens of thousands of dollars will also be added to the State highway funds by the diversion of the fines received from motorists to the State.

Only a part of the new law is now in effect, but motorists are well pleased with the way in which it is working and believe that when the whole is in operation Massachusetts will have the best auto law ever put on the statute books of any State.

NEW BOOKS FOR AUTOMOBILISTS

"American Cyclopedia of the Automobile"—In the six volumes published under this title will be found not only a new and excellent method of treating the subject matter, but much that is new and different in the way of description of automobile parts. So full are the descriptions, that possessing one of these encyclopedias, one would have no further use for the numerous instruction books, troubles, diseases, and repairs being treated very fully in turn, under their respective heads. Of the six volumes, the first five are concerned wholly with cyclopediac matter, from the first definition of volume one, A. A. A., the abbreviation of American Automobile Association, to the last of volume five, Zylonite, same as Xylonite, another name for celluloid. The last, or sixth volume, is more on the order of interesting reading, for it is devoted to the history of the automobile, in which it is the most extensive that has ever been written. Following this naturally some space is given over to a description of the road and track races which have taken place, this being written in an historical fashion. A few pages are also allowed for an intelligent though brief résumé for the legislation pertaining to the automobile, while the windup is Study Helps. The latter consists of questions and answers, so arranged as to produce a steady, forward progress in the knowledge of the automobile from the very rudiments to the highest theory, and complete construction. The writers number the best men in the country, including Charles E. Duryea, C. P. Root, Thomas H. Russell and Victor Lougheed. It is being placed on the market by Bacon & Fynney, 121 Bolyston street, Boston.

"Accidents and Emergencies"—Everyone should have a book of this sort, not only automobilists, but everybody engaged in work around machinery, or wherever there is a liability of accident. The title and sub-title, a manual of the treatment of surgical and medical emergencies in the absence of a physician, indicate clearly the scope of the work. Into 200 small pages the publishers, P. Blakiston's Son & Co., Philadelphia, have crowded a wealth of valuable information on the subject of first aid. A brief glance at some of the chapter headings will give an idea of the worth of this little volume.

AUTOMOBILE CALENDAR OF EVENTS

Shows, Meetings, Etc.

Aug. 5-7..........Chicago, Midsummer Meeting Society of Automobile Engineers.
Sept. 21-23.......Cleveland, Good Roads Convention, American Automobile Association.
Nov. 6-13.........Atlanta, Ga., Auditorium-Armory, National Automobile Show.
Dec. 31-Jan. 7....New York City, Grand Central Palace, Decennial International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.
Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.
Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Races, Hill Climbs, Etc.

July 30-31........New York City, Brighton Beach, 24-Hour Race, Motor Racing Association.
July 31...........Richfield Springs, N. Y., Hill Climb, auspices of the "Earlington."
Aug. 5...........Chicago, Fourth Annual Algonquin Hill Climb, Chicago Motor Club.
Aug. 26-28.......Minneapolis, "Little Glidden Tour," Minnesota State Automobile Association.
Aug. 19-21.......Indianapolis Motor Speedway, First Race Meet.
Sept. 6-11........Lowell, Mass., Automobile Carnival, Lowell Automobile Club.
Sept. 15..........Denver, Col., Start of Flag to Flag Endurance Run to Mexico City.
Oct. 7............Philadelphia, Second Annual Stock Chassis, 200-mile Race, Fairmount Park, Quaker City M. C.
Dec. 29-30........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

FOREIGN

Races, Hill Climbs, Etc.

Aug. 22-29.......France, Reims, Aeroplane Races and Grand Prix, Aero Club of France.
Sept. 5...........France, Mont Venteoux Hill Climb.
Sept. 19..........Austria, Semmering Hill Climb.

MASSACHUSETTS PARK COMMISSION RAISES SPEED LIMIT

BOSTON, July 10—Although exempted specifically from the provision of the new automobile law which annuls all local speed and exclusion regulations in Massachusetts, the Metropolitan Park Commission today gave evidence of its desire to assist in the cause of uniformity of automobile regulation in the State. The commission controls many of the main arteries of automobile travel in the suburbs of Boston, its boulevards and parkways being the favorite avenues of travel in and out of the city on nearly every side. Heretofore the maximum rates of speed have been fifteen miles on the principal parkways and ten miles on others, with many roads closed to motor vehicles. By an order issued today, to become effective August 1, the maximum limit is increased to twenty miles an hour, which is the same as the maximum under the State law. No intermediate limits, as in the State law, are made, the commission being convinced that it is better policy for it to enforce rigidly the twenty-mile maximum and depend upon the reckless driving clause of the general law to curb driving at improper speeds in the more crowded parts of the parkways under its jurisdiction. The new maximum limit applies to all roads under the care of the commission to which automobiles are admitted. The commission, however, makes it plain that it does not consider twenty miles an hour a safe rate of speed at which to drive around curves, across intersecting streets and upon certain parkways where there is heavy travel by pedestrians and vehicles. The park police will be instructed to prosecute drivers who drive their vehicles in a manner to endanger the public, no matter what the rate of speed.

In addition to increasing the speed limit, the commission has opened several more park roads to motor vehicles. These include the Lynn Fells parkway in Melrose, a new road entering the Middlesex Fells reservation, the great public park to the north of Boston, the border road in Middlesex Fells reservation, between the Lynn Fells parkway and Wyoming avenue in Stoneham, and the road in the Quincy Shore reservation to the south of Boston. Other parkways upon which the speed limit is increased to twenty miles are the Middlesex Fells parkway and Revere Beach parkway, the main automobile road followed in going from Boston to Lynn, Salem and the north shore; Neponset River parkway in Milton, Charles River parkway in Watertown, a favorite automobile route; Lynnway, another part of the north shore route; Furnace Brook parkway, leading to the Blue Hills reservation, the great southern park of the Metropolitan system; the driveway of the Lynn Shore reservation and the driveway of the Revere Beach reservation. Furthermore the hours at which automobiles are excluded from the Revere Beach reservation driveway, formerly from 2 to 11 p. m. on Saturdays, Sundays and holidays from June 16 to September 14, are changed to from 3 to 10 p. m., allowing autoists two hours more during which they may use this important link in the chain of parkways to the north of Boston.

With these concessions by the Metropolitan Park Commission a uniform maximum rate of twenty miles an hour is established in Boston and vicinity and practically throughout the State. The rules of the Boston Park Commission, limiting the speed on its parkways to eight, ten and twelve miles an hour, were made void by the new automobile law, and in the new set of rules prepared by this commission and now before the Highway Commission for approval, no provision is made as to speed limits. Other cities and towns have not shown a disposition to enact special speed regulations, though some have passed rules excluding motor vehicles from certain highways where their presence is considered dangerous. As a whole, they show a welcome desire to be fair and reasonable.

GEORGIA INTERESTED IN PROPOSED LAW

SAVANNAH, GA., July 5—Automobilists of this State are waiting with interest to hear the particulars of a State automobile law, which is being compiled by Senator J. D. Boyd, of Griffin. This, it is expected, will be introduced at the Capital in a very short time, and will provide for the registration, licensing and speed regulation of the cars. It will also probably arrange for the registration of automobile drivers, and the license number to be carried will correspond, for the purpose of identification. President F. C. Battey, of the Savannah Automobile Club, has drawn up a bill which will be presented to the Council of this city, to govern autoists while operating in the municipality. It will arrange for the licensing of everyone who operates an automobile, after they have been examined by a board of commissioners. It would be necessary for the applicant to show a sufficient knowledge of the rules of the road, and mental and physical ability to run a machine. The commission would also have the right to revoke a license of anyone convicted of speeding, or other improper conduct, upon two or more occasions.

STATE WILL NOT GRANT REBATES

COLUMBUS, O., July 10—In a decision rendered by Attorney General Denman of Ohio, upon the request of State Registrar of Automobiles, Fred H. Caley, it is held that the State law gives no rebate to motor car owners for the time after the end of the year. According to the law, every license expires on the last day of December and a new one is required after the first of the year. For instance, a person securing a license in October can only use it until the end of December. Mr. Caley said: "Some regard this as an injustice, but it is the only way in which the automobile department can be conducted on a business basis."

MOTORCYCLE COPS TO ENFORCE LAWS

INDIANAPOLIS, IND., July 12—Local authorities are giving much attention to the regulation of automobiles. Two ordinances are now pending before the city council and a third will be introduced next week increasing the motor cycle corps from two to six officers.

Pending ordinances require the registration of automobile drivers, for which an annual fee of $1 is to be charged, and prohibits the driving of cars by any one less than seventeen years old. The measure also requires the use of mufflers, lights at night when cars are left standing in the street, and prohibits the running of machinery while cars are standing unattended. The motor cycle corps is used for running down violators of the speed law. Two officials are employed in the work but after August 1 there will be six men.

CONNECTICUT CLUBS OPPOSE NEW LAW

HARTFORD, CONN., July 12—The Connecticut Automobile Association has just issued a circular letter setting forth a number of objections to the new law at present under consideration in the legislature. It is claimed that the law is unjust to automobilists in the matter of taxation, and that altogether it is so complex that even a lawyer cannot find out what it really means. It is the consensus of opinion that it would be preferable to retain the law of 1907 at present in force. This is substantially what various members of the legislature have hinted at all along. They believe that the law is inadequate and that it would be well to prevail upon the Governor to veto the measure. Automobilists are numerous and well organized in this State, and it is believed that they will be able to defeat the measure, and secure a longer trial for the present law.

The Transcontinental Regal Leaving Detroit

While in Detroit on Friday of last week the Regal car, which is after the coast-to-coast record, was the recipient of much attention from the visiting Gliddenites. The picture shows the Regal lined up with a number of escorting cars, ready to make its departure from the "City of the Straits."

REGAL TRANSCONTINENTAL LEAVES CHICAGO

Chicago, Ill., July 13—George D. Wilcox, in command of the Regal which is making a transcontinental journey as a demonstration test of the 1910 model, arrived in Chicago late Monday night and left Tuesday morning on the second leg of its trip. Seven days out of New York, the car has covered 1,152 miles, running on its prearranged schedule with a daily average of 164 1-2 miles. So far the car has suffered but two punctures to its Empire tires, both coming in the same tire. After a night's rest here, the Regal started at 11 o'clock from the *Motor Age* office, bound for Clinton, Ia.

GENERAL MOTORS ABSORBS CADILLAC

Detroit, July 10—By far the largest deal in the local history of the automobile, if not in the trade at large, was consummated when negotiations pending for some time ended in the General Motors Company acquiring the Cadillac Motor Car Company. The price paid was between $4,500,000 and $5,000,000, stockholders in the Cadillac Company receiving slightly in excess of three for one on the $1,500,000 capital of the concern.

Back of this deal is an interesting story of how previous negotiations failed through a financial hitch. Some time ago the General Motors Company offered 160 for the stock of the concern. The proposal was viewed favorably by a majority of the stockholders, and it looked for a time as though the transfer would be made. Then came delay in securing money to finance the project, and it fell through. It is reported on good authority that the General Motors Company came back later with an offer of 200. In the meantime the Cadillac Company had been riding the crest of prosperity, and what would ordinarily be considered an exceedingly advantageous offer fell on unheeding ears. Then came the third attempt, which proved successful, and, incidentally, compensated the stockholders for the delay in closing the deal.

According to William C. Durant, chairman of the executive committee of the General Motors Company, and who conducted negotiations for that corporation, there will be no change in the management or factory organization of the Cadillac Company. The management of the company will be in the hands of W. C. Leland, with H. M. Leland acting in an advisory capacity.

The Cadillac Motor Car Company has one of the largest automobile plants in the world, and none is better equipped for the production of high-grade cars. Henry M. Leland, one of the founders of the concern, is a manufacturer of the old school, and under his direction automatic and time-saving machinery second to none has been installed.

The acquisition of the Cadillac Motor Car Company adds another to the string of factories taken over by the General Motors Company in the last few months. Those located in Michigan are the Buick Motor Company, Flint; Olds Motor Works, Lansing; Welch Motor Car Company, Pontiac; Reliance Motor Truck Company, Owosso; Rainier Company, Saginaw; Oakland Auto Company, Pontiac; Cadillac Motor Car Company, Northway Motor & Mfg. Co., and Motor Parts Company, Detroit.

Ten-year-old Mary Freda Brown at Wheel of Her Overland

This diminutive driver is the daughter of Will H. Brown, vice-president of the Overland Automobile Company, Indianapolis, and she has demonstrated repeatedly that she can handle an Overland with unusual dexterity. She recently drove her car in a parade in which 400 autos participated. During her trips she is always accompanied by her young brother Albert and the factory mascot, a pet dog called "Overland Bob."

Sir Lomer Gouin in his Six-Cylinder Stevens-Duryea

As was noted in last week's issue of "The Automobile," the popular Premier of Quebec was presented with the car shown in the above picture by admiring friends. Sir Lomer is seen raising his derby in the rear seat of the tonneau, while passing through the streets of Montreal.

ANOTHER AUTOMOBILE FROM INDIANAPOLIS

Indianapolis, July 12—To enter more strongly than ever the field for low-priced cars, the Empire Motor Car Company has been formed by prominent antomobilists of this city, notably A. C. Newby, Carl Fisher, James Allison and Robert Hassler. The concern has already started business in the Rumsey or old Mohawk bicycle works at West Twenty-ninth street and the canal, and the first two cars are expected to be finished early in August. The present work being done is mainly in arranging the machine shops, and preparing to handle the castings. The car will be marketed under the trade name of Empire, and will sell for $800. It will have a four-cylinder, 3½ by 4 inch motor, selective sliding gear transmission, shaft drive, a wheel base of 96 inches, and will be equipped with 32 by 3½ inch quick detachable tires. The company plans to make 2,000 during the coming year, and will begin an active campaign to establish agencies throughout the country.

Wausau, Wis.—John Fehl has leased the Liederkranz Building and will convert it into an up-to-date garage.

News in General

Rapid Fire Gun Mounted on Packard Three-Ton Truck Chassis

Packard as a Military Car—Foreign governments have been very active building automobiles to carry rapid-fire guns, but a test recently made in Cleveland was the first to be officially made in this country. The automobile used was a Packard three-ton truck, and the gun is said to be the largest automatic gun in the world. It fires three-pound shells at the rate of 100 per minute. Experiments were made with the brakes of the truck set and also with them released. In the first case the truck did not move and no shock was felt by those surrounding the gun on the truck platform. With the brakes released the recoil caused a slight movement of the truck. Lieutenant-Colonel O. W. Lissack, of the ordnance department of the United States Army, and Dr. S. W. McClean, the designer of the gun, were in charge of the tests, assisted by the Standard Automobile Company, the Packard Cleveland agent.

Spare Wheel Comes Handy—The Rambler spare wheel proved its adaptability, as well as usefulness, in an incident during the Crown Point races near Chicago. F. L. Winslow, of Riverside, Ill., was driving to the race in his Rambler, which has already seen two years of service, when one of his front wheels was struck by another car, shearing off all the spokes, and he was left stranded by the roadside. Some time later C. T. Jeffery, the general manager of the Rambler Company, came past in his Model 45 and at once offered his spare wheel. Although it was two inches larger in diameter than the broken wheel, the adjustment was made with little difficulty and Mr. Winslow was able to drive home in his own car.

Meiselbach Stays in Milwaukee—The Meiselbach Mfg. Co., of Milwaukee, Wis., has filed articles of incorporation, with a capital stock of $50,000. The company has been considering removal to Sparta, Wis., or Kilbourn, Wis., but has now decided to continue manufacturing its automobile trucks in its present factory at North Milwaukee. Up to this time the company has built trucks in limited quantities mostly for the home trade, but with the backing of new capital it is expected to make an active entrance in the manufacturing field, with light delivery and commercial vehicles of all kinds, as well as heavy trucks.

E. V. Co. Resumes Operation—The plant of the Electric Vehicle Co. at Hartford, Conn., which since July 1 has been closed to permit the receivers to take an inventory, started up full blast last Monday. H. W. Nuckols, the newly elected general manager and vice-president of the Columbia Motor Car Co., which has taken over the business of the old concern, expressed himself most optimistically of the outcome and assures many refinements in the 1910 output. A good part of the creditors have already been paid a dividend of 20 per cent.

Factory for Vanguard Company—The Vanguard Mfg. Co., of Joliet, Ill., has purchased a tract of land adjacent to two railroad lines at Joliet and is erecting a 60x250 factory building of brick and concrete. The new plant will contain a brass foundry and other conveniences, and the company expects to have one of the most complete accessory manufacturies in the country. The 1910 line will include a new brass-frame windshield called the "Breech-Lock," for which many points of superiority are claimed.

Now the Thermoid Company—The Trenton Rubber Mfg. Co. of Trenton, N. J., has been authorized to change its name to the Thermoid Rubber Company, and will continue to manufacture their brake lining material known as "Thermoid," as well as other automobile goods of rubber. The company recently suffered a fire, but only the old part of the plant was destroyed. However, work is to be started at once on the erection of a new concrete structure.

Harris Oils Score Again—The A. W. Harris Oil Co. has received a telegram from the Chanslor & Lyon Motor Supply Co., its Pacific Coast agent, telling of another victory, this time in the Santa Monica race. The winning Apperson and the Chadwick & Stearns that took second and third places, as well as the Chalmers-Detroit, that won the light car race, all were lubricated with Harris oil.

Palmer-Singer to Have New Plant—The Palmer & Singer Manufacturing Company has filed plans for a new factory in Long Island City. It will be located on the south side of Webster avenue, between Second and Third. The construction will be of brick, three stories high, and cost $100,000.

A New Emergency Tire—A company is being formed in Laporte, Ind., to manufacture an emergency automobile tire of wood, and the necessary capital has been guaranteed. The device is intended to be fastened to the wheel to relieve a punctured tire. It is easily attached and can be manufactured very cheaply.

Factory for Elkhart, Ind.—Elkhart business men are planning a new automobile factory to be financed by local magnates, and it is reported that a building has already been leased. F. A. Howe, formerly superintendent of the Elkhart Motor Car Co., is said to be interested in the new enterprise.

Heinze Company Enlarges Plant—The Heinze Electric Company, of Lowell, Mass., maker of ignition appliances, has just completed an extensive addition to its No. 1 plant, making a welcome increase in its manufacturing facilities.

A. O. Smith Company Plans Enlargement—The A. O. Smith Company, of Milwaukee, manufacturer of automobile frames, has arranged to erect several new shops at a cost of about $500,000.

IN AND ABOUT THE AGENCIES

Maxwell, Chicago—J. I. Handley, district superintendent for the Maxwell-Briscoe Company in Chicago, has stated that contracts have been made for the erection of a branch house at Eighteenth street and Michigan avenue. The structure will be fireproof and thoroughly modern in every particular. Workmen have already started breaking ground, and it is likely that the whole building will be ready for occupancy on October 1. It will be four stories high, 80 by 163 feet in dimensions, and the main floor will be used for garage and salesrooms while the offices will be located upon the upper floors. The size of the building will give room for keeping cars in stock for shipment to outlying towns on rush orders, and for giving a more uniform delivery at all times.

White, Chicago—James E. Plew, who has been manager for several years of the White Company's business, has purchased the entire retail sales business of that concern, and will hereafter conduct it under the name of the "White Garage and Salesrooms." He is negotiating for a large building, the location of which has not been announced, but according to the plans, it will be the largest and best-equipped building for automobile purposes in this country. The White wholesale business will be conducted by W. J. Urquhart, as formerly, and its selling organization considerably strengthened to take care of the 1910 line of steam and gasoline cars.

Darracq, New York City—The exclusive American agency for the Darracq car has been secured by Henry Ducasse & Co., 140 West Forty-second street. According to the terms of the agreement, this company is to handle the Darracq throughout the entire country, not only the regular touring car, but also the taxicab, which has been such a success.

Oldsmobile and Oakland, Cleveland—A. A. Auble, Jr., and Fred Wood, formerly Akron, O., agents for the Oldsmobile, have taken the Cleveland agency for that car and for the Oakland as well, and will have the entire State of Ohio as their territory. "Andy" Auble drove a clean-score Oldsmobile in the Glidden tour last year.

Studebaker, Columbus, O.—A. J. Pray has taken the Studebaker agency for this city and has a garage in course of construction at No. 254-266 North Fourth street, which will be completed about August 1. A full line of both gasoline and electric models will be handled.

Hupmobile, Trenton, N. J.—F. C. Martin, who handles the Mitchell at his garage on East State street, has taken the agency for the Hupmobile for the entire State.

Hudson, Chicago—The Levy & Hipple Motor Co., now acting as agent for the Chalmers-Detroit and the Lozier, has decided to take on the new Hudson roadster.

Velie, Brooklyn—The Empire Garage, at 449 Madison street, has taken the agency for the Velie car, a newcomer in this city.

RECENT BUSINESS CHANGES

Franco-American Taxicabs — The Franco-American Taximeter Company has moved to new quarters at Seventh avenue and Forty-ninth street, New York, and will now take complete charge of its taxicab business, which has hitherto been in the hands of Lavalette & Company as rental agents. The new building contains a garage and repair shops, calculated to care satisfactorily for the fast increasing business. This company now has branches in Boston, Washington (D. C.), Chicago, San Francisco and New Orleans.

Carlyle Johnson Machine Company Moves—Necessity for larger quarters has required the makers of the Johnson friction clutch, the Carlyle Johnson Machine Company, to move to Manchester, Conn., nine miles east of Hartford. The new plant was occupied on July 1.

PERSONAL TRADE MENTION

Benjamin Whittaker has resigned the position of treasurer of J. H. Williams & Company, Brooklyn, makers of drop-forgings, and will now give his entire time to handling the exporting business of this company and others, with headquarters at 17 State street, New York.

Henry H. Hower is the new advertising manager of the F. B. Stearns Motor Co., Cleveland. Mr. Hower has resigned the automobile editorship of the Cleveland *Plain Dealer*, and W. S. Gilbert, formerly of the Cleveland *Leader*, has succeeded to the place.

Carl Kaufman, general manager of the Motor Car Equipment Company, 55 Warren street, New York, sails for Europe July 14. During his two months' stay he will visit foreign manufacturers and arrange for the handling of the latest creations in automobile accessories.

E. Leroy Pelletier has been made assistant general manager of the Studebaker interests and will, of course, make his future headquarters at South Bend, Ind. Mr. Pelletier's energies have been notable in the industry.

R. S. Drummond has taken the sales managership of the Detroit Steel Products Co., Detroit, which reports an unusually heavy demand for its motor car springs and drop forgings.

TAXICAB AND TRANSIT

Cabmen Secure Injunction—The independent cabmen of New York City, through their attorney, G. F. Holbert, have secured a temporary injunction restraining the drivers of the New York Taxicab Co. from picking up fares elsewhere than at their regular stands. The cabmen claim that, although only a small number of the taxicabs are licensed as "free-lances," they all nevertheless take fares wherever they find them, thus illegally injuring the business of the independents.

New Orleans, La.—Following a series of trails by the police department, the Abbott Cycle Company agents for the Studebaker car have delivered the new patrol wagon to the department and it has been put in regular service. The city authorities expressed their satisfaction over the adoption of the motor vehicle, which it has been desired to purchase for some time, but the appropriation therefor was not forthcoming until the last budget was made.

Andalusia, Ala.—Business men of Andalusia are interesting themselves in the proposal to connect their town with Pensacola, Fla., with an automobile line. As it is now it is necessary to make an all-day trip between the two places by rail, stopping over night in going via Florida. If the L. & N. Railroad does not put on a through train it is probable that an automobile passenger and freight line will be established.

Simplex Increases Capital Stock—The Simplex Motor Car Co., of Mishawaka, Ind., has filed articles giving notice of an increase in its capital stock, which in the future is to be $400,000.

RECENT INCORPORATIONS

Auto Parts Company, Chicago—Capital, $50,000. To do a general manufacturing business. Incorporators: B. Symonds, A. Symonds, F. W. Hartsberg.

Hartford Auto Parts Company, Hartford, Conn.—Increased capital from $50,000 to $100,000. Manufacturing automobile parts and specialties.

Northway Motor & Manufacturing Company, Lansing, Mich.—Increased capital from $100,000 to $250,000.

NEW AGENCIES ESTABLISHED

Regal: Roanoke, Va.—Model Garage, J. H. Marsteller, proprietor.

Jackson: Columbus, Ga.—Southern Automobile Company.

Waverley Electric: Houston, Tex.—Mosehart & Kellar.

Great Western: Peru, Ind.—Peru Automobile Company.

FISK ON TIRE TROUBLEITIS

The man who has changed tires in the broiling sun in summer and with half-frozen fingers in winter may be interested in some observations on tire troubleitis by one of the Fisk Rubber Company's experts. This specialist recognizes three forms of the disease, due to (1) poor tires; (2) improper sizes; (3) abuse. For the first the remedy is obvious. As for the second, one should not be afraid of getting too large a tire. It may look clumsy, but this is compensated for by its easier riding qualities. The tire manufacturer is blamed for many things directly caused by abuse of the tire, and the commonest cause is insufficient inflation. The specialist adds a few "don'ts" which may be instructive. They are:

Don't slide your wheels by locking your brakes.

Don't go around corners on two wheels.

Don't let your clutch in too suddenly.

Don't let your tires stand on oily places.

And above all keep your tires well inflated.

This is the sort of advice that cannot be repeated too often, and every autoist should remember.

RECENT PUBLICATIONS

Remy Electric Company, Anderson, Ind.—A most interesting little booklet from a pictorial standpoint, in connection with terse details, has been issued by the Remy Electric Company, describing a trip made with the Remy magneto. On November 3, 1908, A. T. Mosher and Harry Harter left Anderson for the South and they were gone until January, 1909, traveling over 6,000 miles of all kinds of country. They many times had to ford bogs and streams in the Florida everglades and like places, and although the battery on the car was submerged and silenced, they had no trouble with the magneto. It was under water many times and this test is a conclusive one. The pictures in the leather-bound booklet tell a realistic story.

The Auto Draft Company, Lake City, Minn.—For the autoist who runs over sandy or heavy roads, the Auto Draft will fill a long felt want. The device comprises a pair of drums which are attached or detached at will to special collars fitted to the hubs of the driving wheels, a cable and two metal anchor stakes. The drums fasten to the collars by an interrupted screw arrangement, the collars being bolted to the spokes of the wheels by means of clips. A car can be withdrawn from mud by anchoring the cable to the stakes and winding it on the drums attached to the wheels. The catalogue has a number of photographs showing the device in operation on a car in heavy sand.

Winton Sales Managers at Their Recent Convention at the Cleveland Factory

VOL. XXI NEW YORK—THURSDAY, JULY 22, 1909—CHICAGO No. 4

THE AUTOMOBILE

BIG TOUR COVERS THE GOLDEN NORTHWEST

In the Minnesota Wheat Belt.

Arrival at Hotel West, Minneapolis

Lake Minnetonka's Waters Provided a Pleasing Diversion.

MINNEAPOLIS, MINN., July 19—Next comes the second leg of the reliability tour. At exactly eight o'clock the first of the contestants headed southeasterly for Mankato, some 132 miles distant over roads that would quickly deteriorate if much rain fell. Confidently and refreshed with the hospitable two-day stay in this bustling city of the great Northwest the dust-saturated and discolored contenders began the obliteration of the 1,813 remaining miles, happy in the knowledge that 823 of the 2,636 total had been left behind.

'Twas with few losses that the fight was renewed, only two of the thirty having fallen by the wayside since the start from

All the Participants in the Glidden Tour Were Most Hospitably Entertained at the Tonka Bay H

Detroit just one week ago. These crippled ones never expected to be real prize winners, being hopelessly outclassed in horsepower and price. Answering admirably the purposes intended for them, they were at an impossible disadvantage in such a strenuous tour as this sixth annual of the American Automobile Association.

One week's driving found these cars still up and doing and without any demerits:

GLIDDEN

No. 1 Premier (Jay).
No. 2 Premier (Hammond).
No. 4 Marmon (H. Marmon).
No. 5 Marmon (Wing).
No. 6 Maxwell (Gager).
No. 7 Jewell (Bernhart).
No. 8 Pierce-Arrow (Dey).
No. 9 Pierce-Arrow (Winchester).
No. 10 Glide (Bartholomew).
No. 11 Thomas (Buse).
No. 14 White (Searles).

HOWER

No. 100 Moline (VanDervoort).
No. 101 Moline (Wicke).
No. 102 Moline (Gregory).
No. 105 Chalmers-Detroit (Machesky).
No. 108 Pierce-Arrow (Williams).
No 109 Pierce-Arrow (Schofeld).
No. 114 Lexington (Moore).

DETROIT

No. 51 Simplex (Woods).
No. 52 Chalmers-Detroit (Bemb).
No. 53 Premier (Waltman).

By an exact count five of the 15 running days are over. The daily runs have been covered at an average pace of 30 miles per hour for the class A cars and from that down to 18 miles per hour for the class E cars, which are vehicles selling for less than $999.

Although the tour is one-third over it is not expected that one-third of the total penalties that will be recorded on arrival at Kansas City have been chalked up against the cars. As in previous years, the last few days will be trying ones on many cars. So far the cars have all made a most creditable performance; in fact, much better than was expected when they departed from Detroit.

Of the thirty cars that started on the Glidden-Hower-Detroit tour only nine—scarcely one-third—have suffered penalties in one-third of the test. But two have had troubles among the thirteen Glidden cars, and these have been due to two broken fender irons and a mud apron which struck a waterbreaker, was pressed against the flywheel, and had to be hammered back into place. Not one of these incidents or happenings had any effect on the running of the car, in that the motor and the transmission system were not in any way injured. This is a remarkable performance over roads that have been treacherous in many ways, due to hidden rocks buried in the sand and dust, to bad bridge or culvert approaches, to waterbreakers, and to miles upon miles of long sandy stretches.

The Hower runabout contestants are not faring so well, for of the fourteen that started seven have already received penalties. Fifty per cent. penalized in the first third of the tour is too much even if the runabouts have had to travel on a fast schedule as compared with many of the Glidden entrants. With the Hower candidates the penalties have been more directly connected with important parts of the cars. It was never expected that the Hower cars as a whole would show up so well as their Glidden brothers, for the reason that many are lower-powered and not a few are driven by men who have not had previous experiences in long-distance touring.

So far not a single point has been recorded against the trio of toy tonneauites contending for the Detroit trophy, and it would be a most commendable performance if all three could reach Kansas City with clean road records.

Notable Lack of Serious Mechanical Trouble

A great contrast of the mechanical troubles thus far as compared with previous tours is the entire freedom from spring troubles. There has not yet been recorded a single case of breaking spring leaves. In previous Gliddens in the first few days many cars suffered; but it appears that experience has had a valuable effect on this part of the car, and the makers have seen to it that springs are made adequately strong. Last year had several examples of broken wheels. Wheels are heavier this season. In the majority of cars the I-beam front axle is used and not a single one yet shows any weakness as a result of experiences with waterbreakers. In fact, in looking over the cars each morning as they check out, it is remarkable how spick and span they all appear. The fenders are in place, the bodies not dented, wheels are running true, no odor of burning brakes has

', July 18, After a Two-Hour Boat Ride on the Crystal Waters of Beautiful Lake Minnetonka.

been discovered, and many of the high-priced machines have not taken a drop of water since leaving Detroit. It is remarkable how little work is done on the cars.

It is proper to give great credit to improvements in the cars, but the drivers must not be overlooked. Old veterans such as "Teddy" Dey, Frank Wing, Walter Winchester, Webb Jay, H. Hammond, "Jack" Williams, and Gus Buse, Jr., are taking no chances, because each one sees a possibility of winning the Glidden trophy himself. Last year it was won by a team of three men with three cars, but this year it will be won by one driver and his car. This new phase of the rules gives additional interest, and each driver realizes that it entirely depends upon himself whether he wins or loses and that he cannot be prevented from winning by a team-mate who may have been running in hard luck. This is a big factor in the maintenance of the big clean score sheet.

HOW MINNEAPOLIS EXTENDED A REAL WELCOME

MINNEAPOLIS, MINN., July 19—This half of the "Twin Cities" is fulfilling the promises made to give the Gliddenites one of the finest entertainments on record. Never before this year have the travelers been so feasted and fêted, and with four points en route where special programmes have been arranged, each is striving to outdo the others. Elaborate preparations had been made at the Minneapolis Automobile Club for the two full days spent here, and there has not been a dull moment. From the time the cars appeared at the city limits there were interesting doings.

Dinners, trolley rides, military reviews, boat rides and an automobile parade were features, all of which were enjoyed and appreciated. The mammoth parade held Saturday evening in the center of the city took the top notch for beauty and excellent management. When it was stated by those who have seen similar celebrations in other parts of the country that the one here was the finest, the comparison was not overdrawn, and the tourists will take away with them an excellent impression of the enterprise of the autoists of Minneapolis.

There were 358 cars in line, of which forty were elaborately decorated, and all of the participants flew American, Minneapolis and welcoming flags. The lights of the long line, moving at a rate of about 12 miles per hour, made the down-town streets as light as day, when combined with the brilliant decorations on the buildings and the red flares. Such ingenuity as was displayed in the finishings of the automobiles has probably never been equaled, for all of the handsomest ones were illuminated, and the settings were particularly fine. The first prize, a wicker touring outfit, was won by Miss H. B. Whitted, whose Wilcox car, made in Minneapolis, was arranged with a canopy of fresh cut flowers, intertwined with electric lights. The second prize, a pair of Solar lamps, was won by C. E. Van Duzee, who had his Chalmers-Detroit entirely covered with tufted white material, only the tires showing, with all the occupants dressed in white. For the best decorated car driven by a woman, a cut-glass punch bowl and glasses were presented to Miss Ethel Cosgrove, who had a Maxwell handsomely trimmed with white flowers. The pleasing decoration included a large swan and two storks with all occupants of the car utilizing the numerous electric light bulbs which made the craft so markedly artistic. From the rear projected the stern of a canoe in which sat another young woman dressed in white and holding a paddle studded with small electric lights. A wonderfully beautiful effect was made by the American roadster which competed in the division for cars decorated by the children of the owner. Long and racy, it lent itself readily to the scheme, and was entirely covered with dainty white with purple trimmings, and with purple lights along the sides and rear. In front, on the radiator, was an immense letter "G" in lights, in honor of the Glidden tour. It was driven by John Fawkes, the son of L. H. Fawkes, and the prize was a camera.

To show that trucks can be made veritable fairy-lands was illustrated several times during the evening. The best appearing one was beautiful, indeed, a gorgeous affair, in the center of which a miniature fountain surrounded by greens spouted real

Rose-Decked Wilcox Car, a Leading Prize Winner

water from a little conservatory. This won first prize, a Bowser oil outfit, for the L. S. Donaldson Company, and its driver secured an order for a suit of clothes.

Only one untoward incident occurred, that of a fire to one of the handsome cars, driven by the daughter of C. M. Rawitzer. The red roses caught fire from the lamps, and quick work was necessary on the part of the young women in the machine to escape. It was too badly damaged to continue in line.

Charles J. Glidden, Frank B. Hower and Col. W. W. Brown were the judges. After the parade the Minneapolis *Tribune* served a Dutch luncheon to a number of the tourists. Joined with them were officials of the local club, the State association and newspaper men.

Friday evening, that of the arrival of the contest, was given to the men for rest. In honor of the officials of the tour, the officers of the Minneapolis Automobile Club gave an informal dinner that evening in the West Hotel. Among those present were Col. F. M. Joyce, Minneapolis State Association; H. W. Lowry, president of the Minneapolis Club, and Asa Paine, an ex-president.

Saturday morning the real entertainment began, with an excursion to Mennehaha Falls in chartered trolley cars. The club members had rightly decided that their guests would not appreciate rides to and from this beauty spot in autos. The walk was around the falls, to the ravine at the bottom, and then up on the other side to the cars again. Fort Snelling was next visited, to witness a review in honor of the autoists. There were eight companies of the 28th United States Infantry, a platoon of machine guns, and the 2d squadron of the 4th Cavalry on parade, and they made a beautiful showing. The bronzed veterans have but recently returned from Cuba, and had seen service both there and in the Philippines, so the maneuvers were a treat. The reviewing officer was Lieut. Col. Silas Wolf. Immediately following the review the guests of the day walked across the verdant parade ground to the officers' club, where they were entertained.

In the afternoon a special train took about 400 people, half of them belonging to the caravan, to Savage, Minn., to see a match race between Dan Patch and Minor Heir, the fastest horses in the world. One heat was run in 2:06 1-4, and the horses were seen for a time while warming up, while lesser lights of the stable held the attention during the process.

Sunday the tourists were given still another kind of an outing. At 9 o'clock several score of automoiles were brought to headquarters by their owners, and all the Gliddenites in sight were taken out to beautiful Lake Minnetonka for a two-hour ride. Dinner was taken at the Tonka Bay Hotel, and once more the cars were pressed into service to convey the guests to the Automobile Country Club for a buffet supper. The club has a superb location, and 'tis doubtful if any other automobile organization is so ideally situated.

As the Illuminated Parade Progressed Through the Streets of Minneapolis, the Sight Was Inspiring to the Beholder

The Last Day of the Tour—When Dai Lewis made the pathfinding trip he took six days to cover the 154-mile route between Madison and La Crosse which the tourists were required to cover in 8 hours and 42 minutes. "I admire your nerve in coming in on the hour," said one driver, "after having laid out that route. I certainly would never have taken the same chances, now you may depend upon that. All that saved your life was the fact that it did not rain." Lewis smiled, and his reply was disquieting. "You think La Crosse to Madison tough? Just wait until the last day of the tour. Then you will see something." On that basis those who have lost points have failed to worry, as they believe that they will have plenty of good company before the tour ends, especially if rain should set in and stir up the roads, converting them into a muddy paste that will be hard to drive straight on.

Asa Paine's Winton Contained a Bevy of Beauties

Taking on Supplies.

A Picturesque Michigan Road.

Studebaker furnished Lunch at South Bend

HOW TOUR PROGRESSED FROM CHICAGO TO FORT DODGE

ENTHUSIASM marked the progress of the tourists through the States of Wisconsin, Minnesota, and part of Iowa. Not only was the tour made welcome, but the rural population turned out *en masse* to watch the cars pass and to speed them on their way. The roads showed a vast improvement over those just traversed in Indiana and Illinois, which, with the enthusiastic reception accorded by the people, made the going more enjoyable for the contestants themselves and the numerous newspaper men. The only thought that spoiled the enjoyment was of the conditions to be met with farther on, which Dai Lewis felt free to state was much worse than anything heretofore. With this in mind, the drivers exercised much care.

THIRD DAY—CHICAGO TO MADISON, WIS.

175.2 Miles

MADISON, WIS., July 14—There was some keen enjoyment in the run here from Chicago. Furthermore, the escape from the so-called "Windy City" lay through its most beautiful sections, including the Lake Shore drive, Lincoln Park, and then Sheridan road. Surely the man who labors during the day in the murky and disheveled town must appreciate lovely Evanston when he arrives home at night; and Kenilworth, Glencoe, Highland Park, and other succeeding places located on the shores of Lake Michigan are similarly inviting. A look at Zion City gave one the idea that it no longer had the directing hand of a capable manager, for, despite his peculiarities, Dowie possessed rare business ability.

Kenosha, home of the big Rambler plant, and also noted in automobiling for the Solar lamps of the Badger company, figured as the first city entered in Wisconsin. While there were no Ramblers in the tour, one of the notables met in the main street was Thomas B. Jeffery, in a runabout driven by his son, and that the veteran maker, first of bicycles and then automobiles, was interested in a look at the dirt-daubed cavalcade required only a hello to the man who refused to become involved in the Selden litigation.

Mitchells were numerous in Racine, though few of the company's officers apparently took time to see the Gliddenities. Sales Manager Gilson had seen the start at Detroit, and admitted that this year the long route had no charms for him. He and Al Reeves, however, watched the cars fly into the outskirts of the town. The KisselKar plant being located at Hartford, it was natural that cars of this make in demonstration form were to be observed in the vicinity of Milwaukee.

Prompt and generous hospitality came to the tour party during its Milwaukee stop, the refreshments including all the beers that have "made Milwaukee famous." The officers of the Milwaukee Automobile Club saw to it that everything was done that "Jim" Drought has mentioned the night before in Chicago, for he was "taking a day off" by riding in the Premier pacemaker of "Napoleon" Hower.

Wisconsin supplied roads that proved an appreciated inprovement over the alleged highways of Michigan and Illinois, and, excepting a stretch of about 15 miles between Waterloo and Watertown, the going bothered the contestants slightly, though Madison certainly presented an inviting appearance when reached late in the afternoon. Here is located the University of Wisconsin, and it is not boasting for the Badgerites to say that their institution of learning has the most advantageous and picturesque site of any college in the whole country. Lake Mendota is a lovely sheet of water, and its sister lakes are scarcely less beautiful. Though no set form of entertainment was provided, many of the party were shown the beauties of the model little city, Glidden, the globe-girdler, arousing pardonable local pride by comparing it to Athens, which was not very far-fetched for a good illustration. The Governor was absent, but Colonel Munson, his private secretary, assisted the officers of the Madison

Veteran "Teddy" Day, Who Again Pilots a Pierce

Automobile Club in the courtesies showered. It followed as a natural sequence that "Jim" Drought had a hand in the proceedings.

Two Cars Met with Penalization—Rough as some sections of the route were, and as fast as was the time made when the fine roads presented themselves, the Gliddeenites had no perceptible trouble, and not a single penalty was inflicted in the ranks of the Glidden or Detroit trophy cars. There were two among the runabouts which felt the pen of the scorer, however, and one of these felt something still harder. This was the little McIntyre high-wheeler which jumped down an embankment before reaching Milwaukee and there remained. Its driver, Frank Goodwin, later stated that his car got caught in the tracks of a trolley line. When it did jump out and extricate itself a nut on the steering system dropped off, and the car was ditched and damaged beyond immediate repair. Neither driver nor observer were injured. It was not expected that the McIntyre would go very far without penalization, for the required speed was too great, but it was hoped that it would make a fine showing for the motor-buggy industry. On the first day it was 29 minutes late, and on the second this was increased by 423.7 points, so that its total, when the 1,000 for withdrawing was added, arose to 1,452.7, a penalty incommensurable with its trouble. The sturdy little Brush runabouts are in for endurance, and it is not expected that they will keep the time schedule. Consequently it is understood that the entrants intend to continue just to demonstrate their ability to cover the distance at a pace suited to their size and power. The one driven by Huss was the other of the two machines penalized to-day.

The running time for the 175.2 miles was 8 hours 50 minutes, an average of 20 miles an hour being required of the class A cars, those selling for $3,750 and upward, and, as usual, a proportionately lower rate for the smaller machines.

Charles Goldthwaite, Who Drives the Maxwell Runabout

FOURTH DAY—MADISON TO LA CROSSE

154.4 Miles

La Crosse, Wis., July 15—One could easily have imagined himself in Vermont to-day, for the country bore a striking resemblance to the Green Mountain State. Leaving Madison, the little gem of a city, and taking a parting view of its quartette of lakes, the Wisconsin river was crossed at Sauk City, just below which is Prairie du Sac, the two dwelling in peace and harmony and advertising their advantages jointly.

Baraboo is an enterprising and substantial town which deserves to have its name writ large for the reading of automobilists. With its own money, and no help from the State, it has constructed miles of good roads in its vicinity. As the flying procession passed through Baraboo's well kept streets there was a shout of welcome that had the genuine tone in it; and this same kind of greeting seldom had a dissenting voice all the way to this lively burg grandly located on the Mississippi. Reedsburg, however, particularly warned the travelers not to go faster than 12 miles an hour, but, with the exception of a short stretch of brick pavement through the main street, this was plenty fast enough.

Once the route led for several miles on a crossroad that divided fields of grain. The explanation of this sandy substitute for a road came from Pathfinder Lewis, who said that when he laid out the tour in the Spring the main road was impassible and someone directed him to this little used sand track. At any rate it contributed something to the diversified character of the day's running, which presented much to please the eye even if it included road surfaces of changeful moods. For the first time in the tour one met with and cussed the waterbreaks that infest Pennsylvania mountain roads.

Between Kendall and Sparta three ridges were climbed and descended, which caused distress to nearly every car in the tour. The presence of waterbreaks added to the task, and all uttered words of thankfulness when gliding into hospitable Sparta, the automobile club of which tossed lunches and drinkables into the laps of the car occupants. The remaining 25 miles of the journey had no incidents worthy of note, though mention should be made of the fact that there was some "beating" to keep free from time penalties.

To a number a pleasant feature to-day happened just beyond Wilton. After climbing a long hill two of the press cars and the Jewell roadster came upon a Pierce-Arrow picnic party. The photographers stopped a moment to take a picture, and in the meantime the hungry men discovered what they voted was the best cake in the State of Wisconsin. The car belonged to La Monte Rollands of Tomah, and with him were W. R. McCall and L. M. Compton, and party of ladies.

How the Contestants Progressed—A single penalization was inflicted in the Glidden ranks, and it was for work of little consequence. The Midland, driven by E. O. Hayes, in crossing one of the terrible waterbreaks in the semi-mountains, scraped its dustpan upon the ground. To straighten this required 15 minutes of work, thus giving the car a demerit of 1.5 points. Shortly after this the left front fender broke loose, and wire and strap were procured with which to fasten it. The cost of the material was 30 cents, for which the penalty was .6—double the one-tenth system because the material was purchased. It took 16 minutes to fix this, so that the total penalty against the car is 3.7 points.

The Detroit trophy trio kept their ranks intact.

Howerites were far less fortunate, for penalties were inflicted upon five of them, four of whom had previous clean bills of health. The lowest was that of the Mason, driven by Roy Snyder, which was given 2.4 points, divided into 2.2 for labor in changing a petcock from the radiator to a cylinder head, and in plugging up the vacancy in the radiator. For the wooden plug used in the latter instance the charge was .2. The Maxwell. driven by Goldthwaite, took slightly more—2.6 points. A spring clip on this machine gave way yesterday, and the crew was undecided as to whether to use a new one or not, for the car

WHILE THE TOURISTS WERE AT CHICAGO

"The Rivals" Spooner and Lazarnick.

President H.N Van Sicklen — President H.M. Swetland
Automobile Blue Book Pub Co. Class Journal Company.

Pilot Lewis and Secretary Ferguson compare notes

Tourists arriving at Auditorium Annex, Chicago.

Crossing Flatlands south of Chicago

Cavalcade departs for Minneapolis.

Press Men Extinguishing Grass Fires in Wisconsin

Along the Shore of a Beautiful Wisconsin Lake

Where the Cars Were Parked for the Night at Madison

Sauk City Tenders the Tourists a Cordial Welcome

might have traveled without it. The rough roads to-day were sufficient to show that no risks should be taken, and so W. F. Smith, the Maxwell manager, instructed Goldthwaite to put in a new one. For the clip the damage was .4, and for the labor it was 2.2.

The rules this year might confuse those not intimately familiar with them in certain points, as illustrated by the case of the Maxwell. The clip cost 20 cents, or, at least, over 10; but, inasmuch as it was not carried at first, the score was doubled and, as the 11 minutes spent in adjusting it were upon such an article, the time was marked up double.

The Jewell roadster, driven by John Shimp, was nine minutes late—its first penalty.

Two other cars whose records were touched did not fare so easily. These were the Hupmobile and the Brush, driven by Huss. The former had been able to maintain the hard schedule on the roads of the first three days with little trouble, but the precipitous hills of to-day were too much for the little car, and it was marked 358 points for lateness. Its companion in trouble was another of the little fleet, which found the grades very steep for a one-lunger when combined with time necessary for certain adjustments. Two connecting rod bearings were used, and in all the material and labor counted for only 8.9 points, with 335 points charged for tardiness, so that its score was increased to a total for four days of 957.6.

The other cars were all classes and had no difficulty in negotiating the route, although a number of them steamed on the heavy climbs. The conservative methods of driving were less in evidence, perhaps because time had to be made up whenever possible. Considerable tire trouble was noticed.

FIFTH DAY—LA CROSSE TO MINNEAPOLIS

177.8 Miles

MINNEAPOLIS, MINN., July 16—Pleasant valley to-day elicited the encomiums of the lovers of scenery, and one would have to go a long distance to find its superior in quiet beauty in this big land of ours. Dai Lewis had incidentally mentioned the existence of this valley, but few were prepared to enjoy such a gorgeous prospect of nature as was discovered some 25 miles from La Crosse. Next came the Stockton valley, with additional loveliness in the way of foliage-bedecked hills that closely approached mountains in size, and again followed a reminiscence of the Green Mountains and the Berkshires of Massachusetts.

Emerging from the hills, the miles of grain fields stretched in all directions, and then one began to understand the source of the real wealth of the Northwest. Signs of prosperity abounded in the waving seas of wheat. and oats, and corn, and the farmers gazed at the motor-driven brigade with friendly eyes, and their greetings bore tokens of unmistakable friendship. For the man on a Minnesota farm there could be no greater boon than the automobile; furthermore, he is appreciating the fact by buying cars, as was made apparent again and again at the crossroads gatherings where invariably there were one or more autos to be seen.

Lewiston, Utica, St. Charles, Dover, Eyota, Chester, Rochester, Orinoco, Pine Island, Zumbrota, Cannon Falls and Hampton were among the flourishing communities passed through on the way to St. Paul, which is only 10 miles from its sister city, though one is constrained to note the absence of very much sisterly affection.

It was a triumphal progress that punctuated the tour's arrival in Minneapolis, after being met in the outskirts by a delegation from the local automobile club, which included President Lowrie and other officers. President F. M. Joyce, of the Minnesota State Automobile Association, to-day came with the tour on its 177-mile run, and there seems to be no hesitancy whatever on the part of anyone to give full credit to him for the excellent condition of automobile affairs in the State.

Penalizations Were Few—When the route of the tour was first spoken of the officials stated that there would not be a perfect score, and when Pathfinder Lewis returned from his prospecting with long tales of the road conditions the contention was believed. There are those among the tourists to-day, however, who are thinking that this must apply to the country beyond. At any rate the 13 Glidden cars and the three Detroit trophy ones performed as usual without a smirch on their records.

There were three inflictions among the roadsters and runabouts, but no new ones, and one of these was a withdrawal. The Jewell added 6 points to its 9 of yesterday, giving it a total of 15. The items were as follows: For outside labor in rethreading a gasoline force feed pump, 3.8 points; for labor of the driver upon this, 1 point; for a hinge which cost 5 cents, .2 points; and for applying the hinge, 1 point.

The withdrawal was that of the Hupmobile, which stripped a low-gear pinion in the transmission in trying to climb the steep hills at the beginning of the journey. When this happened it was only a few miles from the start, and the car was able to get back without difficulty and obtain a new one. It is understood that the car will continue as a non-contestant. The Brush naturally contributed to its increasing total, the 294 points giving a total of 1,251.6. Of that to-day 285 was for lateness and 9 for labor. The score of the other Brush was given out this evening as incomplete because in coming into this city Trinkle went according to the route book to the Plaza Hotel instead of following a change to the West Hotel. It is probable that his application for an allowance, inasmuch as he waited after arriving at the Plaza, will be granted and his story is substantiated by the observer.

SIXTH DAY—MINNEAPOLIS TO MANKATO

132.0 Miles

Mankota, Minn., July 19—When Dai Lewis laid out the route of the tour in the Spring one of the toughest stretches that he encountered was between Minneapolis and this city. A good part of the way consisted of what are known in this country as "gumbo" roads, which in the rainy season are well-nigh impassable. Even with a hard downpour of a day the going is exceedingly difficult, and it was for this reason that the run to-day was made of only 132 miles, coupled with the additional fact that the next big town where hotel accommodations were procurable was too far away.

With fond recollections and thorough appreciation of the good time supplied by the Minneapolis club, the contesting part of the tour took its departure from the front of the Plaza Hotel at 8 o'clock. The trip here owing to the favoring weather conditions proved easily within the capacity of all of the cars. Of hills there were none worthy of the name, and the scenery had almost exclusively the look of the fields, seas of grain frequently encompassing the horizon on all sides. St. Paul waylaid the tour shortly after it left the rival sister city, and the cars were deviated from the street and into the big auditorium, where into the laps of the occupants were thrown cigars and candy and other souvenirs of the city, including a miniature of St. Paul himself.

Northfield, some fifty miles from Minneapolis, attracted attention because of the fact that it was here on September 7, 1877, that Jesse James and his gang met with their first Waterloo, two of the gang biting the dust, though two townsmen were also killed in repelling the attempt to rob the bank.

Enthusiastic welcomes pleased the tourists until one got tired of waving answers to the flag and handkerchief and other salutes which punctuated progress through every town and village, with equal enthusiasm, though necessarily intermittent, in the country.

A Big Tent Filled with Refreshments Was Provided for the Hungry Tourists by the Milwaukee Automobile Club

Owatonna contributed the noonday luncheon, its automobile association doing the honors, with wives and daughters of members serving the refreshments, which included the best buttermilk ever tasted. Owatonna is the biggest town in Steel county, which annually produces about three million pounds of butter and holds the national championship in the quality of its dairy achievements. The president of the local club is Senator T. H. Cashman and the secretary is Dr. A. B. Stewart. In the absence of the president, G. A. Merrill directed affairs in a most satisfactory manner.

Of course to-day some more of the three thousand odd lakes in Minnesota were sprinkled through the country traversed, and several possessed uncommon beauty, Elysian lake probably carrying off the honors.

Mankato with its solitary big hotel had some difficulty in housing the party, some of whom passed the night in homes of residents who volunteered to meet the needs of the overflow.

To-morrow night at Fort Dodge, Ia., will begin the ten days' occupation of Pullman sleepers, and it must be confessed that the prospect is not viewed with any vast amount of enthusiasm.

Webb Jay in Premier Checking Out at Minneapolis

To-night Globe-Girdler Glidden announced that if next year's tour is a San Francisco-New York affair he will drive a car himself in the non-contesting division.

The local club is supplying entertainment to-night to the visitors, a band concert, ride on the Minnesota river, and a Dutch lunch being included in the festivities. The journey to-day having been so easily accomplished, the recipients of the courtesies are in mood to enjoy the occasion.

Penalties Inflicted on the Sixth Day

The cars to-night are parked on a historic and bloody spot. On the day after Christmas, in 1862, thirty-eight belligerent Sioux Indians were captured by the United States troops and strung up on the very half-acre where the cars now stand shrouded in their tarpaulins.

All the machines seem to be in splendid order, and little change was made in the standings to-day. Only one Gliddenite had to suffer, and that was the Chalmers-Detroit, driven by William Bolger, which had to tighten a loose fender iron which has been giving trouble for some time. There was more alteration in the standing of the Hower trophy contestants. The Jewell roadster, in charge of John Shimp, spent so long tightening hub flange bolts this morning that 5.6 points were chalked up against it, with an extra 0.2 point for a washer used. The total of this car has therefore grown to 20.8 points. The Mason's score has been increased from 2.4 to 4.3 points, on account of some work done on the run from Madison to Lacrosse last Thursday. The 1.9 difference is the price of making a wooden plug for the bottom of the radiator to replace a petcock transferred to the cylinder head. The repair was so complicated that the committee has only just decided the penalty.

The two little Brushes have been withdrawn, the entrant stating that the schedule has been found entirely too strenuous for a 7-horsepower, single-cylinder runabout. The marks given them on the runs from Madison to Lacrosse and from Lacrosse to Minneapolis have just been announced. On the former, the mark was 3.0 points, being 0.6 for a new radius rod and 2.4 for the labor of putting it in place. On the following day another radius rod had to be used, but only eight minutes were spent putting it in place, so that this penalization was 1.6 points, making a total for the little car of 5.2. Dwight Huss, too, had considerable trouble, as expected. Both cars, of course, get the maximum penalty of 1000 points for their withdrawal. However, they will continue with the tour as non-contestants.

J. A. Wicks in Moline Car Near Pine Island, Minn.

The little Hupmobile arrived this evening and was given a warm reception by the crowd. It is now being driven by A. E. Nelson, the designer, in place of Frank Striman. Two of the non-contesting cars met with mishaps during the day's run. The second pilot car, used in following up Dai Lewis and in further distributing confetti, was nearing Faribault on the sun-baked gumbo roads when the right steering knuckle gave way, and the car had to stop on the border of a cornfield. Mortimer Reeves, with his bag of "scent," was taken on in Chairman Hower's pacemaker. The driver took the broken knuckle into Faribault and had it welded at the local smithy's. The car arrived late in the evening.

The Maxwell, carrying a number of Chicago newspaper scribes, reported with a bent front axle, the bend coming between the spring seat and the right wheel. The accident was in no way the fault of the car. It happened while turning from the road to allow one of the Pierce roadsters to pass. This courtesy is granted by all non-contestants to the real tourists, but the reward of virtue in this case was that the wheel dropped into a hole so large that it nearly disappeared from sight. The axle was straightened this evening, although the mishap did not prevent the car from coming into the city easily.

Strange to relate, tire troubles were numerous, due possibly to the fact that the pneumatics are beginning to feel the strain of the thousand miles that have already been put behind. Then, too, the speed was greater than usual, and at the same time there were numbers of right-angled turns. None fell behind the schedule because of punctures or blow-outs, but not a few had their innings along the roadside in the 132 miles.

SEVENTH DAY—MANKATO TO FORT DODGE

138.6 Miles

Fort Dodge, Ia., July 20—Down into Iowa to-day straggled the goggled-eyed caravan, with the same interminable line of roadside onlookers waving and shouting greetings, and at two places contributing to the demands of the inner man. The route was almost due south, and the gumbo brand of road continued its rough, though dustless, course into Iowa, the line being crossed just outside of Elmore, where the townsfolk supplied buttermilk in generous quantities. Occasionally the gumbo had been dragged, but more frequently its roughness compelled a speed of not more than twelve miles an hour. Algona, 93 miles from Mankato —thanks to the liberality of E. E. Connors—supplied luncheon and some drinkables, though the town is "dry."

Soon afterwards a sign across the road indicated the county line of Humboldt County, and for some twenty-five miles the going proved most enjoyable. Then there came an abrupt return to the gumbo, continuing almost into Fort Dodge. The town today is agog with the Barnum & Bailey circus and filled to overflowing. However, many must have put off the show till tonight, as the streets were alive with people when the cars began to arrive in the public square. The reasonable schedule for the 138 miles had in view the possible effects of rain on the gumbo, and as there was no waterfall, the tourists could take things quite easily. The weather to-day has been scorching hot, but a breeze saved the tourists from feeling its full effects. In Fort Dodge the thermometer showed 115 degrees in the sun and 95 degrees in the shade, and it is said that a hotter day has not been experienced in years. The party is finding sleeping cars a bit uncomfortable to-night.

E. L. Ferguson had a narrow escape from serious injury to-day. His Acme hit a culvert near Eagle Grove, Ia., and the car and its occupants were thrown through a barbed-wire fence into an adjacent corn-field. In trying to save himself Ferguson caught hold of a strand of the wire, which slipping tore long gashes in his hand and broke several of the small bones. The injuries were dressed by a local surgeon. Ferguson caught the special Pullman train on its way here. He will continue the tour, but *a la* Pullman instead of Acme.

Although the cars to-day at times had exciting escapades, and three of them learned that Iowa roads are not always what they seem, penalizations were few. The Maxwell roadster, driven by Goldthwaite, received 1.6 points for labor in stopping a leak around a cylinder valve cage. The Midland got 0.6 points for tightening a fender iron. The Chalmers-Detroit stopped to tighten a connecting ord bearing, for which it received 17 points, plus 187 points for the ensuing lateness.

During the day the Mason Hower contestant pulled to one side to allow another car to pass, and as reward for its politeness its wheels sank immediately into the gumbo so that it could not get out under its own power. The Midland, which is running under the Glidden flag, was the next along and it was successful in landing the Mason and its crew on firmer ground. The other cars to get in trouble were of the non-contesting division. The Rapid truck, which seems to be followed by a specially active hoodoo, turned out for a hay wagon just outside of Algona, and immediately slid off the road into the ditch. It was rescued by a couple of the other cars without suffering any injury. The Maxwell press car ran out of gasoline and was pushed to one side to allow one of the Chalmers-Detroit cars to pass. It also sank into the gumbo so that outside aid became necessary. H. C. Marmon gave some help, but his time was necessarily limited and he had to go on. Finally man's best friend, so alleged, the horse, was pressed into service for the first time on the trip. The Studebaker-E. M. F. car which was delayed yesterday had more serious trouble this morning. The left half of the drive axle crystallized and gave way at Vernon Center, only 21 miles from Mankato.

The machines which received penalties as a result of to-day's trip had all lost their clean records previously. To-morrow there will be some tough hills in the 185 miles to Council Bluffs and the predictions are many that the scores will be changed by nightfall. Rain has fallen recently in the roads to be traversed within the next few days and the roads are reported to have suffered severely.

Replenishing the White Steamer with Kerosene

A FEW OBSERVATIONS MADE EN ROUTE

In These Long Tours it has come to be business pure and simple, and no horse play. One man, and he was a maker, gave it out cold to his men that things of late had changed and that all horse play, late hours, and cutting up would have to be dispensed with." I am not out for the fun of spending a few thousands of dollars for my firm just to let some men have a good time," said this man. "My men are out to win the trophy, and they are going to start every morning in shape to make a hard drive. Horse play is all right in its place, but the time for such doings is not on a tour when results count for so much."

Hats Are Various and Many in style on the trip. Every time a hat store on the line offers anything outlandish in the way of a chapeau the tourists go right after the novelty and buy out the dealer. Lots are not large in the way of bargains that are wearable, and so the great variety. Khaki, however, as a touring uniform has come to be quite the style, and nine-tenths of the tourists wear suits that seldom cost more than $5. Although cheap, the suits look well, and the men appear to better advantage than in dusty business clothes.

The Underwood Typewriter Company supplies typewriters at many of the points on the route, and these machines are placed in press headquarters, much to the delight of the press men.

THE TABULAR STORY OF THE BIG TOUR AS IT PROGRESSES

No.	Car	H.P.	Cyl.	Bore	Stroke	Driver	1st Day	2nd	3rd	4th	5th	6th	7th
	GLIDDEN TROPHY												
1	Premier	32.4	4	4½	5¼	Webb Jay	0	0	0	0	0	0	0
2	Premier	32.4	4	4½	5¼	H. Hammond	0	0	0	0	0	0	0
3	Chalmers-Detroit	40	4	5	4¾	William Bolger	1	0.4	0	0	0	0	187.0
4	Marmon	32.4	4	4½	4½	F. E. Wing	0	0	0	0	0	0	0
5	Marmon	32.4	4	4½	4½	H. C. Marmon	0	0	0	0	0	0	0
6	Maxwell	28.9	4	4¼	4¼	E. G. Gager	0	0	0	0	0	0	0
7	Jewel	36.1	4	4¾	5	O. P. Bernhardt	0	0	0	0	0	0	0
8	Pierce-Arrow	48.6	6	4½	4¾	F. S. Dey	0	0	0	0	0	0	0
9	Pierce-Arrow	48.6	6	4½	4¾	W. F. Winchester	0	0	0	0	0	0	0
10	Glide	36.1	4	4¾	5	A. Y. Bartholomew	0	0	0	0	0	0	0
11	Thomas	72.6	6	5½	5½	G. B. Buse	0	0	0	0	0	0	0
12	Midland	32.4	4	4½	5¼	E. O. Hayes	0	0	0	3.7	0	0	0.6
14	White	40	..	...	...	H. N. Searles	0	0	0	0	0	0	0
	DETROIT TROPHY												
51	American Simplex	50	4	5	5	W. A. Wood	0	0	0	0	0	0	0
52	Chalmers-Detroit	40	4	5	4¾	Jean Bemb	0	0	0	0	0	0	0
53	Premier	32.4	4	4½	5¼	Cliff Waltman	0	0	0	0	0	0	0
	HOWER TROPHY												
100	Moline	32.4	4	4½	5	C. H. Van DerVoort	0	0	0	0	0	0	0
101	Moline	32.4	4	4½	5	J. A. Wicke	0	0	0	0	0	0	0
102	Moline	32.4	4	4½	5	W. S. Gregory	0	0	0	0	0	0	0
103	Brush	7	1	4	4½	F. A. Trinkle	0	0.4	0	*	*	Withdrawn	
104	Brush	7	1	4	4½	D. B. Huss	40.8	149.3	423.6	343.9	294	Withdrawn	
105	Chalmers-Detroit	40	4	5	4¾	John Machesky	0	0	0	0	0	0	0
106	Hupmobile	16.9	4	3¼	3⅜	Frank Steinman	0	0	0	358	1000	0	0
107	Maxwell	28.9	4	4¼	4¼	C. E. Goldthwaite	0	0	0	2.6	0	0	1.6
108	Pierce-Arrow	38.4	6	4	4¾	J. S. Williams	0	0	0	0	0	0	0
109	Pierce-Arrow	38.4	6	4	4¾	Chas. Schofield	0	0	0	0	0	0	0
110	McIntyre	18	2	4¾	4¾	Frank Goodwin	29	423.7	1000	Withdrawn		0	0
111	Jewel	36.1	4	4¾	5	John Shimp	0	0	0	9	6	5.6	0
112	Mason	20	2	5	5	R. Snyder	0	0	0	2.4	0	1.9	0
114	Lexington	36.1	4	4¾	5	J. C. Moore	0	0	0	0	0	0	0

HEARD AND SEEN ALONG THE ROUTE OF THE TOUR

How Moline Squadron Travels—While the regulations allow each car to carry a sack of extra parts for replacement in case of a breakdown, the three Molines which constitute the "Moline Dreadnaught Squadron," are traveling without a single piece of additional equipment. The Molines are the only cars which are not equipped with a bag full of extra parts. When asked why he was taking this unnecessary chance, President W. H. Van Dervoort said: "When an owner starts on a tour he is not equipped with extra parts. The Glidden tour is to demonstrate what the motor car can do under regular touring conditions, and we are endeavoring to demonstrate that Molines can travel 2,600 miles without replacements of any sort. Our perfect scores bear us out in this respect. Personally, I would like to see the extra parts eliminated from the rules." Too bad this very commendable attitude is not taken by all contestants.

"Jehosaphat, Boys! It's a Scarecrow!" said F. Ed. Spooner, just outside of Union Center, Wis., after members of the party in the No. 89 Studebaker press car had waved their arms off at a lady (?) in the field who was apparently busy with hoeing and had just raised up to watch the autos go by. The tourists like to receive recognition from the people along the route and upon finding a "frozen face" always try to make her smile or wave her hand, and then say "Thank you." This particular lady, well dressed and to all appearances good looking, would not show the slightest sign of recognition, and the Studebaker slowed up to try and make her do so, the men rising up in the car to do homage to her beauty. The discovery that she was a scarecrow quite unnerved them, and after that they were not so enthusiastic in trying to make anyone wave.

An Observer on the Brush did not know that the speedometer of the little car was out of order. He watched it closely and noted that it registered 55 miles an hour regularly. "Say," said he, "we'll just about be up to the big fellows before long, won't we?" Another observer who made the trip in the little Brush said: "I tell you that I had about the most remarkable ride I ever took. I would never miss one ride of the kind for the world; but never again. I've had my time of it. Why, Tinkle just opened the little car wide, and then held it right down to hard tacks regardless of the road conditions. We went over the bumps at full speed, and we flew, or it seemed to me we did. And with that sort of work the little car held together, and we arrived on schedule time by a narrow miss only."

The White Steamer Quartette—A quartette has been organized by the crew of the White Steamer, the car which is making a highly successful demonstration of the use of kerosene as fuel. As might be expected, the vocal efforts of the quartette are devoted mainly to exploiting their use of the new fuel. On entering each town they attract attention and applause by rendering the following song to the tune of "No Wedding Bells for Me":

No gasoline for me,
It's as dear as it can be.
  Kerosene is what we're using.
  Old John D. is surely losing.
Three cheers for kerosene,
  No gasoline for me.

"'Tain't No Race, Then!" said one farmer. "Then I don't see why we folks are so interested, by Gol. We came a darned long way to see this 'ere race only to find that it ain't a race at all. I'm plumb disgusted with myself, for my hay's laying there, and, by Gol, I believe it's going to rain. As long as 'tain't no race I don't suppose you people 'll care, for you can get in any old time." Informed that to get in ahead of time was as expensive in the contest as to get in behind time, he scratched his head. "You call it a contest, by gosh, and then you say it ain't a race; and ain't a race a contest—that's what I want to know." Time was precious, so the gentleman from rural Wisconsin was left still puzzled about a race that wasn't a race.

"I Find the People Very Cold and distant when going through the towns early in the morning," said Chairman Hower, "but I understand from those who bring up the rearguard and try to keep out of the dust that the people have warmed up toward the last and throw flowers, kisses, and all sorts of bows and smiles at the tourists. I presume that I start the training of the masses, and others who follow are quite as good teachers." The chairman was right, for those who trail are the men who have the real fun and who lose the monotony of the journey through the reception accorded all along the line. Perhaps the chairman thinks that people who get up early ought to be good natured.

In Days of Old "When Knights Were Bold" the tourists ofttimes heard disquieting reports of obstructions on the roadways to be followed and scout cars were sent out to clear the way. There was antagonism in those days against the tourists. All that has changed now and farmers make Glidden Tour Day a holiday, bring their family and friends and hold a picnic by the roadside, cheering the contestants on. In days of old speed traps were set to catch the tourists, but to-day the policemen in all of the towns en route push the tourists on and give them a cheer for every ounce of speed they put on.

Things Have Changed within a very few years. All antagonism has apparently disappeared and farmers cheer the tourists lustily and wave to them to go faster. The automobile has come to stay, and its beneficial effect has been noted by the farmer, who is not unappreciative of the good roads movement now so successfully launched. The farmers own automobiles, and want good roads, and know that the autoists of the entire country also want them, and are working tooth and nail to benefit the farmer as well as themselves. Conditions will improve more and more as the years go by.

Charles J. Glidden Predicted at Minneapolis that within five years the men who kick about the roads and the stiff schedules will be looking from above on the roads they once cussed and laughing at the old days, just as the cyclists look backward to hard centuries and double centuries made on roads even worse. "Many of these men will be in the aero field," said Mr. Glidden, "and I have no doubt that endurance contests in the future will follow much the lines of our great tours of to-day, but without thought of roads. It is not impossible in fact, it is certain."

More News Matter is being sent out from this tour than any other. C. H. Kent, representative of the Western Union, who is making the tour in a Chalmers-Detroit car, says that an average of about 30,000 words is being sent out by his company alone, and P. S. Williams, of the Postal Company, says his company is doing fully as well. It is not improbable that an average of 60,000 words daily for the trip would be about fair, and this will be greatly increased providing the weather changes and the difficulties become greater.

Tonneau Is a Catch-All—To the driver, the tonneau of a car is a catch-all and the convenience of his passengers does not enter into his mind. "Put it into the tonneau" is his regular statement and his regular habit, and those who have to travel in the back seat suffer hour after hour through inability to get their feet to the floor or to get them into a comfortable position. The observers on the tour objected to this feature of touring, and Chairman Hower, at one of the early meetings, asked that the drivers of the cars cease choking up the tonneaus.

Talk of the "Transcontinental Tour" is heard on every side in the touring party. Charles J. Glidden said in speaking of it: "I have talked the matter over with Mr. Hower, who is now in favor of the tour to start from San Francisco and finish in New York. The rules will be more liberal than they are at present, and I believe that the entry list will be a large one. The makers seem to want a really hard trip, and an across-country trip would be a splendid chance to bring out a record breaking list."

"Matches That Won't Blow Out," handed out by Morgan & Wright, are also the matches that set the world on fire, for the occupants of tour cars touch them to cigars or cigarettes and then throw them carelessly to one side. Sundry fires along the roadside have been caused by this, and No. 79 Studebaker, driven by George Smithson, and No. 83 Chalmers, driven by Harry Ford, stopped to relieve the anxiety of one woman near El Roy by putting out what might have been a serious fire for her.

Photographers Are Having a Hard Time on the trip, for the reason that the promoters failed to take them into consideration by routing the tour westward rather than eastward. Somehow the sun has been directly against the men who push the button at most of the interesting points on the route, and as a consequence the pictures of this journey have not been altogether up to the usual standard set by those who make it a business to photograph every tour.

starters and their numbers pasted on cards have been checked again and again.

Dogs Were Chained as a Rule all along the route through Wisconsin, and many a good dog was saved to posterity by this fact. Chickens have taken wisdom with age, and few chickens are caught crossing the road. The youngsters of a few years ago were frequently orphaned by the autos and grew to know that it was dangerous to cross the road as was their custom in years gone by.

When the Panoram Was Taken at Lake Minnetonka one man of more than average intelligence sat at one end of the line when the circuit panoram started and then ran around back of the camera and took a position at the other end of the line, appearing twice in the same picture. It is not on record that he ordered any more pictures than the man who appeared only once.

"Johnnie" Johnson, old-time "King of the Cyclists," became very much excited at Minneapolis, where he is manager of the Winton branch, when his employees did some great decorating for the parade, in which the six-cylinder Winton made a hit. "Johnnie" was a member of the reception and entertainment committee and did yeoman work.

Before Reaching Minneapolis the Route Passed Through Beautiful Pleasant Valley, One of the Gem Farming Regions of Minnesota

Youngest Driver in the Tour—Considerable interest is centered in the driving of W. S. Gregory, driver of the Mobile No. 102, due to the fact that he is the youngest driver in the tour. Gregory is only eighteen years of age, but is handling his big car like a veteran, and has already received compliments from many of the tourists. Gregory hails from Los Angeles, Cal., and came East purposely to drive in the great American touring classic.

H. C. Marmon and F. E. Wing drive the two Marmon entries with tops up, and attract no little publicity to themselves by so doing. As a rule every car is stripped right down to action for the tour, and tops are put away until after the finish, owing to the trouble they cause. In these long, hard rides the hundred-pound top hanging at the back throws a hard strain on the body, and a competitor cannot afford to take the chances.

Rural Free Delivery has aided in putting the farmer in closer touch with the motorist, and the increased interest shown along the line has been very marked. The farmers and their families have been seen standing at the roadsides studying the daily papers carefully every time a car passed. The lists of

H. O. Smith, of the Premier Company, Indianapolis, was forced to leave the tourists at Minneapolis to go home to do a little work, but will again rejoin the party at Council Bluffs. Mr. Smith is enamored of the big tour, and has become a veteran by reason of his steady attendance in the past.

The Rapid truck is now starting at midnight in order that it may save delay on the road turning out for the tourists, as it does whenever a car comes in sight. The truck came through successfully from Madison to La Crosse and feels certain now of a successful trip to the finish.

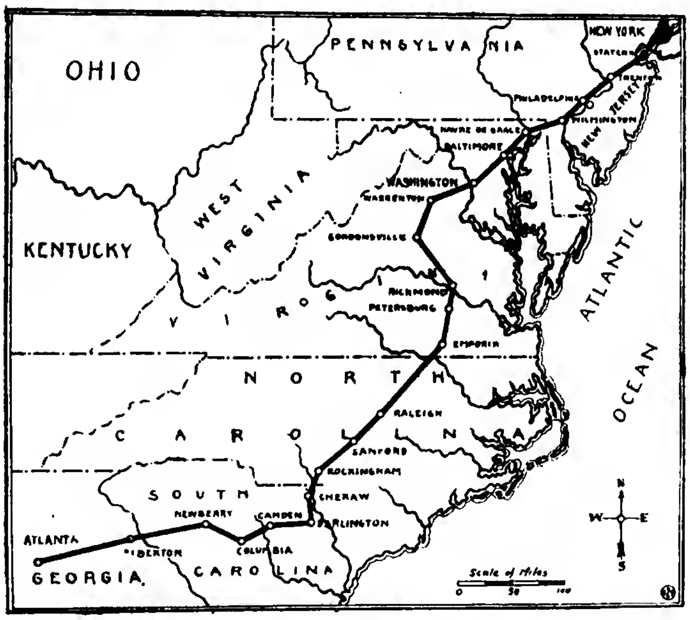
J. M. Evans, representing the Brush in the capacity of advertising representative, feels that his subject is a good one, as the little Brush cars with but 7 horsepower are performing miracles, considering the odds accepted in participating in such a strenuous tour.

NORTHERN TRIP OF THE GOOD ROADS SCOUT

By PATHFINDER

SEVERAL weeks ago a brief description of the trip of the New York *Herald's* White Steamer from New York to Atlanta appeared in these columns. After a week spent in the latter city, the car started northward, this time over what is known as the "capital-to-capital" route via Elberton, Columbia, Raleigh, Richmond and Washington, as shown on the accompanying map. Although no official announcement has been made, it is understood that this route was found to be, at the present time, not nearly as good as the route via the Shenandoah Valley, Danville, Charlotte and Anderson which the White covered on its trip southward.

As was anticipated by those who have had experience in southern touring, the "capital-to-capital" route, being comparatively near the coast, leads through many miles of sandy, swampy country with almost innumerable creeks which are not provided with bridges. But it was not all bad going by any means, and the scouts reported a number of localities where the roads were almost faultless.



"Capital-to-Capital" Route—Atlanta to Washington

Not in many years has the South been so stirred up as it is by this good roads project. The scouting trips have awakened a spirit of emulation so that each county is striving to excel its neighbor in good roads development and an appeal has been made to local pride, the results of which will be far reaching. The business men in the various cities are alive to the advantages which would result from having the "New York-Atlanta Highway" pass through their sections and, accordingly, each day the scouts learned of road improvements which were projected and, in many instances, work was actually started while the White was on its way northward.

Foremost among the good roads advocates of the South is Leonard Tufts, the owner of Pinehurst, the famous North Carolina resort. Mr. Tufts, when he heard of the plans of the good roads scouts, came down from his summer home in New Hampshire, hired 200 men and 100 teams and in four and one-half days constructed three miles of splendid road over which the White, with Mr. Tufts as a passenger, made an exhibition run at a rate of 50 miles an hour. Mr. Tufts is now devoting practically his entire attention, and is spending no small amount of money, in forwarding the good roads movement along the "capital-to-capital" route.

At many other points along the line special exertions were put forth to improve the roads in order that the scouts might form a favorable opinion of the "capital-to-capital" route. Bridges were built over creeks which never before could be crossed except by fording; stumps were cut out of the road; holes were filled in and, in general, people all along the route gave evidence that they had awakened from their previous attitude of letting the roads go by default.

The arrival of the scouts in their White steamer in the various towns was the "big story" of the day in the local newspapers. Between Atlanta and Washington, they did not have a single hotel bill to pay. In some cases, the local chambers of commerce looked after this item, and in others the scouts were the guests of the city. Every town, large or small, sent out a delegation to welcome the scouts, these delegations invariably including the Mayor and other prominent citizens.

A fitting climax to the series of receptions and entertainments occurred at Washington, where President Taft received the scouts and expressed his appreciation of the work which they were doing. Furthermore, the President readily consented to pose for a picture with the scouts outside of the White House.

As pointed out in a previous article, there was a latent good roads sentiment in the South before the New York *Herald* and Atlanta *Journal* embarked in their enterprise. But it needed just such a spectacular performance as the trips over the road between New York and Atlanta to quicken and crystallize the good roads sentiment. People in Southern towns have hitherto been satisfied with conditions if they had good roads extending a few miles from town in each direction. Now they are beginning to see that they cannot be satisfied with such a condition and are giving some attention to the roads from town to town. They can no longer look on a bad spot in the road with equanimity simply because it is five miles outside of town and no one ever goes out that far. They are beginning to realize the importance of having a good highway all the way to the next town. Last but not least, their local pride has been aroused and they are not going to let it be published to the world that the roads in their county are far inferior to the roads in a rival and nearby county.

One of the results of the trip of the good road scouts has been to inaugurate a strong movement to build a good highway between Richmond and Washington. The leading citizens and commercial bodies of both Washington and Richmond have entered into hearty co-operation and it is a safe prediction that before another year has elapsed the road between the two cities will no longer be the disgrace to the Commonwealth of Virginia which it is to-day. The direct road between those cities is known as the old "Telegraph road" and was described by "Pathfinder" in The Automobile of April 22. The scouts heard such discouraging reports of the condition of this road that they essayed a longer route via Gordonsville and Warrenton, but it is doubtful if the condition of this road is enough better to compensate for its forty miles of extra length. The direct road from Baltimore to Philadelphia was followed, crossing the Susquehanna river on the ferry at Havre de Grace. A vast amount of misinformation exists regarding this road. A number of years ago this road was reported to be almost impassable, and this information has been so widely disseminated that most tourists going from Philadelphia to Baltimore take a long, indirect route via York and Westminster. As the writer pointed out in the article above alluded to, no one need have any hesitation in going via the Havre de Grace route.

The good roads scouts ended their northward trip at New York on June 26 and were welcomed in behalf of the city by Acting-Mayor McGowan. Their work, however, is by no means completed, as there is still another route to be tried out, that by way of the Shenandoah Valley, Bristol and Chattanooga, Tenn., and, at this writing, the pathfinding White Steamer, with its passengers, is on its way to Atlanta by this route.

SOUTH INTENDS TO HAVE GOOD ROADS

Photos. by Lazarnick


Tells a Story.


Tucker's Ferry over the Savannah.


Farmers who aid.


Almost impassible at Camden S C


Escort from Richmond Va


Near Southern Pines N C


Leonard Tuffts of Pinehurst N C


Making Road to Pinehurst N C


Georgia employs its Boarders.


In Covington Ga


Lithonia Roads of Georgia


Crossing the Susquehanna

EXTENSIVE PLANS FOR LOWELL AUTO CARNIVAL

LOWELL, MASS., July 19—Plans are being drawn up on an extensive scale for the Lowell automobile carnival during Labor Day Week. There will be "something doing" every day from Monday, September 6, till Friday, September 10, and that something will include three days of automobile racing on the Merrimac Valley circuit, a day of motor boat racing on the Merrimac River, alongside the course, and a day of motorcycle events on the automobile circuit. There will be also, perhaps, a balloon ascension or other aeronautic stunt on the side.

For Monday, which is Labor Day and a holiday, the event is the automobile races for cars in classes 2, 3 and 4 under the A. A. A. piston displacement classification. The class 2 event (301 to 450 cubic inches piston displacement and 2,100 pounds minimum weight) will be over 20 laps of the course, or 212 miles; the class 3 event (231 to 300 cubic inches, 1800 pounds) will be over 15 laps, or 159 miles, while the smallest cars, class 4 (161 to 230 cubic inches, 1,500 pounds) will cover 12 laps, or 127.2 miles. The races will be started at 10 a. m. There will be trophies in each class, as well as cash prizes for the successful drivers.

A series of dash races on the straightaway, a part of the circuit in front of the grandstand, is being arranged for Tuesday. The course is one of the best that could be asked, the surface being as smooth as asphalt and the roadway straight and wide. The trials will be mostly at a mile, with flying start.

Wednesday has been set apart for the National stock chassis race, to which President Taft has been invited. This will be for class 1 cars under the A. A. A. classification, namely 451 to 600 cubic inches piston displacement and 2,400 pounds minimum weight. The race will be over 30 laps, 318 miles. Motor boat racing has been assigned for Thursday, and an excellent course is available. Friday the American Federation of Motor Cyclists will hold sway.

President John O. Heinze of the Lowell Automobile Club returned a few days ago from a tour in New York and the West in the interests of the carnival, for the double purpose of ascertaining the feeling of the makers and dealers toward the proposed races and of conferring with the A. A. A. officials concerning some of the details. In both of these he was most successful.

MAY OPEN QUAKER RACE TO FOREIGNERS

PHILADELPHIA, July 19—Although the Contest Committee of the Quaker City Motor Club has hinted at a possible opening of the entry list to foreigners for next October's 200-mile stock chassis Fairmount Park race, it seems hardly likely that there will be room for all the American makers who expect to enter cars in what will be the biggest event of the year in the East. Some of those concerns who have asked for entry blanks are talking of putting in two, and, in one case at least, three cars each. At this rate the limit of 20, beyond which the promoters cannot go by reason of the comparatively short course—a trifle under eight miles—will be reached long before the date for declaring the entry list closed.

There is quite a difference of opinion existing among the Quakers as to the effect the Contest Committee's recent letter to the American makers may have had. Some of them fear that the exclusion of foreign cars may give the public an idea of the possibility of the existence somewhere of a streak of yellow, that the opening of the list to foreign cars means a foreign victory, and that that is to be avoided above all things. The opinion is held by not a few of the committee that the admission of all the foreigners who care to enter should be welcomed on the ground that a victory will be all the more creditable to an American car under the circumstances. Those who follow the racing game closely are of the opinion that in a stock chassis event American makers have now nothing to fear from their foreign rivals, whatever may have been the situation a few short years ago.

The Quaker committee had a party of city officials out over the course last Wednesday, suggesting where improvements could be made. There are one or two short stretches where a car coming up from the rear would have to encounter some rather soft going in getting around. The officials promised that these portions would be macadamized to triple their present width long before the date of the race.

F. I. A. T. TO HAVE AMERICAN FACTORY

Many rumors have been spread that the F. I. A. T. Company was to build a factory in this country, but the first authoritative statement to that effect has just been made public. The factory is to be located at Poughkeepsie, N. Y., where the company has acquired nearly thirty acres of land. The site has the advantage of a private dock in the Hudson River and connection with the New York Central Railroad. Albert E. Schaaf will manage the new factory. Although there has been much delay, it is hoped that operations will begin by the end of the year.

NEW PROGRAM FOR ALGONQUIN CLIMB

CHICAGO, July 19—There has been a revision of the program of the Chicago Motor Club for its annual hill-climb at Algonquin, Ill., August 5, and instead of classifying by piston area as has been done for the past three years the A. A. A. classification scheme will be followed, both piston displacement and price classification being used. In addition to the usual A. A. A. events the Chicago Motor Club has been given permission to add climbs for motor buggies and electrics, which are not provided for in the A. A. A. card. The revised card is as follows:

Class A, open to any stock car fully equipped and governed by the following prices. Winner to be the car making the fastest aggregate time for both hills: Division 1, $4,000 and over; division 2, $3,001 to $4,000; division 3, $2,001 to $3,000; division 4, $1,251 to $2,000; division 5, $851 to $1,250; division 6, $850 and under. No car shall compete in any division above than that to which its price entitles it.

Class A2, same as class A except that the winner will be determined by the club formula.

Class B, open to any stock chassis (A. A. A. rules) and governed by the following table of piston displacement and minimum weights. Winner to be decided by time only.

	Piston Displacement	Weight
Division 1......	451 to 600 cubic inches........	2,400 pounds
Division 2......	301 to 450 cubic inches........	2,100 pounds
Division 3......	231 to 300 cubic inches........	1,800 pounds
Division 4......	161 to 230 cubic inches........	1,500 pounds
Division 5......	160 cubic inches and under....	1,200 pounds

No car shall compete in any division above than that to which its weight entitles it.

Class C, open to any chassis made by a factory which has produced fifty cars, not necessarily of the same model, during the twelve months prior to the event, winner to be decided by time only.

Class F, the same as class C, but having the following limitations as to size: Division 1, for cars having a total piston displacement not to exceed 390 cubic inches; division 2, for cars having a total piston displacement not to exceed 202 cubic inches. Time to decide the winner.

Class C, division 1, open to motor buggies, wheels 36 inches in diameter or over, with solid tires; division 2, open to electric. Time only to decide the two divisions.

MAXWELL TRANSCONTINENTAL IN WYOMING

Mrs. John R. Ramsey, of Hackensack, N. J., who is driving a Maxwell car on a transcontinental trip from New York to San Francisco, has reached Granger, Wyoming, breaking all women's touring records. She is accompanied by Mrs. N. R. Powell, Mrs. Atwood and Miss Jahns. The party has met with bad weather all the way from New York, and in the West the roads have been in a condition the like of which is not remembered even by the oldest inhabitant. Long detours were necessary to avoid washed-out bridges, and at some of the fords which had to be crossed the water came in over the footboards of the car. Horses were found necessary on several occasions. However, the car is still in condition, and Mrs. Ramsey expects to complete the trip.

Functions and Frailties of Motor Cylinders

BY THOS. J. FAY

IN using automobile gasoline for fuel, the thickness of cylinder walls is almost independent of bore, and the foundry possibility seems to be the ruling consideration. Measurements of a considerable number of motor cylinders of various bores, ranging between 100 and 170 millimeters, disclosed wall thicknesses of six millimeters (6 | 25.4 = 0.239").

A formula devised for the purpose of determining the required wall thickness reads as follows:

When,

P = maximum pressure in pounds per square inch.

d = diameter of bore of cylinder, in inches.

t = thickness of wall of cylinder, in inches.

k = a constant, representing an allowance for reboring, then

$$t = \frac{P \times d}{7{,}200} + k$$

The above formula is on a basis of 18,000 pounds per square inch, minimum tensile strength of gray cast iron, with a working strain of 3,600 pounds per square inch, making the factor of safety, after the cylinder has been rebored.

$$f = \frac{18{,}000}{3{,}600} = 5, \text{ after reboring.}$$

Excepting in racing car motor work, the pressure may be taken at 300 pounds per square inch, and even less in some cases involving rather low compression. Numerical examples involving extremes of cylinders, as respects bore, will afford an insight into the scope and utility of the formula, as follows:

For a cylinder with a bore of six inches, which is about as large as they are made in general practice, the formula demands, for the thickness of cylinder walls, the following:

$$t = \frac{300 \times 6}{7{,}200} + 0.0125 = 0.2625 \text{ inches.}$$

In order to be able to judge of the competence of the formula another example, using a smaller cylinder is given as follows:

For a cylinder of four-inch bore:

$$t = \frac{300 \times 4}{7{,}200} + 0.0125 = 0.1775 \text{ inches.}$$

Since the water-jacket walls do not have to sustain under a pressure of moment, it is at once a foundry problem, the question of the thickness of the walls. In continental practice, in view of the desirability of symmetry in thicknesses of walls, the jacket walls are made one millimeter thinner. The problem may be solved, affording all the protection that the occasion requires, if the jacket walls are made 0.0125 inch less in thickness than the thickness of cylinder walls as found by formula.

Effect of Sharp Corners of Cores—Fig. 25, showing vertical sections through moulds of two cylinders, one of an L, and the other of a T type of cylinder, indicates the contour of the walls of the cylinders by white, and the cores in black, with the moulding sand rammed around the exterior, as shown by cross-hatching. The parting line is indicated, and the cores are shown at their extremities tapered off to fit in bearings so as to be self-centering. Loose pieces for the bosses of the valve-stem guide are shown, and the cores, at several points, are indicated with sharp edges, thus rendering the castings defective, since strength depends upon a uniform thickness of walls, and the entire absence of abrupt turns. As a general rule it is due to defects such as these, and misplaced cores, that cylinders are found wanting in service; true, the necessity for good material must not be overlooked, but it is not, as a rule, a question of mathematical proportioning that results in inferior work; it is rather a matter that rests with the foundry, as disclosed in Fig. 25.

Pistons are made of the same material as cylinders and experience seems to indicate that the bearing surfaces afforded are better than when steel pistons are used in cast-iron cylinders, or when steel cylinders are made to serve with pistons of either steel or cast iron. Fig. 26 shows the several shapes of piston heads in vogue, and A is of a flat head, of least ability from the strength point of view; B indicates the usual elliptic formation

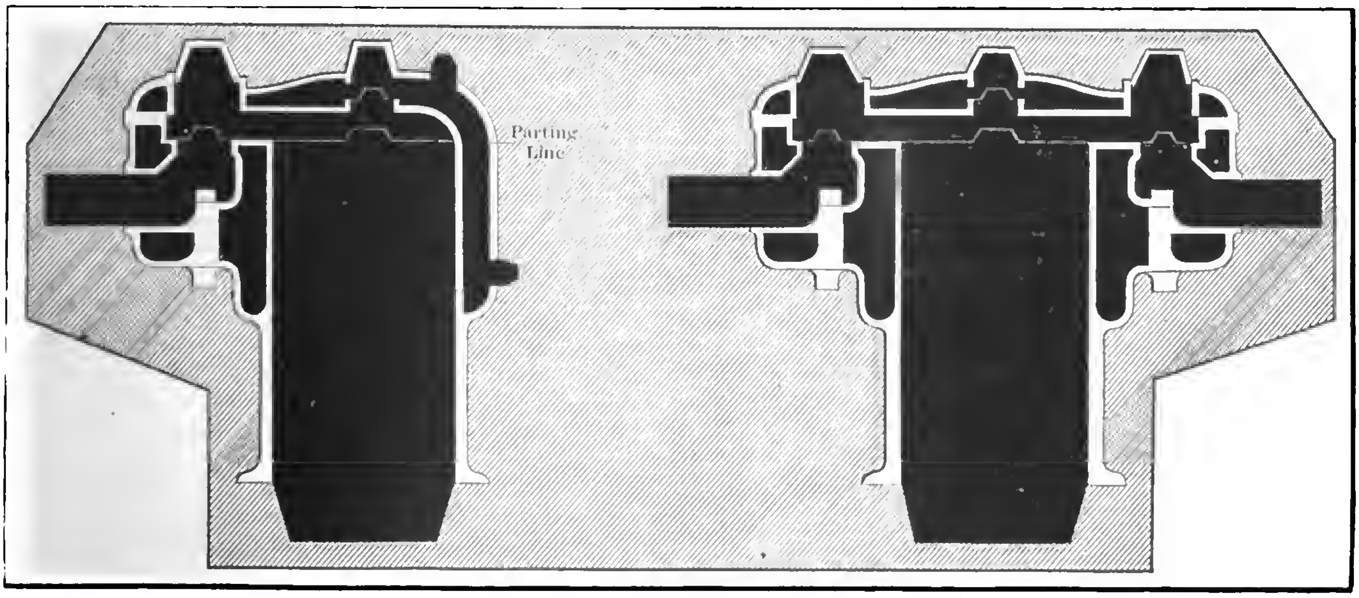


Fig. 25—Illustrating defective moulding preparation, resulting in sharp corners in the metal of the walls of the cylinders

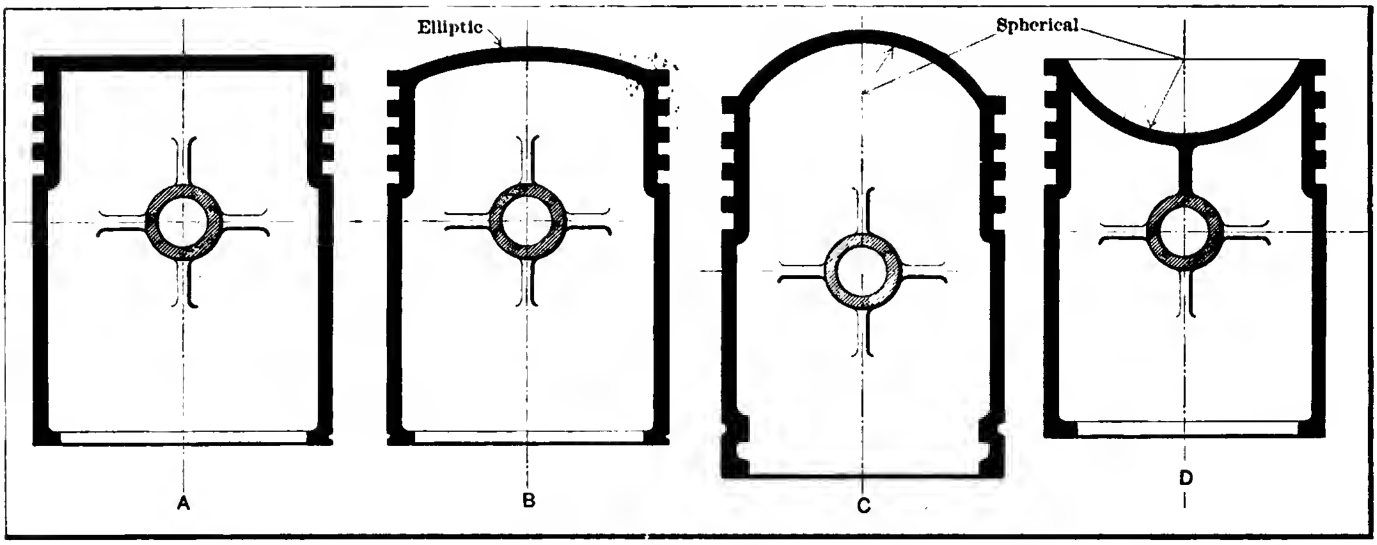


Fig. 26—Depicting the several forms of piston heads in vogue and showing the customary number of rings used

which has the merit of great strength at the junction of the head with the barrel, and lightness on the whole, so that the total weight of the reciprocating mass will be on a minimum basis if the connecting rod is suitably devised. C shows a spherical head sometimes used, and in high compression motors it has the advantage of displacing compression chamber volume and the strength of the head is maximum. D is of an inverted spherical head suitable for use on motors with a low compression, especially in the class that do not run at a very high speed, for, like C, the head is somewhat heavier than the weight attending the use of the elliptic shape as shown at B.

Influence of Ribbing on Strength and Shape—Expansion, following changes in temperature, will be uniform in a piston of symmetrical shape with uniform thickness of the walls, if the metal used is of even texture. If the ribbing is as depicted in A, Fig. 27, the expansion will not be uniform, since the ribbing is in one plane, at right angles to the axis of the piston pin; this scheme is also defective because the rib, so placed, does not lend support to the bosses in which the pin is held. B indicates ribs in two planes, so contrived that the pin supports are ribbed, and in this case the ribs are deeper in the axle plane of the pin, so placed to afford additional strength. The disadvantage of this plan lies in the difference in expansion that will follow the use of ribs of differing depth. C represents a system of ribbing that offers a more even distribution of the work, and the results in practice, from the use of this plan, are very good. When the speed of a motor is so very high that it is necessary to restrict the weight of the piston, the scheme as shown at D is substituted for that of C, and three rings are used instead of four. In all cases excepting at D the bottom of the piston is provided with an inward projection flange to add strength and rigidity to the whole; it is probably not necessary to thus add weight, and in practice it is found that pistons are satisfactory without this addition. In a few notable instances the walls of the pistons were drilled quite full of rather large holes to reduce weight, and the plan offers the desired advantage at an additional cost of construction.

Since pistons are not jacketed for water, or other cooling solutions, they are likely to prove troublesome, due to over-heating, especially in case there is any protruding part above the head in contact with the heated products of combustion, as when bolting, the heads of the bolts project into the combustion chamber. As a rule it is considered better to have the head perfectly smooth all over the exterior, which will be true when the pistons are machined all over. That the head may be very thin is true provided the walls are thickened as they approach the barrel. Oil-grooves are usually placed at advantageous points, as shown at B and C, Fig. 26, and that they aid in distributing the oil seems to be true. In some cases a ring is placed near the bottom of the piston for the same purpose, offering the further advantage of rendering the piston more tight against compression. Lubrication has a wide influence on the question of tightness, no matter how the cylinders are made, or how tight the rings may be.

(To be continued.)

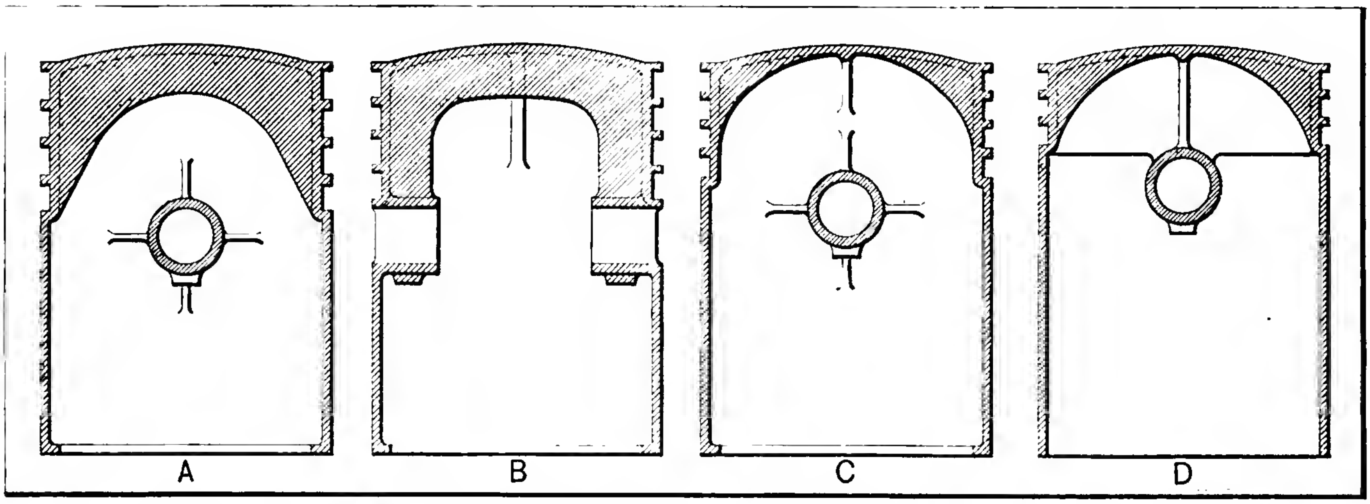


Fig. 27—Sections, showing the plans of ribbing used, and the several ways of sustaining the piston pin supports

FLEXIBILITY DESIRABLE IN AUTOMOBILE MOTORS*

By E. GIRARDAULT.

THAT quality of the internal combustion motor usually referred to as "flexibility" conveys to the mind of the average autoist but a vague idea of what is really meant. Study of a number of tests has led us to attempt to formulate a number of the more important factors bearing upon this quality in a manner that should be of interest to the automobilist. This has been carried out with the aid of M. J. Bethenot, a well-known electrical engineer. We will make the results of this investigation plain here, accompanying it with elementary demonstrations, from which there have been eliminated as far as possible mathematical formulæ and the jargon of the mechanic. It will also be possible to realize from this the influence that the matter of flexibility in the motor should have on the design of the car, and particularly on the change speed gear.

It is a matter of common knowledge that the power of the explosion motor varies according to the speed at which it runs. The same motor will give a maximum of 10 horsepower at 600 revolutions, for example, and 16 horsepower at 1,200 r.p.m. If there are marked off on a straight horizontal line *om*, points denoting the number of turns of the motor per minute, and each point thus obtained, a vertical line is raised, across which at proportional heights lines representing the increasing horsepower are drawn (measured experimentally with the brake), points such as T, A, M, etc., which indicate the horsepower of the motor, are obtained. Joining these points with a line, a curve is obtained representing the variation in the power with differences of speed.

At the same time as the power curve is traced—that is, the work done by the motor per second—we may also outline the curve of the couple; in other words, the energy delivered by the motor at each turn. The second curve may be traced point by point, from the first, the energy per turn being deduced from that per second by means of the rule of three, since the number of turns per minute is known. Experience has demonstrated that the two curves in question take the form shown in the accompanying diagram of flexibility.

There may also be deduced from the power curve the curve of the couples without the necessity of calculating the couple for each point by proportion. Let us join the point M by a line with any one of the power indications having their origin at O. The triangle O*Mm* will give us the formula:

$$tg\,\alpha = \frac{Mm}{Oo} \;\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Mm represents the power of the motor at the speed of rotation measured by O*m*. Now the quotient of the power by the number of turns per second is exactly equal to the couple; that is, $tg\,\alpha$ represents the motor couple. The couples may then be measured on the diagram by the segment *uv*.

By dropping a perpendicular from M until it meets a line extended horizontally from *v*, the point *n* is obtained, indicative of the couple represented by the conditions O*m*.

It may be remarked that the maximum couple is obtained when α is highest; that is, when the straight line joining O and M is elevated as much as possible, since then it is tangent to the power curve, and by this means it will be easy to recognize conditions under which the motor will be in danger of stalling. It will be apparent that this is knowledge which should be interesting to the purchaser.

The curve of the couples indicates that the maximum is at C, the point where the tangent is horizontal, while the power curve has its maximum at A. In the case of the motor from which the curves here illustrated were taken the maximum couple was registered at 400 r.p.m., while the maximum power was delivered at close to 1,000 r.p.m. To generalize, we will designate by *n* the conditions corresponding to the maximum couple, and by *N* normal conditions, under which the maximum power is developed.

Inasmuch as the resistance offered the motor is constant and the conditions of running are equally so, the motor continues to operate practically the same. This is the case of an automobile motor with a steady, harmonious exhaust. As soon as the car begins to mount a hill the motor cannot continue to advance the vehicle at the same speed, and it slows down; as its r.p.m. rate falls off, the power decreases correspondingly. Let us consider the curve of the couples. Since the motor is at a point superior to *n* turns (on the diagram 400 r.p.m.), there is no fear of stalling, because the effort produced by each turn becomes greater as the motor slows down. We have already said that between *n* and N the motor is in its zone of stability; that is, the zone in which the motor will not stall. But it may be that its speed will be retarded to a point below that of *n* turns. Then it will not be capable of producing sufficient power at each revolution to carry the load imposed by the grade. The motor will be stopped unless

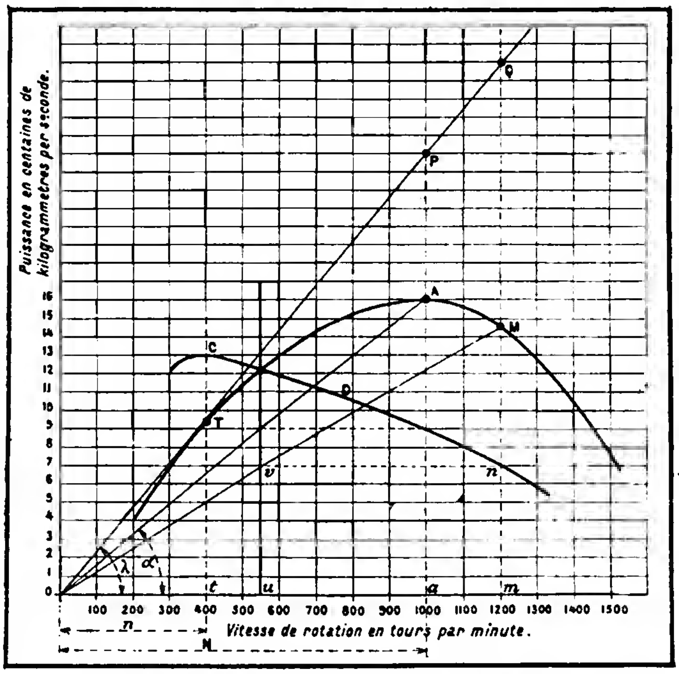


Diagram Representing the Flexibility of a Motor

Vitesse de rotation en tours par minute = speed in revolutions per minute. Puissance en centaines de kilogrammetres par seconde = force in hundreds of kilogrammeters per second = force in units of 13.83 foot-pounds per second.

recourse is had to a change in the gear ratio between it and the driving wheels. This elementary reasoning is evidently applicable to the condition attendant upon the change of gear. The lack of flexibility of the automobile motor makes it imperative to be able to vary the gear ratio of the transmission is the way this is commonly stated.

We have observed that the change of speed should be made at the point where the speed threatens to fall below that of *n* of the maximum couple. Once the lower gear ratio is in action, the motor will resume its normal speed. From the point of view of efficiency it will evidently be advantageous to have the motor run continuously under conditions which permit it to develop its maximum power. But we will see further on that it is not always possible to design a change of speed gear-set so that the different steps may be effected at the normal speed of the motor. But for the moment we will assume that this is the case, subsequently modifying the simple conclusions which this hypothesis furnishes.

Briefly, the motor oscillates between the two extreme condi-

* Translation from the French of "Omnia," by Charles B. Hayward.

tions, n and N. Being at the point n, which gives the couple C, we pass with the aid of the change speed lever to the point N, which gives the couple c. The relations between the corresponding steps in the gear-set are evidently equal to the relations between the couples $\frac{C}{c}$, since this is also the ratio between the effort required per turn of the wheels at the different speeds.

If we substitute for the couples their values in functions of the power and the speed we obtain for the constant ratio s of the steps (also termed the speed ratios):

$$S = \frac{N}{n} \frac{w}{W} \quad \ldots\ldots (2)$$

in which N is the number of turns at normal speed, giving the maximum power.

W is the maximum power.

n, speed at which maximum couple is produced.

w, power corresponding to the speed at which the maximum couple is produced.

The constant ratio, which theoretically is that of the two successive speeds, measures the flexibility of the motor.

The speeds provided by the gear-set are, assuming v_1 to be the first: v_1 $v_1 \times s$ $v_1 \times s \times s$ $v_1 \times s \times$.

In other words, s, the flexibility of the motor, is the reason for the geometric progression of the speeds.

However, the speeds will no longer be in geometric progression when the resistance of the air is taken into account. The higher speeds must be lower than those indicated by the progression.

We will also show that the flexibility as thus defined is susceptible of a very simple geometric calculation, and that s may be obtained graphically by tracing the power curve of the motor. Taking the power curve and the point of origin, O, produce the tangent shown. The right angled triangles OPa and OTt give:

$$Pa = Oa\,tg\,\lambda$$
$$Aa = Oa\,tg\,\alpha \quad \ldots\ldots (3)$$

From which:

$$\frac{Pa}{Aa} = \frac{tg\,\lambda}{tg\,\alpha} \quad \ldots\ldots (4)$$

It is already known that the tangents measure the couples, and that the ratio of the couples measures the flexibility of the motor.

The equation $\frac{Pa}{Aa}$ accordingly measures the flexibility.

It will be seen that this relation is always greater than unity, but in automobile motors it exceeds that figure very slightly, i. e., 1.2 to 1.5. With the first figure, 1.2, for instance, it will be evident that a great many steps would be required in the change speed gear if the conditions we have outlined are to be met. But in practice, recourse is had to an artifice for taking care of the lack of flexibility in the explosion motor; at the moment that the speed of the car is to be changed the motor is speeded up.

The following shows how this well-known custom of the chauffeur may be rationally justified. Our figures give the explanation sought. It is, in fact, that the condition Om, superior to N, is attained by the motor when it is speeded. If the gears then be shifted the relation s of the two consecutive speeds is represented on the diagram by $\frac{Qm}{Mm}$. It will be seen that this ratio increases very rapidly as the motor drops from normal. It may be said that this ratio represents the flexibility of the condition Om, and defines the flexibility at any given speed.

But in running the motor above its normal speed at the moment of gear shifting, the flexibility is increased at the sacrifice of efficiency and the life of the mechanism, this being necessary to avoid having to employ too many gears in the transmission. But, naturally, those motors which require the minimum of speeding will be preferred; that is, those possessed of the greatest factor of flexibility at normal speed. The ideal would be to obtain a motor having a coefficient of flexibility of at least 1.6 at its normal speed, which would eliminate the necessity of racing.

From this it may be appreciated that the coefficient of flexibility, of which the expression and geometric demonstration are so simple, is a very important characteristic of a motor, and that builders should give it quite as much as they do the consumption per horsepower hour of their motors, since it is intimately related with the necessity for using the gears—an enormous source of expense in cabs and autobuses.

Another result of the foregoing investigations is to bring forward very prominently the advantages of a four-speed gear over one having but three steps, from the point of view of fuel consumption and life of the motor, for the more speeds there are and the less the speed of the motor has to be varied the less necessity will there be for handling the change speed lever. This advantage disappears, however, with a motor sufficiently flexible to make gear changing possible at the normal speed of the motor.

To increase the flexibility, devices designed to regulate the carburetion in proportion to the speed are commonly employed. These may be classed in two groups, those producing throttling at the higher speeds and those which impoverish the mixture as the speed increases. The first class is inferior in principle, because throttling lowers the degree of compression and in consequence the efficiency, while the employment of a poorer mixture tends to maintain this at the maximum. This expedient is not without its disadvantages, however, the first of which is the necessity for avoiding auto-ignition, since the compression employed at high speeds with a poor mixture must not be the same as that at low speed, when a rich mixture is necessary. Otherwise, auto-ignition is inevitable with the latter, from which there arises the necessity of throttling at the lower speeds.

To sum up, it always ends by arriving at a point where the efficiency of any given motor must be sacrificed, but it will evidently be better to do this at speeds rarely employed than at the normal r.p.m. rate of the motor. This is because we are able to employ a system of carburetion which will reduce to a minimum the expense for fuel and gears—both items of considerable importance. One objection that may be urged against the use of poor mixtures at higher speeds is the low factor of power per weight thus obtained *(puissance massique)*. We are, in fact, compelled to employ motors which produce all the power of which they are capable under normal conditions; that, is with normal mixtures, bore, volume and weight being considered. Is that a great drawback? We hardly think so, especially for industrial vehicles. It is interesting to note how little power per unit of weight may be employed, and how great the total weight may be raised, but within certain limits there should be no fear of employing somewhat heavy and relatively slow motors of great capacity, with the compression as high as possible and employing fuel mixtures which become poorer as the speed increases. This, of course, for the autobus and the truck.

To make a résumé, it will be seen that studying the question of flexibility has led us to considerations of other parts of the vehicle, and particularly the choice of the motor, construction of the change-speed gear and the regulation of the carburetion. Advantage has been taken of the foregoing in the touring car, and builders have been asked to reduce the horsepower to one-fourth of what it is. It may not be beside the point to remark that foreign engineers head the commercial vehicle industry, because they do not build their cars on sentiment, but according to the needs of economic exploitation, which involves mechanical problems that must be solved.

Removing Foreign Substances from Cylinder—Sometimes a foreign substance, such as a piece of porcelain from the spark plug, the key of an automatic inlet valve, or a small washer, falls into the cylinder. Such substances can be easily expelled by removing the exhaust-valve cap and turning the motor over by means of a starting crank, when the fragment will be shot out into the air, very quickly.

LETTERS INTERESTING AND INSTRUCTIVE

USE OF CASTOR OIL

Editor THE AUTOMOBILE:

[1,948]—To settle an argument, will you kindly answer the following question: Is it not only possible, but also good practice, to use the best grade of castor oil for lubricating a high-speed engine, at, say, 1,000 r.p.m.? By this is meant a gasoline engine such as is used in automobiles.

Lebanon, Pa. C. L. WEIMER.

Yes, it is not only possible to use castor oil as a lubricant for automobile engines, but is also representative of the best practice. In fact, it is more than that—it represents the very highest practice, being used upon racing machines, where ordinary lubricants would not answer. Particularly is this true of very high compression motors in which the pistons and piston rings must be an unusually tight fit in the cylinders. For these, castor oil is the only thing that will serve the purpose. Its universal use is very limited because of the price, which is far beyond that which ordinary motorists are able to pay. There are several cars built in this country the makers of which advocate the use of nothing but castor oil for the cylinders, although other oil may be used elsewhere on the machine.

OFFSET CRANKSHAFT

Editor THE AUTOMOBILE:

[1,949]—Please set forth in "Letters Interesting and Instructive" the advantages of an offset crankshaft; also, of a long stroke motor; that is, small bore and comparatively long stroke. R. N. HICKMAN.

Cleveland, Ohio.

The principal advantage claimed for the offset crankshaft construction is the elimination of the side thrust of the piston on the cylinder walls, during the power stroke. By eliminating this, it is possible to increase the power from the same sized cylinders and at the same speed. The disadvantage to which the most weight is attached is just the reverse of this; the side thrust on the return or compression stroke is increased over what it would be on an engine with shaft set central. The amount of the off-set differs with different cars. The usual range is from one-quarter inch to an inch and a quarter, but a formula for it has been advanced. This, which was given much discussion about a year ago, was one-fifth of the stroke for the amount of the off-set. So, with a 5-inch stroke, the off-set would be one inch.

This formula does not hold, however, to any extent, as the few users of off-set shafts do not agree on the subject, some advocating more off-set up to one-quarter of the stroke, and others advising the use of less, even down to one-eighth of the stroke. The fact remains that it is not or should not be an arbitrary constant quantity like that, but should be proportioned to the other parts of the engine. Thus, with a very short stroke motor, in which short connecting rods are used, a large offset would be more desirable than in the case of a long stroke motor with long connecting rods.

Much discussion has attended the attempt to determine the superior length of stroke. Prominent French makers not only advocated but adopted the longer stroke. English makers, on the other hand, were more given to short strokes, and still stick to them. It remained for the races in which an unlimited length of stroke was allowed to prove the point to the satisfaction of all—French, German, English and American. Thus, in the English Four-Inch race the bore was limited to four inches, but the stroke was unlimited. The result was that several machines were constructed with abnormal strokes which were able to deliver on the testing block as high as 71 horsepower. So, too, in the more important Continental contests the stroke has been unlimited, with the result that a series of abnormal racing motors has been developed, many of them having a stroke twice the bore.

At any rate, it has been proven that both more power and greater speed may be obtained with very long strokes—this, too, on racing motors, which are nothing if not light in weight. So, one of the most weighty arguments against the long stroke was laid to rest by this experience. It is argued in its favor that by allowing more time for each of the cycles they are more complete, and consequently more perfect. Take the exhaust stroke, for instance: this has a much greater length of time in which to take place, and is more effectually carried out. Similarly with other functions.

It is argued also that with slower engine speed less reduction is necessary between the motor and the road wheels, resulting in a less amount of gearing, and consequently a lessened number of control rods and levers, all of which adds to the so-desirable simplification of the automobile.

Without desiring to go into this matter to any greater extent here, the reader should know that this does not by any means cover the subject. Those interested in pursuing the matter further are referred to the following articles which have appeared in the columns of THE AUTOMOBILE recently:

August 27 issue, 1908, pages 293 to 295.

September 17, 1908, pages 397 to 398.

September 17, 1908, issue, an additional article on page 398.

December 24, 1908, issue, page 897.

The matter of offset crankshafts was gone into very thoroughly under "Letters" in the May 20 issue, THE AUTOMOBILE.

ABOUT HIGH ALTITUDES

Editor THE AUTOMOBILE:

[1,950]—My attention has been called to several unusual problems in automobile work and I take the liberty of asking you to give me your opinion on same. Also, please inform me if you have ever published any answers to the following questions, and when:

Question A—Suppose I toured through the West in my car, built by an Eastern builder, and during my trip I arrived at the city of Denver. The altitude of Denver is, I believe, about 5,000 feet above the sea level.

First—What effect would the lessened atmospheric pressure have on the carbureter's action? Could I remedy same, and how?

Second—Would the lessened pressure effect to any noticeable extent the work of the gas mixture in the cylinders?

Third—Would the explosive pressure be less by reason of the air being lighter and having a correspondingly smaller amount of oxygen per cubic foot?

Fourth—Would not the water, by reason of its lower boiling point at this altitude, permit the cylinders to become dangerously warm?

Question B—What arguments are advanced for or against the use of sub-frames upon which to place or suspend the power plant—that is, the motor and transmission gear? E. B. G.

Elyria, O.

In reply to the first paragraph of question A, the lessened atmospheric pressure would lower the gasoline level in the float chamber relative to what it is at present in a lower place. To remedy this, lower the nozzle, which will raise the level of the liquid, lowering it enough to compensate for the difference in pressure of the present place and Denver, one mile up. Similarly, the air there is thinner and more rarefied, so a greater amount of it will be needed to vaporize the same amount of fuel. To remedy this it will be necessary to open up the auxiliary air inlet, so that more air may enter, accomplishing this according to the construction of your carbureter. It might seem like needless work to make the two alterations to the carbureter—raising the spray level and allowing more air to enter, when a person might think that the lower level would require less air—so the same result would be accomplished by leaving both as they are at present. However, this supposition is contrary to fact, for the engine needs just as much fuel, which can not flow if the level in the float chamber is reduced. Therefore, you must alter the position of the spray nozzle. If this is done, it will also be necessary to alter the air supply.

Second paragraph: No.

Third paragraph: Yes; if no changes are made in the carbureter adjustments. No; if the changes are made as indicated above.

Fourth paragraph: Yes; this will have a marked influence, and more care will have to be used in running the engine so as to heat the water as little as possible. Similarly, more care will have to be exercised in filling the radiator, which should be filled oftener—that is, kept filled more carefully than is the usual case.

Question B—There are two reasons which are ordinarily advanced against the use of sub-frames, differing widely. One is a constructive reason, cross members and sub-frames cost more than extended arms on crankcase and gearcase and also cost more to put into place. By increasing the number of joints in the suspension, the number of sources of trouble is also increased. The other reason is one of principle, the opponents of the use of sub-frames saying that it makes too rigid a frame construction, so that the inequalities of the road are transmitted to the crankcase and gearcase; thus rough roads are very liable to cause a fracture of the arms of one or both, through no fault of their own, but simply from the fact of its being rigidly tied to the sub-frame. In three-point suspension, which has many adherents, the elimination of the sub-frame is practically necessary to the completion of the three-point construction—that is, the idea could not be carried out with a sub-frame.

In favor of the use of sub-frames, it is argued that it allows of the segregation of the power parts, as engine, transmission, clutch, etc., into a number of separate and distinct units, each complete in itself, machined, assembled, and repaired separately. With long arms on the crank and gearcase attaching them to the main frame, the important parts of the car's mechanism are supported on castings which are unreliable, whereas in the use of a sub-frame the very short, stiff, and strong arms are supported from a sub-frame of steel, so that the whole is more reliable.

TO STOP THAT NOISE

Editor THE AUTOMOBILE:

[1,951]—Relative to the letter (1,926) of Don S. Numbers in the July 1 issue of "The Automobile," there are six blots that hold the brake drum to the rear wheels. By taking off the wheels it will be found that these strike the mechanism of the brake. Clipping off the ends with a chisel will cause the noise to disappear. I had the same trouble with my model 10 Buick and cured it in this way. N. S. HEGNES.
Argyle, Minn.

By blots the writer of the above evidently meant bolts, the two letters having been transposed by accident. This remedy might be tried by Mr. Numbers, and if not successful doubtless other similar sources of trouble will present themselves later.

ANOTHER VIEW OF IT

Editor THE AUTOMOBILE:

[1,952]—Inquirer 1,926 will undoubtedly find upon close examination that the light clanking noise in his Buick Model 10 comes from looseness of the emergency brake bands. These bands should have very little side play, else vibration will cause them to continuously tap the brake drum and thereby produce the light clanking noise spoken of. Upon removal of the wheel from the axle the proper remedy will be apparent.
Park River, N. D. F. J. PROCHASKA.

Since the above letter presents another view of the light, clanking noise trouble and a remedy for the same, it is given in full. Several other letters treating of this same trouble have been received and will be published in later issues.

CARBURETER TROUBLE

Editor THE AUTOMOBILE.

[1,953]—Will you explain in "Letters Interesting and Instructive" what is wrong with a 1906 model Indian motorcycle? It starts hard and the primer has to be held down. Then it will run about 200 yards, when the primer has to be held down again. Sometimes even this remedy will fail. I have had the carbureter apart and it is in good shape and clean. The spark seems to be very good at all times.
Hazleton, Pa. SCHUYLER PARDEE.

Since your spark is good, the trouble must be in the fuel system. It appears from your description as if you were starving the engine, although doing so unconsciously. This starving action is due to the fact that the gasoline level has been lowered so far that the suction of the engine does not draw up sufficient fuel for running. The fact that you have to prime to start and then, prime to keep a going, even this priming failing to work sometimes, would seem to prove that the engine is not getting enough fuel. The trouble is that the spray nozzle has been raised too high, so that the gasoline level is four or five times as far below the nozzle as it should be.

The engine suction must raise the gasoline this distance before any of the fuel will get into the cylinder, and if the distance exceeds the height which the suction has ability to raise the fuel, none will pass over. In a case of this sort, priming only helps temporarily.

It might be of interest to you to refer to the answers to others who have had the same trouble, and particularly the ones which were illustrated, as the figures may help you out in your present dilemma and aid you in understanding our explanation. Letter 1876 in the May 13 issue of The Automobile discussed the effect of change of jet elevation. Then, in the June 17 issue under the heading of "Cause of a Bad Knock," this was enlarged upon and a figure shown, which illustrated the effect of a variation in the nozzle level. The latest "letter" on this subject is 1940, in the July 15 issue, just off the press, in which this subject is spoken of incidental to a number of other troubles.

WHERE FORT ANCIENT IS

Editor THE AUTOMOBILE:

[1,954]—In your issue of July 1 appears an article, "Climbing Fort Ancient Hill—41 Miles from Cincinnati." I take exception to the statement that it is directly east of Cincinnati on the C. H. & D. R. R. The fact is that it is located five miles east of Lebanon, O., the county seat of Warren county, on the Little Miami Railroad and the Little Miami River. Again, the writer of the article says that Fort Ancient will become "historical." The fact remains that it is historical since it is the fort built by the mound builders and is now owned by the State of Ohio and is being laid out as a State park to perpetuate as far as possible this natural fortress and the remaining earthworks built by this unknown people.

The nearest the C. H. & D. approaches Fort Ancient is 20 miles west. I made the climb a year ago and until recently resided in an adjoining county. My object in writing is that such a point as Fort Ancient should be properly located geographically.
Los Angeles, Cal. C. O. RICHTER.

Mr. Richter misunderstood the use of the future tense in connection with the statement, "Fort Ancient *will* become historical." The idea to be conveyed by this remark was that the hill will become famous in connection with hill-climbing contests, just as Dead Horse, Giant's Despair, Fort George, and many other hills which doubtless were historical in so far as they were connected with incidents of American history years and years before the automobile was ever dreamed of.

WHAT TO DO ON WET PAVEMENT

Editor THE AUTOMOBILE:

[1,955]—Kindly advise me what to do when in driving an automobile on wet, slippery asphalt or wood pavement, the car skids and starts to whirl around. This is particularly liable to happen when an attempt is made to slow down or stop the car.
Westfield, Mass. H. P. MOSELEY.

There are two methods, both on the order of preventatives: equip your car with tires having a non-skid tread or use chains. If you do not care to do this, avoid wet or slippery pavement, just as you would mountains, rocky roads, or anything else dangerous. If it is absolutely necessary to drive over a slippery piece of pavement, start onto it and proceed across it, with a speed reduced as low as possible. When approaching such a piece of road retard spark, reduce throttle, and change down into a lower speed. The very erratic movement of a fast-moving car upon a slippery pavement, particularly, as you have remarked, when slowing down, has never been satisfactorily explained. At best, it represents a source of imminent danger and should be approached with much care and treated as such.

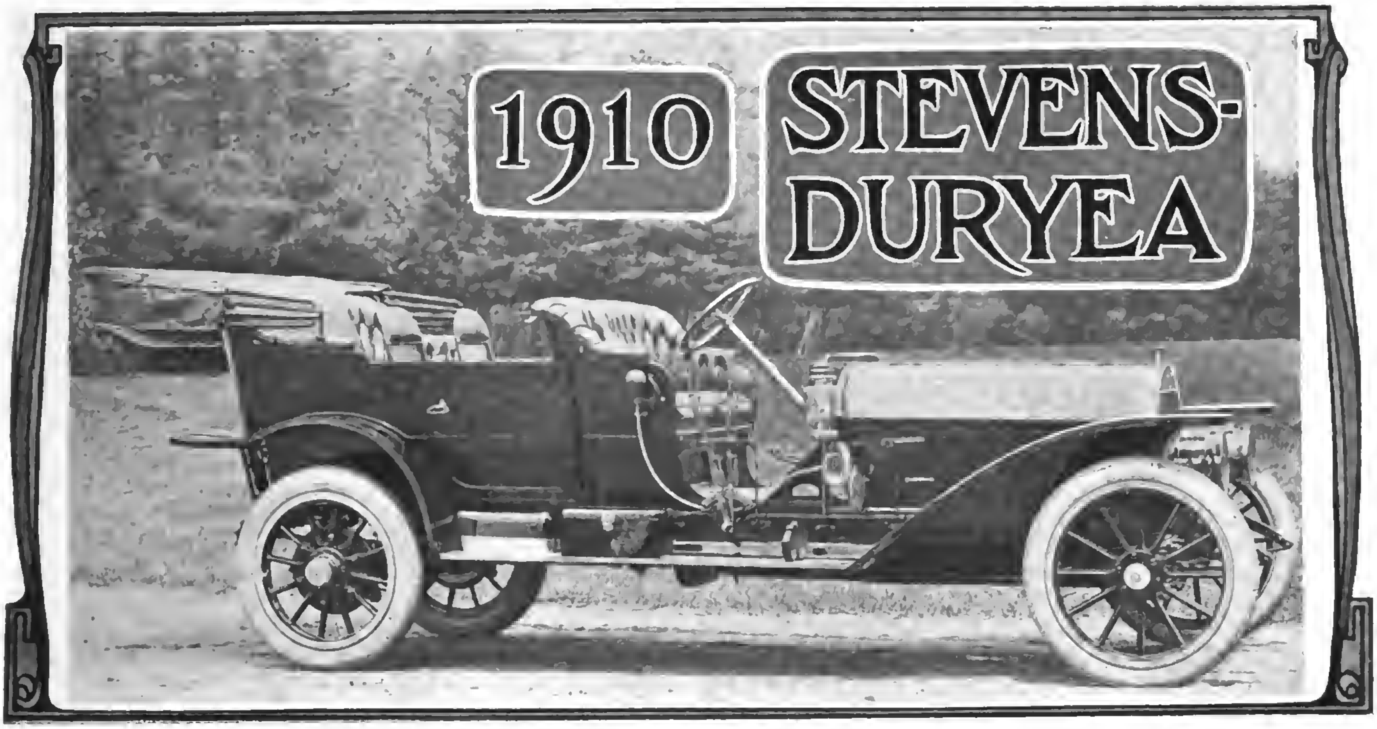
CONTEST RULES UNJUST?

Editor THE AUTOMOBILE:

[1,956]—As manufacturers of light-weight cars we would like to make public protest in your reading columns against the rules laid down to govern the so-called "light car contests." At the present time in all the light car events for the next two or three months, where piston displacement is the basis of qualification, a minimum weight of chassis of 1,800 pounds is called for. What chance has a manufacturer, like ourselves, who does not build a car that weighs to exceed 1,700 pounds, to show his cars in competition? The ruling gives an unfair advantage to the builders of heavy cars with small motors, and leaves the light car manufacturer completely out in the cold.

Automobile racing is supposed to have its greatest value in assisting to determine the most defective and least practical design. If a manufacturer is able, as we claim we are, to build a 36-horsepower engine, place it in a car with a carrying capacity of five persons and show a total weight for car and equipment of less than 1,700 pounds, why should he not be permitted to demonstrate in important contests in competition with other manufacturers that his idea of construction and proportion of power to weight is superior? In other words, why should we not be allowed to take the chassis of our 1,675-pound five-passenger car and place it in competition with other cars of our same rated horsepower? In a race of 250 miles if light cars can stand the racket better than heavy ones, why should not the light ones get the credit, and vice versa?

We claim an advantage over the heavy car, and the heavy car manufacturers claim an advantage over the light. Why should we not be allowed to get together on the same footing and fight it out? All we want is a chance with cars of our same power, but at the present time the best we get is a chance to compete in free-for-all events with no limitations of any kind, which proves nothing of value to the builder and merely furnishes good sport for the spectators.
CAMERON CAR COMPANY,
Beverly, Mass. H. W. DOHERTY.

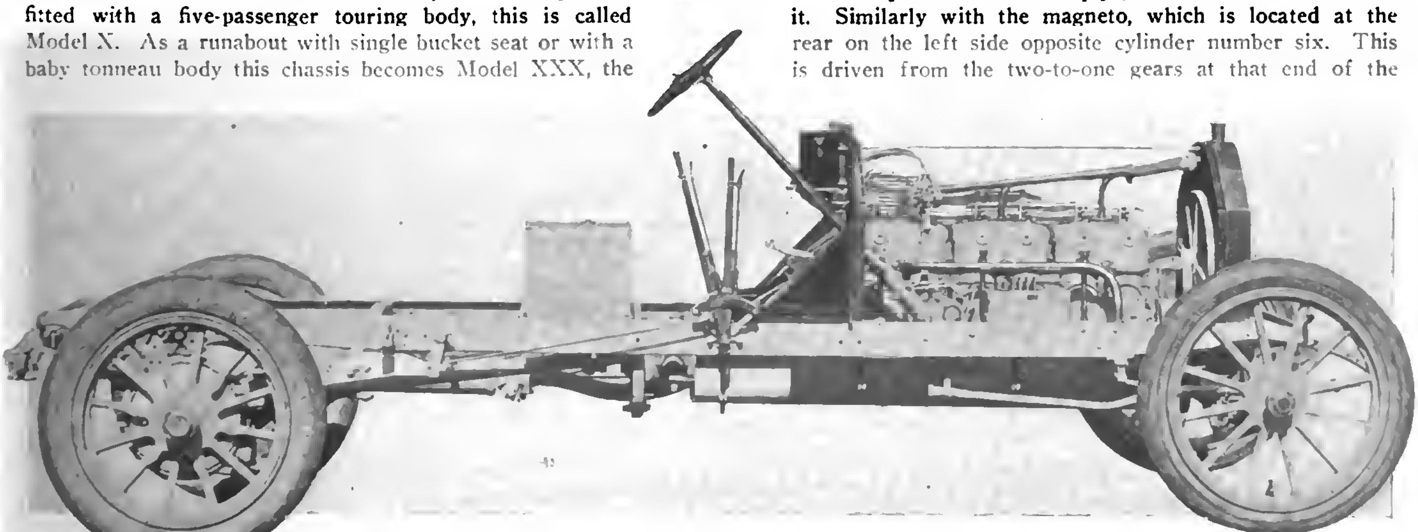


Big Six, the Stevens-Duryea Leader for 1910, a Forty-Horsepower Seven-Passenger Touring Car

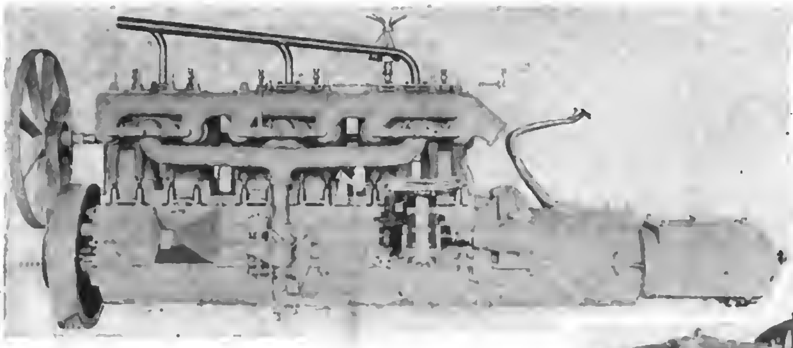
OF long standing, but up to date, is the complicated and somewhat paradoxical phrase which describes the cars of the Stevens-Duryea Company, Chicopee Falls, Mass. Since 1905 this concern has been the steady and aggressive exponent of the six-cylinder engine for large powers, and the output for the coming year will contain an excellent example of this form of construction. In addition to this, the New England concern has advocated the unit power plant with three-point suspension ever since 1904, and the cars for the season of 1910 will all contain a power plant constructed along these lines. Such was the clarity of the original ideas in both that no changes have been made from that time to this, and as the present product shows, the construction has not been altered from the first car built.

Next season's leader will be the old standby, Big Six, a six-cylinder forty-horsepower car called Model Y, with cylinders of 4¾-inch bore and 4½-inch stroke. As a standard equipment this will have a roomy seven-passenger touring body. Then there will be two "fours," differing mainly in the bodies and the little changes that go with the different bodies. The motor is 4¾-inch bore and 4½-inch stroke, rated at twenty-four horsepower. When fitted with a five-passenger touring body, this is called Model X. As a runabout with single bucket seat or with a baby tonneau body this chassis becomes Model XXX, the power unit of Models X and XXX being identical. The former, however, has a 124-inch wheelbase and will take limousine or landaulet body interchangeably with the touring body. Model XXX, on the other hand, has a shorter wheelbase, 109 inches, and so will not take the enclosed type of body. Moreover, in keeping with the idea of a light, fast car, the springing has been altered, the rear springs on the X being platform, with 48-inch side members and 35-inch cross spring. On the XXX model this is changed to semi-elliptic, 56 inches long.

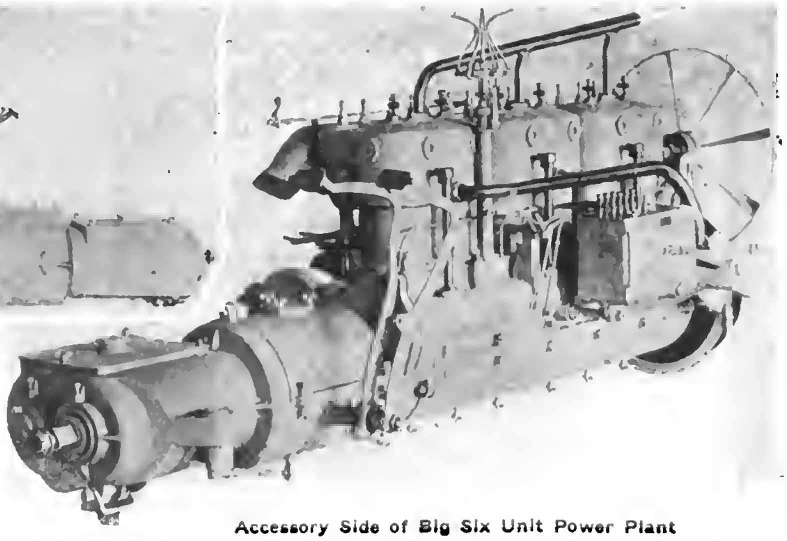
Big Six Power Unit—Model Y is powered with a six-cylinder engine of 4¾-inch bore by 4½-inch stroke, rated at forty horsepower. The cylinders are cast in pairs, with integral water jackets and valves located all on the left side. The construction is so planned that nearly every part ordinarily removed may be taken off without disturbing the others. Thus, the exhaust pipe rises above the exhaust ports and passes across the upper part of the cylinder, while the inlet pipe drops down below the line of the openings, in this way making each pipe removable without disturbing the other. The carbureter is made integral with the lower part of the intake pipe, and can be removed with it. Similarly with the magneto, which is located at the rear on the left side opposite cylinder number six. This is driven from the two-to-one gears at that end of the



Appearance of Model Y, Six-Cylinder Chassis, when the Body Is Removed



Inlet and Ignition Side of Six-Cylinder Engine



Accessory Side of Big Six Unit Power Plant

engine through the medium of a small universal joint, which relieves all strain upon the armature shaft, while at the same time allowing the removal of the magneto complete without disturbing anything else. To take off this important accessory it is necessary to loosen but one bolt, the one holding the flexible strap, when the magneto may be pulled forward and up. This rear position of the magneto is claimed to be of special merit, for it is removed from all mud, dirt and water so prevalent at the front end of the chassis.

In the driving gears just spoken of, silence is obtained by the use of fiber for the gear faces, this also doing away with the necessity for lubricating the gears. Camshaft bearings are held in place and adjusted by means of a series of set screws projecting above the surface of the crankcase. These allow of adjusting the bearings or changing the position of the shaft without taking it out. The latter operation is also facilitated by this means, since to take the camshaft out it is only necessary to loosen these screws, two in number, and draw the shaft out.

Cylinders are of special gray iron, ground to size, after a preliminary machining operation. In grinding, water is circulated through the cylinder, wiping out the heat of the grinding wheel and in this way permitting the highest possible rotative speed, which is attended with the best results.

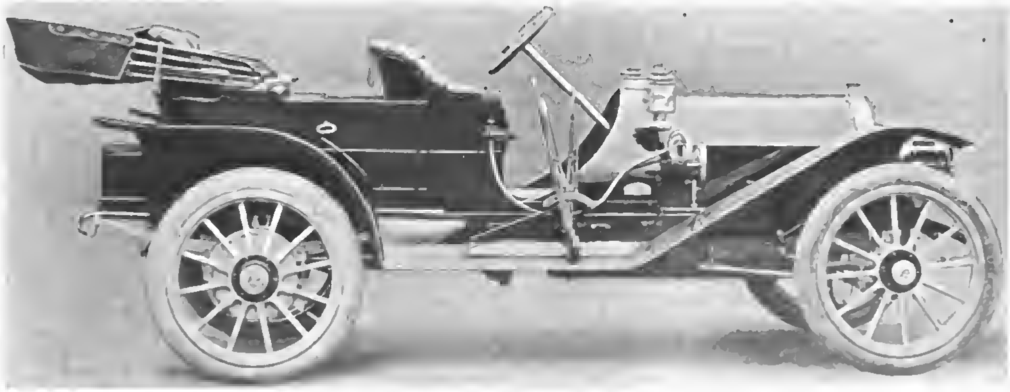
Accessories Located on the Right Side—Opposite to the camshaft side, with the carbureter, is the rest of the accessories, located together on the right side of the motor. These include the oiler, pump, timer and the fan drive, which is, however, located at the front. The oiler is carried from the side of the crankcase by a pair of bolts which pass through the base of the oiler. At the front end a cross-shaft drives the pump and oiler. The pump is of the centrifugal type, and the forward position is a change from the old location, which was in a vertical plane alongside the crankcase. Now it is in a vertical plane, but forward, opposite cylinder number one. The pipe is graduated in size from the pump back to the rear cylinder-block, changing diameter at every point. So, too, with the outlet pipe on top of the cylinders; this is of a gradually increasing section, while at the same time it gradually rises to the radiator inlet, so that there are no sharp bends, usually so disastrous, in the water circulating system.

A timer with six contacts is located between the second cylinder casting and the third. This is placed on top of a vertical shaft which is driven from the camshaft on the opposite side of the engine by means of bevel gears. The forwardly located fan is mounted upon a forged arm attached to the motor base, and rotates on ball bearings. It is driven from the crankshaft extension by means of a flat belt.

From the oiler, just described, the oil is forced to the main bearings, where, after lubricating, it flows to the lower part of the case. There it forms the source of supply of a splash lubricating system, which caters to the piston, connecting rod and cylinder walls. To drain the oil, pet cocks are provided, and to fill the case when emptied the breather pipes—three in number, seen in the view of this side of the engine—are used.

An important feature of the engine, not apparent from any of the views, is that of accessibility of the pistons, which may be removed from the cylinders bodily by removing the lower half of the crankcase, the bearings being attached to the upper half. These bearings are four in number, of babbitt.

Chrome Nickel Steel the Transmission Material—The transmission affords three speeds and a reverse, sliding gears being the medium. These are operated on a quadrant, which shows the Stevens-Duryea individuality. The shifting lever carries a pin which projects through one of the side bars of the quadrant. The slot in the bar is cut with two levels, a low and a high, the lower notch being in two parts, the forward and the rear part. The higher slot unites the other two. At the ends of the notches there are enlargements into which the pin drops so as to preserve the position. In the middle of the upper part, which provides for the low and second speeds, is placed the notch for neutral. This makes the shifting progressive from the low to second to high, and from neutral to low to reverse.



Model XXX, Four-Cylinder, Looks Right with Baby Tonneau Body

Chrome nickel steel is the material of the gears and the shafts also, both being cut from the solid. Aluminum is the crankcase material, the barrel shape being adhered to for strength. The top of the case is closed by means of a flat cover, in the center of which is a filling cap. This serves to fill the case with lubricant, without the bother of taking off the cover.

Between the transmission and the engine is placed the clutch, which is of the multiple disc variety. This is the same clutch as was developed by this company in 1904, consisting of a number of steel discs, half of them being faced with an almost indestructible lining. This is an asbestos material, composed of woven wire and asbestos fiber, the idea of its use being the increase in the coefficient of friction with steel and such a fiber over that of steel on steel. This is one of the few clutches running successfully without a lubricant; that is, it is what is known technically as a dry clutch.

It is mounted in the second compartment of the unit case, which may be considered to have three compartments—first, the engine base, or crankcase; second, the clutch; third, the transmission part. These, being constructed as a unit, allow the use of a joint between the clutch and transmission, the desirability of which is granted, but which is prevented in the ordinary construction. This joint consists of a squared end on both the clutch shaft and the main shaft of the transmission, over which is fitted a sleeve with a square hole broached in it.

Numerous Universal Joints Are Used—Not only is a joint used between the clutch and transmission, but two are used in the propeller shaft, one at the forward end and the other at the rear axle. All of the joints are self-lubricating, since they carry a grease cup, or rather a series of grease cups.

The rear bridge is of very simple construction, leaning as it does toward single and complete units. Thus the propeller shaft is square at the forward end for the universal joint, and the rear end has the driving bevel cut integral with it. This shaft is very short and can be removed bodily from the case with very little work.

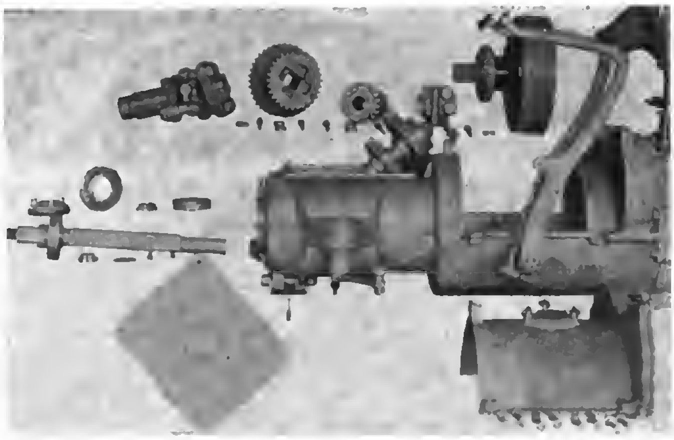
New Steering Connection

Carried on the large driven bevel is the differential, which has a unique cover arrangement, designed for accessibility. The differential case is made with a series of slots or dovetails in its circumference, into which the slots in the cover fit closely, the holding bolts pulling the cover up tight. These holding bolts are, however, separate and distinct from the bolts which retain the differential in the gear, so that the cover may be removed bodily or slid off enough to allow inspection of the interior without disturbing the large bevel or differential.

The axle is of the full floating type, the axle proper consisting of a pair of round shafts with squared inner ends and flanged outer ends. The latter are cut with six slots, which fit over a similar number of identical places in the outer end of the wheel hubs. By removing the hub cap these may be drawn out without using force, and while the car is either standing still or running. Different from the ordinary rear axle is the differential unit construction, this being mounted as a separate unit on special ball bearings arranged to take thrust as well. The bearings should never need adjusting, but if they do it is a simple matter to rotate the two collars provided for that purpose, and the adjustment is made. Differential case, bearings and all may be removed by taking off the upper half of the case and withdrawing the axles enough to allow lifting the unit up. The rear wheels revolve on the stationary axle housing, and are equipped with annular ball bearings at both inner and outer ends of the hub.

Distinctive Steering Gear Construction—Steering is accomplished through the medium of a gear of the worm and sector type, a distinctive feature being the forging of the gear integral with the shaft of the steering post. Another of equal merit is the attachment of the sector to the steering arm by means of a taper square, which never wears out or becomes loose. Adjustment is made through a hardened eccentric bushing.

Platform spring suspension is used on the rear end, the correcting shackles being so designed as to overcome the side roll



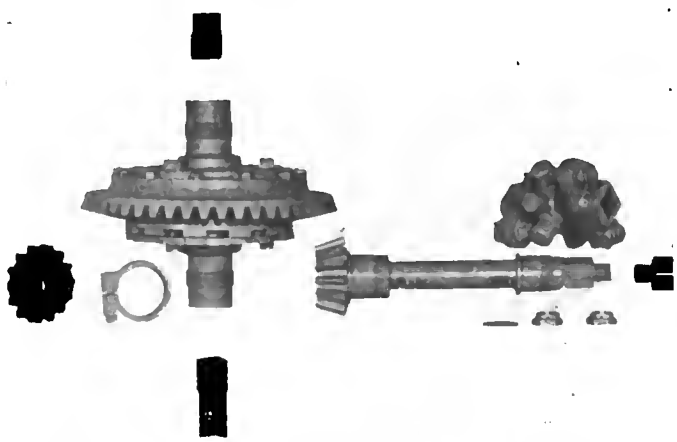
As the Transmission and Clutch Look Dissembled

on curves. Both springs are of special design, which dispenses with the usual binding bolt in the center, a common source of weakness. The forward ends of the springs are attached directly to the frame, but do not take any of the torsional effort of the drive, a torsion rod of large diameter being fitted for this purpose. It is attached to the cross member, which carries the rear pivot of the three-point suspensions by means of a ball joint connection, making a very flexible arrangement. The spring material is special, designed to have the greatest possible elastic limit and strength under compression, while at the same time retaining its flexibility, which makes riding such a pleasure.

The price of the six-cylinder car, Model Y, is $4,000; with top, $150 extra, and tire irons, $25 extra. Models X and XXX both sell for $2,900, but the runabout body is $50 less. For the baby tonneau the top with slip cover is $135, while top for the runabout is but $100 extra.

EJECTOR MUFFLERS ARE VERY PROMISING

In this type of muffler it is the aim to utilize the energy that remains in the exhaust to create a vacuum and aid in the process of cleaning out the exhaust ports of the motor, as well as eliminating noise. Increasing power is one of the advantages sought, and there is no reason why this should be attended by additional noise. The principle involved requires that the flow of gas be directed through a nozzle in such a way that a vacuum will be created in a chamber concentric with and surrounding the muffler chamber proper, the vacuum is due to increasing speed resulting from the use of the nozzle, and the vacuum is filled by gas shunted from the stream that supplies the nozzle, which stream is "baffled" to some extent in its passage. In this way the energy in the gas is expended and the lowering pressure is attended by a reduction in noise: power of the motor increases due to the elimination of back-pressure, and to some extent by virtue of the vacuum.



Stevens-Duryea Differential Case and Universal Joint

STARTING with the startling statement, "The best car in the world has been made better," the announcement of the Winton Motor Carriage Company, Cleveland, O., proceeds to give the details of the car which will be found changed from now on, the 1909 output having been disposed of, so that the factory is now working on the 1910 cars. These include, as mentioned briefly in THE AUTOMOBILE's advance notice, page 72, July 8, a larger clutch, an improved carbureter, a new front axle, longer wheel base and springs, as well as a number of minor and less important changes.

The engine remains unchanged, with six 4 1-2 by 5 inch cylinders, rated at 48.6 horsepower. The cylinders, cast in pairs, with water jacket completely surrounding each individual cylinder, are made of tough, close-grained iron; ground to mirror smoothness, assuring long life, freedom from wear and positive compression. Cylinders are submitted to hydraulic test of 300 pounds per square inch before use.

Offset Feature Retained After Severe Test—Cylinders are offset from the crankshaft, securing from the motor its maximum power efficiency, reducing and equalizing side thrust against cylinder walls, and eliminating the "knock" which always tends toward loosening of parts and premature decay of the motor.

Long connecting rods reduce angularity of operation and long pistons avoid "cocking," decrease wear and friction in cylinders. three snug-fitting, eccentric piston rings on each piston assure good compression and power at all times. All pistons, rings, connecting rods and wrist pins of same weight per set, giving perfect balance. Interchangeable, mechanically operated, two-piece adjustable valves of liberal size, all on one side of the motor, avoiding the use of two camshafts.

The nickel steel used in the valves offers high resistance against the oxidizing and warping effect of hot gases. Due to the valve motion, there is no temporary sluggishness in Winton motors. The profile of the cams is such that it gives a flow of gas proportionate to piston speed.

The crankshaft is made of specially treated nickel steel, having a tensile strength of 125,000 pounds to the square inch. There are four large bearings, bushed with Parsons' white brass. Bearing surfaces are ground. An aluminum crankcase is equipped with three 5 by 8-inch hand-holes to permit instant inspection. The case is divided into right and left halves to provide for ready removal of crankshaft, connecting rods and piston, without disturbing cylinders or motor accessories.

Self-Starter Again Featured—Now that so much talk is going the rounds about starters and starting devices, it is not strange that the starting arrangement which has been so successful on the Winton cars for the past two years is retained and featured. The arrangement of this is as follows: Tubes running from the first and sixth cylinders carry part of the combustion pressure to a storage tank under the body. Here it is stored until required for starting purposes. The driver then opens a push valve on the dash, and the compressed air rushes through a rotary distributor valve to the two cylinders just over dead center. This pressure pushes down these pistons and, on the occurrence of a spark, the motor starts. The entire mechanism has only one moving part—the distributor valve. An attachment on the self-starting equipment permits tires to be inflated without the use of pump.

Assembled on the dash are: (1) the gage, which shows the amount of pressure stored in the tank; (2) the push button, which allows pressure to flow from the tank to the cylinders, and (3) a shut-off valve, for use when the car is to remain long idle, preventing escape of pressure from the storage tank.

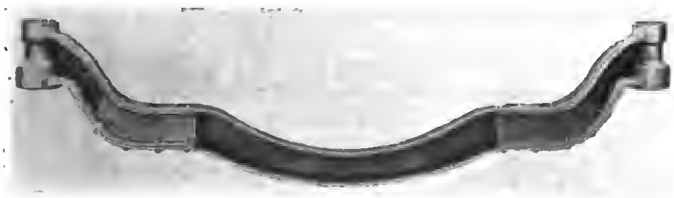
Water circulation is secured by a gear-driven, centrifugal pump, having throw of unusual power. The water is filtered before it passes through pump, making it impossible for water to clog in the radiator or to cease circulation even though pump should become deranged; in that event, water passes through the pump chamber and the circulating system on the thermo-syphon principle. The new design vertical tube radiator is of extra large size, made of copper tubes, with fins. Tubes are lengthened 1 inch. Radiator filler lengthened 1 inch, and has notched hard-rubber cap. Radiator fan is gear driven through friction clutch, securing proper suction of air without possibility of accident to fan or adjacent parts.

Lubrication is force feed, the same as in 1909, and ignition is by Eisemann magneto, with storage battery to supply auxiliary current for starting. The carbureter represents the result of Mr. Winton's long experience in carbureter work. It is of the single-nozzle type, without auxiliary air inlet, and is equipped with two throttles, which work in combination. The carbureter assures economy of fuel and satisfactory operation at all speeds, and obviates the difficulties often encountered at slow motor speed. No automatic air valve. Carbureter is placed on the opposite side of the engine from valves. It is throttled mechanically by lever from steering column or foot button at driver's right foot. Carbureter primer is on the dash.

An oil pump operated by an eccentric on the rear end of the crankshaft takes oil from the oil tank at the left side of motor and delivers it through leaders to the crankshaft main bearings and the front gears. A second pump, operated by the same eccentric, draws oil from the crank case (where it is deposited by gravity), and returns it to the oil tank, whence it passes through a strainer before being used again. No large volume of oil in crank case to drip into pan. Flow of oil is proportionate to motor speed. By-pass regulates quantity. The cylinders are fed by splash. Transmission gears and clutch run in oil and are constantly bathed in lubricant. Oil grooves in cylinders and pistons distribute the oil around their entire surfaces.

Next in Importance Is the Transmission—Probably the details of the gear box will excite more attention than any other one part because of the changes made in it. It is of the selective type, sliding gear transmission, supported on annular ball bearings. There are four forward speeds and reverse. Direct drive is on the third speed, through internal and external gear combination. Lockout on fourth speed. The selective system permits any gear change without passing through any intermediate gears. The gears are of special alloy steel, hardened, and ground to perfect fit. Selective and interlocking mechanism is entirely enclosed in the transmission case, assuring freedom from dirt and allowing proper lubrication. The selective mechanism makes it possible to enter neutral position, but impossible to engage any new set of gears while clutch is engaged.

And the clutch, too, will arouse much interest since it has been enlarged, the number of springs changed and a few minor changes made in it. The multiple disc clutch is tested to hold 90 horsepower at 1,000 revolutions per minute. Of its 67 steel friction surfaces, 33 are attached to the transmission shaft and 34 to the driving spiders, which are connected to the fly wheel, thus observing the mechanical principle that the parts having the least inertia be attached to that part of the mechanism having a variable velocity; as, for instance, when gears are shifted. The clutch discs are 50 per cent. larger in diameter.

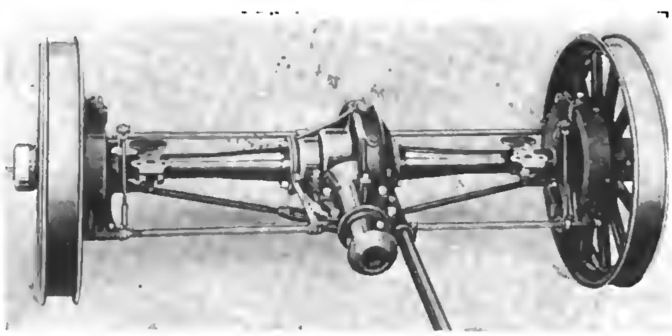


The New Front Axle Is Of Pressed Steel

The discs revolve constantly in an oil bath. This eliminates wear and allows the transmission of the power of the motor to the driving wheels so gradually (owing to its many members, with film of oil between), that shocks to the transmission are unknown. There is no gripping even when starting the car on the third speed. The clutch is carried on annular ball bearings. There is no end thrust on bearings when clutch is engaged. No special lever is necessary to separate the discs when clutch is disengaged. Clutch is contained in the transmission case and is immediately accessible through hand-hole. Four springs, placed at equal distances around the clutch, distribute the tension equally on the discs. Springs are readily removed and replaced. Clutch pedal cannot be locked with the clutch out of engagement, this being a precautionary measure, necessitating neutralizing of gears when car is stopped. Clutch and hand brake are interconnected. The entire clutch mechanism is extremely compact, and the operation of the clutch requires little foot pressure.

Frame Is Narrowed at the Front End Now—Among the incidental improvements is an inswept frame, which permits the car to be turned in short radius. This is all the more desirable now, inasmuch as the wheel base has been lengthened to 124 inches as against 120 inches last year. The additional space thus provided in the body affords the passengers more than ordinary foot room, both in front and back. The body is wider than before, and has a low, rakish look. The low effect has been gained by the use of semi-elliptical springs without scroll. The new car carries four shock absorbers and four rubber bumpers.

The side rails and drop members are of one-piece, channel-section, pressed steel, strengthened at their intersections with heavy gussets of particularly effective design. Motor, clutch and transmission are carried on drop frames. There is no sub-frame.



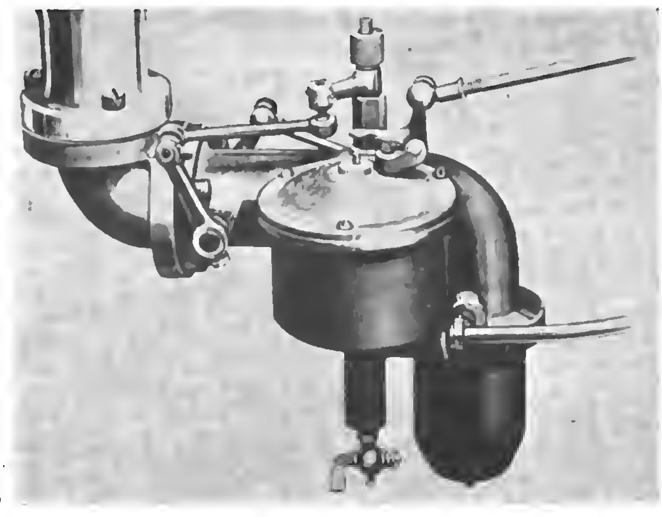
Winton's Rear Axle Construction For 1910

Rear axle is of the full floating type, the axle proper carries no load, but merely transmits the power from pinion shaft to driving wheels, the weight of the car being carried on a heavy drawn steel tube which surrounds the axle. Consequently, it is possible for the axle shafts, differential gears and differential bearings to be removed from the car without the use of jack or pit, car remaining supported by the wheels. Special Timken roller bearings are used throughout. Drop-forging is the process which produces the nickel steel gears and pinions.

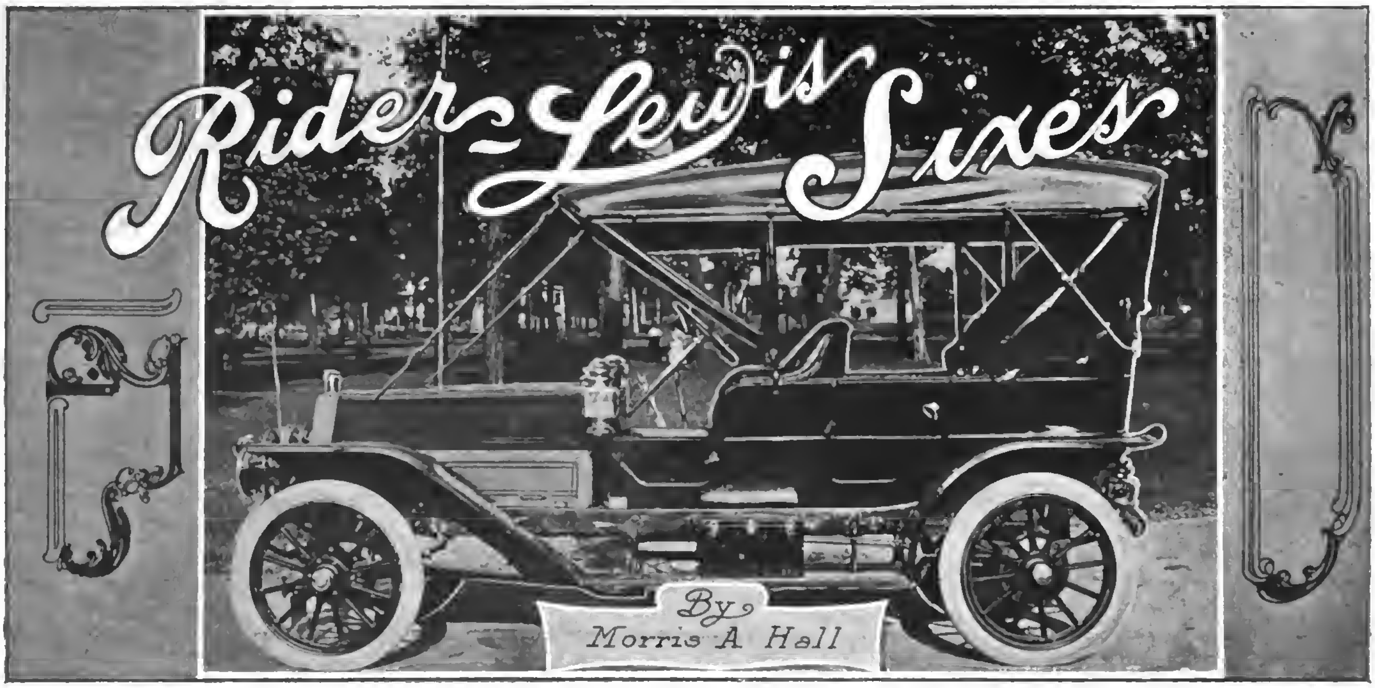
Front Axle Shows a Decided Change—The new car is characterized by a front axle of channel section pressed steel, of a new design, which promises great strength and stability. The central portion (there are three parts to the axle) forms the dropped bed, while the end portions carry the bearings.

At the purchaser's option the car will be fitted with long or short pedals for clutch and brake, and when desired the gear-change and brake levers will be placed nearer the seat than on standard equipment. The radiator is of handsomer design than before, and in making this change the radiator tubes were slightly lengthened, as was also the filler. The filler cap is of hard rubber. Solid brake spiders and increased brake leverage are new features. The oil tank has been enlarged, as has also the front universal joint, which is equipped with a lubricant retainer. There are oil cups on the springs. Running boards and guards are wider than before. Rear guards drop over the wheels. Running boards and front floor are covered with pressed aluminum.

The price remains unchanged at $3,000 for the 48 horsepower Winton Six when equipped with either touring car, runabout or toy tonneau body. When equipped with limousine body the price is $4,250, and with landaulet body, $4,500. For the third successive season the Winton Company will manufacture sixes exclusively. In addition to the 48 horsepower car, there will be a 60 horsepower Winton Six at $4,250, specifications to be announced later. The output of this larger model will be limited.

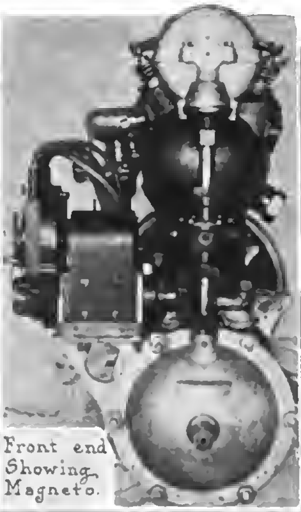


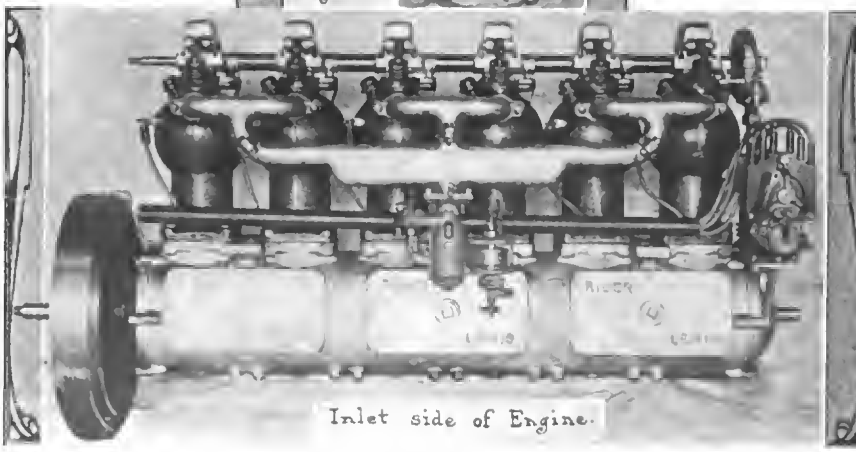
There Is A Double Throttle On The Carbureter



NOW that the question of "sixes" versus "fours" has been settled to the satisfaction of all concerned, it will not be necessary to go into constant torque, regular firing, and all those points upon which the advocates of the "six" delight to enlarge. Suffice, then, to say that the Rider-Lewis Motor Car Company, of Anderson, Ind., in pinning its faith to the six-cylinder motor, is making no mistake. Housed in a large, new and very modern factory, with abundant floor space, contented workmen, and an efficient engineering corps, the company will now proceed to devote all of its energy to turning out a small number of machines, as nearly perfect as human skill can make them.

Motor Shows Individuality—In the engine, probably the most important part, a difference from the ordinary run of cars is noticed at once. This has a number of features not found on any other engine. Thus, the valves are located in the heads, in removable cages. A construction like this allows of the ready removal of the valves for inspection or grinding, and without disturbing any other part. The cylinders of four-inch bore and the same stroke are cast individually. The upper part is given a globular shape to correspond to the spherical combustion chamber, the size being such as to allow of the cooling water being freely circulated around the valve cages. The valves are operated by means of rocker arms, which in turn are actuated from an aluminum-enclosed, overhead camshaft. This is driven from a vertical shaft at the front end of the motor, with a bevel drive from the crankshaft and driving the overhead shaft in a similar manner. Pistons are fitted with four rings, three at the top and one about the middle of the piston, the latter being used to retain the piston pin from lateral movement.


Front end Showing Magneto.


Inlet side of Engine.

By means of four large-sized bolts, the cylinders are fixed to the upper surface of the aluminum crankcase. This is in one piece of the now popular barrel type, the crankshaft being entered from the ends, which are closed by means of a pair of circular plates. White brass bearings are used in these plates and in the crankcase bearings, five in number, making seven in all. In the connecting rod and camshaft bearings, phosphor bronze is used.

Aluminum Used Freely—The inlet pipe is of cast aluminum, in three pieces, bolted together and to the cylinders. The carbureter is located midway of that side of the engine, and rather high up as carbureter location goes. The exhaust pipe, on the other hand, consists of six separate pipes, set slightly out of a vertical, brazed to a horizontal header. The latter is of unusually large diameter, in order to eliminate all back pressure. Water is piped to and from the cylinders in a manner differing from both the inlet and exhaust piping. Into each cylinder, at the rear, top, central part and the left, under side of the hemispherical cylinder dome is screwed a fitting. To this is screwed a union. The inlet and outlet pipes, *per se*, are castings of a tapered section, threaded at the seven extremities. To connect the castings with the cylinders, a short bent pipe of brass with a union connection at each end is used.

Ignition is single. high tension being used. with a Bosch magneto as the source of current. This is located in front and is set across the engine, being driven from the vertical shaft through bevel gears. If it should be desired, double ignition can be had at practically no extra expense, because the rear extremity of the overhead camshaft is arranged to take any standard timer. The magneto position allows of very simple wiring.

Transmission and Rear Axle Form a Unit—Conforming to the practice of placing the transmission on the rear axle, even in this originality is shown. The dead weight is kept down as low as is consistent with strength by the use of an aluminum case. This, considering the differential housing as an integral part, is in three sections. The forward one is but a hand hole to allow the entrance of the gears. The central portion has the left half made separate for the same purpose, namely, the admission of the axles and differential. All three are liberally ribbed to give strength. Hand holes are provided in the forward portion for the inspection of the gearing, while the rearward part has a pair of oil holes, which are so large that one can see the gears through them.

The transmission is of the sliding type, operating on the selective principle. and furnishes three speeds. All gears are of chrome nickel steel, on chrome nickel shafts, which are mounted

Rear Axle and Transmission Unit Is Distinctive

upon roller bearings. The torque reaction is taken by a long stiff rod of circular section. This is fastened to the frame at its forward end by a ball joint.

Old and reliable describes the clutch, which is of the cone type, faced with leather. It is operated directly from the pedal shaft, one of the only two shafts crossing the chassis, by levers with rollers which press against a large collar. Although the spring is inclosed, the construction is such as to allow of easy adjustment from the outside. Directly back of this is placed the only universal joint used.

Front axles on the Rider-Lewis sixes are I-section forgings of large section, the material being steel. The pivots are of the Elliott type, and to their design much care has been given so as to insure safety at this important point.

C Type of Rear Spring Makes Riding Easy—The spring suspension is equally good, semi-elliptic being used in front, while in the rear, superior riding qualities are obtained by the use of the C type of spring. In the use of this, the lower leaf is rigidly attached to the frame after the best semi-elliptic prac-

Straight Line Touring Body on Four-Cylinder Chassis

tice. The size of the front springs is 36 by 2 inches, and of the rears, 38 by 2 inches with eight leaves. Both springs are banded. The frame is of pressed steel, to which is riveted the brace and tie members. This is dropped at the rear for a low center of gravity and narrowed in front to allow of a large steering lock. Steering is effected by an irreversible gear of the screw and nut variety. This has a horizontal fore and aft connection to the cross steering rod, placed in front of the axle.

Two markedly different bodies are fitted, the full touring shown in the heading of this article being known as Type VIII. For the runabout body, the construction is altered somewhat to provide more rake in the steering post. This and other minor changes make it somewhat different from the touring car, so a different model number is given it, Type IX. The price, however, is the same for both, $2,500.

And a Good-Looking Little Car, Too—In addition to the full line of sixes, an excellent little car, to sell at a popular price, has recently been added to the factory output. This has a four-cylinder engine of 4-inch bore and 4½-inch stroke, rated at 30 horsepower. In this, however, the four cylinders are cast in a block. The crankshaft has but three bearings. Cooling is by thermosyphon, and oiling is self-contained. This car is built to be of an unusually light weight, the weight ready for the road being less than 1,800 pounds. As this gives a very low ratio of weight to power, less than 60 pounds, the car is very powerful either on hills or speeding. The light weight is obtained in part by the elimination of needless parts, thus there is but one cross member in the frame.

One big feature of this little car, which is bound to make it popular is the fact that it is equipped with a three speed sliding gear transmission, which operates on the selective principle. The use of a block motor gives a very short hood, which, in turn, gives the greater part of the long wheelbase space to the body and in this way allows it to be more roomy and comfortable. The wheelbase is 100 inches and the wheel sizes 32 inches. To these are fitted 2½-inch tires, large enough for the light weight.

Selling at an even $1,000, this chassis is equipped with a touring body of the straight line type. This resembles the roadster body fitted to the six-cylinder chassis, except for the tonneau in place of the bucket seat of the latter.

Modern Factory of Rider-Lewis Motor Car Company at Anderson, Ind., as It Appeared Just Before Completion

HOUPT CAR MAKES ITS METROPOLITAN DEBUT

THE first of the new Houpt cars returned to the factory at Bristol, Conn., after an 800-mile test trip with Montague Roberts at the wheel, and the makers are well satisfied with its performance. For the last month the car has been traveling over some of the roughest roads in New England, New York and Pennsylvania, yet Roberts declares that he did not once open his tool kit after leaving the factory. This car is of the four-cylinder, 60-horsepower type; the six-cylinder model also planned by the Houpt Company will not make its appearance for another month yet. However, the Houpt Company promises to have at least three of the four-cylinder cars in New York by August 1, and will enter a team for the coming 24-hour race at Brighton Beach. One of the entries will be driven by George Robertson, last year's Vanderbilt winner.

Montague Roberts at the Wheel of the New 60-Horsepower Houpt

The Houpt car is thought to be the largest four-cyclinder stock car made in this country; its cylinders are 5 1-2 inches bore by 6 inches stroke, rated at 60 horsepower. The cylinders are cast in pairs, and the valves, 2 5-8 inches in diameter, are placed on opposite sides. In general the motor follows standard design. In the tests at Bristol, the motor showed exceptional power and quick acceleration, combined with practically noiseless operation. The carbureter is float-feed, the gasoline being under pressure in a tank slung from the rear of the frame. The water-cooling system employs a centrifugal pump with both radiator and flywheel fans. The ignition is double, with a single set of spark plugs in the cylinder heads.

Power is transmitted through a multiple-disc clutch containing 53 steel-on-steel discs, and the change-gear is of the selective type, giving four speeds and reverse. Drive is by a nickel-steel cardan shaft to a full floating type of live rear axle, with bevel differential. The frame, also of nickel steel, is dropped forward of the rear axle and rests on semi-elliptic springs both front and rear. The motor suspension is four-point and that of the gear case three-point. Brakes are internal expanding on the rear hubs and external contracting behind the gear case. The wheelbase of the four-cylinder car is 127 inches; wheels are 36 inches, with 4-inch tires in front and 5-inch in rear. The car weighs 3,100 pounds. In the illustration the car is shown fitted with a testing body; purchasers. however, will have the choice of seven different styles.

The six-cylinder model now under way will have cylinders of the same size as the four—that is, 5 1-2 by 6 inches; and its power will be conservatively expressed by the maker's rating of 90 horsepower. Its specifications are identical with those of the four except as to dimensions. The wheelbase will be 140 inches and the weight 3,900 pounds. In addition to the Houpt cars, the Houpt Company in New York City will continue to act as distributor of the Herreshoff, as the two lines in no way conflict with each other.

Although the design of the Houpt is in direct opposition to the present tendency toward smaller cylinder sizes, its makers believe that there are plenty of automobilists in the metropolitan district who will welcome a car of racing proportions.

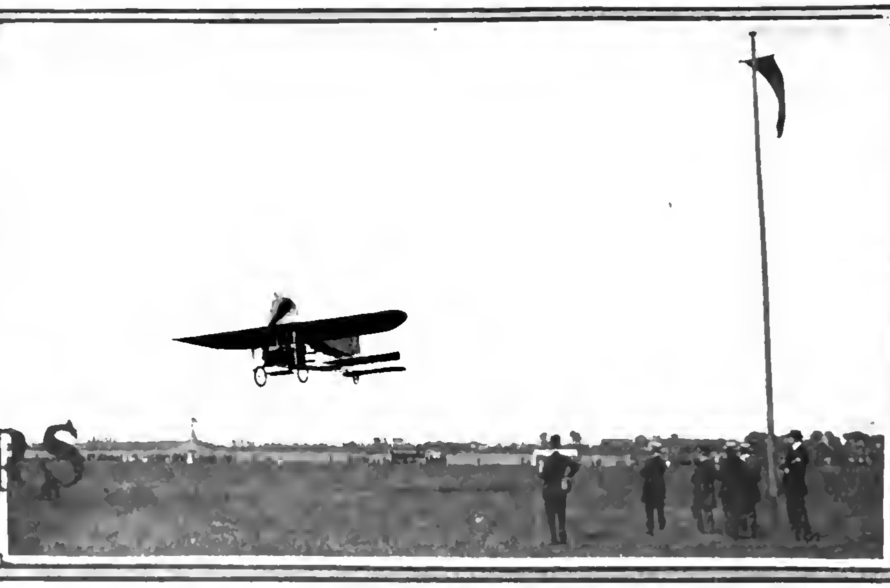
DETAILS OF THE 1910 FRANKLIN MOTOR

The new Franklin motor, like all its predecessors, is air-cooled, but the method of applying the current of cooling air is radically different and completely changes its exterior appearance. Encircling the motor on the level of the chassis frame is a sheet-metal deck with funnel-like casings which encircle each cylinder and tightly embrace their vertical cooling fins. Underneath the motor is the usual mud-pan, but this, in connection with the upper sheet-metal deck, forms an air compartment whose only openings are those of the cylinder funnels. At the rear of the compartment is the flywheel, containing a powerful suction fan which draws a current of air through the funnels. By this system the air currents arc downward, striking first the hottest parts—the tops of the cylinders and the valves—then passing along the cylinders and out through the flywheel. The familiar Franklin features of the auxiliary exhaust, the concentric inlet and exhaust valves and the dome-headed cylinder, are still retained. The usual fan in front of the motor is dispensed with, and this, together with the smooth funnels encircling the cylinders, gives a very simple and neat appearance.

ABOUT PRESSURE FEED GASOLINE TANKS

Considering the difficulty involved in connection with gravity feed fuel tanks, if they are of considerable depth—thus requiring that account be taken of the resultant changing pressure due to the difference in "head"—the usual practice, in the process of avoiding such changes in pressure, is to use pressure from the combustion chamber of one cylinder of the motor, passing the same through a reducing valve, the function of which is to take the uneven wave of pressure from the source and level it down, as well as reducing the pressure per square inch to that agreeable to the requirements, which should not exceed the amount which will assure that the gasoline will positively flow to the carbureter, even with some jelly formation in the system. A difference of pressure equal to 30 inches of water ($0.0358 \times 30 = 1.074$ pounds per square inch) should be adequate for the purpose, even taking into account a considerable gradient of the road, and the car so designed that the gasoline would have to flow up grade one-half of the 30 inches above noted. Since a grade of fifteen inches in the ordinary 120-inch wheel base is seldom met, this is safe practice.

Latest Doings of the Air Navigators



Bleriot Making Successful Flight at Juvisy, In Which He Came Dangerously Near Breaking Monoplane Record

PARIS, July 13—Louis Bleriot, the French monoplane champion, narrowly missed establishing a world's record Sunday July 4, during a magnificent flight with his No. XI, at Juvisy, near Paris. He remained in the air for 50 minutes 8 seconds, being forced to descend because he was blinded with the splashing of oil from his engine. The longest flight ever made on a monoplane type of machine is 1 hour 7 minutes, accomplished by Hubert Latham.

The Bleriot performance was accomplished with a comparatively small machine driven by an Anzani three-cylinder, air-cooled motor of 25 horsepower. In order to assist in cooling, the engine is fitted with auxiliary exhaust ports at the end of the stroke. Whenever there is a slight excess of lubrication, the oil is forced through these holes into the face of the pilot, placed immediately behind the engine. On more than one occasion a flight has been stopped by this reason alone.

Louis Bleriot has also the intention of making a record cross-country flight of not less than 25 miles. His machine was this week taken down to Etampes in readiness for the flight, but owing to a gale of wind and rain no flight could be attempted. The apparatus was left on the spot, and will be brought out in a few days. The flight is the most ambitious one across country yet attempted, for although the country is fairly flat there are serious obstacles in lines of poplar trees rising to a height of 65 feet, the railroad and telegraph wires. Starting from near Etampes, the aeroplane will make almost directly for the town of Orleans, the descent to be made three or four miles from the city limits. The machine to be used for this flight is the monoplane No. XI, equipped with the three-cylinder Anzani motor.

LATHAM FLIES HALF ACROSS THE CHANNEL

CALAIS, FRANCE, July 19—Hubert Latham made a gallant attempt to cross the channel with his Antoinette monoplane to-day, but was forced to come down with his task but half accomplished on account of the failure of the motor. He was picked up by a torpedo boat, along with his machine, and carried back little the worse for the experience.

Latham has been at Calais for over a week, making practice flights and watching for a favorable opportunity. Yesterday a stiff breeze, which had been blowing all day, subsided at sunset, and in anticipation of an early start, Latham slept in the aeroplane shed at the edge of the cliff looking over the Channel. At the first streak of dawn all turned out. The sea was smooth and the wind, a mere breath. The authorities at Calais had been notified, and a torpedo boat detailed to follow the flight waited at the foot of the cliff. Several thousand persons had assembled when the aeroplane was wheeled from its shed and brought to the starting point. Latham made a careful inspection and tested the motor, which worked perfectly. He wore a life preserver.

When all was in readiness he mounted; the motor was started, and with a farewell cry of, "See you in Dover" he swept to the edge of the cliff, tilted the elevation plane and the machine sailed gracefully out over the water. It mounted gradually to a height of about 300 feet and continued its course steadily toward the English shore, at the rate of about thirty-five miles an hour.

Twelve miles, over half the distance, had been covered when the motor began to slow down. Latham found his attempt was hopeless and gradually sank down to the water, in a smooth, even glide, alighting with hardly a splash. The air entrapped under the curved wings kept the machine afloat. and Latham kept his seat, putting his feet up on a cross-bar, and lighted a cigarette. The torpedo boat, which had been steaming at top speed, soon caught up and he was rescued from his perilous position. On the return to Calais an enthusiastic crowd waited on the wharf to cheer him.

Latham said that he thought he was fully a thousand feet in the air when his motive power gave out, so that even though his attempt failed he can claim to have established a record for altitude. The best previous record was 450 feet, established by M. Paulham with a Wright aeroplane. The machine was but slightly damaged, most of the injuries being incidental to hauling it aboard the torpedo boat. Latham left for Paris to-night, saying that he would be back in a week or ten days to try again.

LAMBERT MAY TRY CHANNEL FLIGHT

WISSANS, FRANCE, July 19—Count de Lambert, one of Wilbur Wright's pupils, has brought two Wright aeroplanes here and is preparing to make a series of flights. It is believed that he may make an attempt to cross the Channel before Latham can get ready again. If he succeeds it will secure great prestige for the Wright machine, which has been rather overshadowed by the feats of the Antoinette monoplane type.

PAULHAM MAKES CROSS-COUNTRY FLIGHT

ARRAS, FRANCE, July 19—M. Paulham, who has been making many short flights near here with his Wright aeroplane, to-day flew across the fields from this town to Douai, covering the twenty kilometers (about twelve and a half miles) in twenty-two minutes. He attempted to return, but after going three kilometers was forced to descend by the rising wind. In the landing his rudder was broken.

ORVILLE WRIGHT MAKES SEVERAL SUCCESSFUL FLIGHTS

WASHINGTON, D. C., July 20—The Wright brothers seem to have shaken off the hoodoo that has been so much in evidence recently. The tumble July 14, when one of the skids was broken—the third accident of the present trials, by the way—was its last manifestation, and everybody at Fort Myer hopes that it has gone to stay. Contrary winds and rain storms prevented any trials on the two following days, but the brothers spent the time in altering the starting apparatus. They added about sixty pounds to the weight which gives the initial momentum, dug a pit a foot deep to give it a longer fall, and lengthened the starting rail by about 12 feet.

Saturday saw the first trial of the remodeled mechanism, and it was greatly encouraging. After one short flight the length of the field, which was stopped to avoid a collision with the balloon house, Orville Wright got away in good shape. This time he cleared the house by fifteen feet, and maintaining the inclination of his forward plane he soon soared over the spectators at a height of 100 feet. He made about sixteen circuits of the field, but did not follow any regular course. On several occasions he made wide excursions out over the wooded country behind the balloon house, and seemed to delight in sailing over the cavalry stables and over the tall chimney of the post's power house. Apparently he wishes to accustom himself to soaring over rough and broken ground, as he will have to do in the official trials. The landing was made without the least jar, and stop-watches caught the time at 16 minutes 54 seconds. His speed was estimated at 40 miles an hour.

This flight, however, was far surpassed on Monday, when the aeroplane covered about forty miles altogether. The Wrights ordered the machine from its shed about 6 P.M., after the breeze that had blown all day had died away. They worked some minutes over the motor, and then Orville took his seat and shot away. After several smooth rounds of the field at an elevation of about eighy feet, just to get the feel of it, he began to put the machine through its paces. First he swooped down close to the earth, then rose steadily to about a hundred and twenty-five feet, and made several more rounds. Then he ascended still higher, and at the same time narrowed his circles, with the rudder held steadily to port. The sun had set, but the aeroplane was still full in its rays. Finally Wilbur, who had stood watching, watch in hand, waved his hat as a signal, and Orville swept gracefully down to earth. The flight lasted 25 minutes 18 seconds.

The aeroplane was immediately carried back to the starting point, and after the motor had cooled off it was again started. Soon it was describing great circles at nearly 150 feet elevation. For a while the motor ran irregularly; the skipping of its explosions could be heard plainly. Still the flight continued. In the gathering darkness the machine was often completely lost to sight, only becoming visible as it tilted on the turns. When the planes presented only their thin edges they were completely invisible. This fact especially pleased the officers of the Signal corps, as it demonstrated a great advantage of the use of the machine for scouting and carrying dispatches. It was after eight o'clock when Orville decided to come down. He chose his landing place with great care, swooping down and then ascending several times. He finally descended within a few feet of the shed, after a flight of exactly thirty minutes.

WRIGHT MAKES NEW AMERICAN RECORD

WASHINGTON, D. C., July 21—In a spectacular flight late yesterday evening Orville Wright estalished a new American record by remaining in the air one hour 20 minutes and 45 seconds. The aeroplane made sixty or seventy circuits of the field, interspersed with several figure 8's, and at times attained a height of 300 feet. Some of the circles were so short that the flier seemed to be turning almost within its own length. The motor worked perfectly.

CURTISS AEROPLANE WRECKED BY NOVICE OPERATOR

AFTER a magnificent flight of nearly an hour, placing him easily second to Wright brothers in this country, Gleen H. Curtiss saw his aeroplane wrecked on the grounds of Mineola, L. I., last Sunday by one of the two men whom he was teaching to operate it, in accordance with his agreement with the Aeronautic Society. His pupil, Alexander Williams, lies in the hospital with a broken arm. Although Mr. Curtiss took the train for his factory at Hammondsport, N. Y., immediately after the accident to secure repair material, he will be unable to continue his flights before next week.

The aeroplane was to have been delivered to the Aeronautic Society this week. One of the conditions of its sale was that Curtiss should teach two members of the society to operate it. The two selected were Mr. Williams, who became known through his attempt to build an aeroplane of his own at Morris Park, and Charles F. Willard, a young automobile engineer who has an office at 1777 Broadway, New York. Sunday morning the two met on the grounds for their first lesson. Mr. Curtiss first made a short flight of 7 minutes 40 seconds in perfect form, rising to a height of 150 feet and describing circles and figures 8s.

After this preliminary the two pupils flipped a coin and Willard won. He mounted the seat of the aeroplane and started across the field. The machine soon rose easily into the air and sailed along steadily at an elevation of 10 to 15 feet. After covering about 500 feet Willard slowed down and touched the ground for a moment, then rising again continued for about 200 feet more. Mr. Curtiss was delighted and declared that it was better than his own first flight.

After the machine had been brought back to the starting place Williams climbed into the seat. Apparently trying to imitate Curtiss' previous flight, he at once tilted the front plane to a sharp angle and lifted the machine to a height of 40 or 50 feet. Then he turned the steering wheel full over and sent it sharply to the right. The sudden twist tilted the planes over at an angle of 45 degrees. Then Williams lost his head completely and was unable either to straighten out or to shift the balance planes to regain an even keel. After a few spasmodic movements the framework of the machine seemed to give way under the strain and the whole fabric shot down to the ground, the motor still crackling steadily.

Williams was pulled from the wreckage unconscious, but it was soon found that he had suffered only a broken arm and thumb. The machine was carried back to its tent. It was badly smashed, but the motor, fortunately, escaped uninjured.

Mr. Curtiss began his trials at Mineola July 13, making three short flights. Wednesday, July 14, he flew about five miles in seven minutes. Thursday was foggy and he made only two short flights. The next day, however, he circled the field ten times, covering about 15 miles in 22 minutes 20 seconds, and Saturday, in the presence of 3,000 spectators, he made the best flight that has been seen in America this year. It lasted 52 minutes 30 seconds, and it is estimated that he covered about 30 miles in his 19 circuits of the grounds. This flight qualified Curtiss for the Scientific American trophy, which he at present holds.

In the international aeroplane race at Rheims, France, August 28. Mr. Curtiss with his American-built machine will match his skill against the leading aviators of Europe.

MASSACHUSETTS LAW DOES NOT SUPERSEDE TRAFFIC RULES

BOSTON, July 16—In the first test that has been made of the rights of automobilists under the new automobile law that went into effect July 1, the court to-day decided against the motorist. One of the questions that arose immediately after the law became effective was whether it repealed the Boston street traffic regulations so far as they relate to motor vehicles. These regulations contain various restrictions as to vehicles in general: that they shall go only one way in certain streets, that they shall stop only in certain places and for a limited period of time, that they must keep to the right, etc.

Section 17 of the automobile law provides that "No ordinance, by-law or regulation now in force in any city or town or in any park or upon its ways which regulates the speed at which motor vehicles shall be run upon its ways or which excludes such vehicles therefrom or which governs or restricts the use of such vehicles shall hereafter have any force or effect." Believing, he claims, that this part of the law annulled the street traffic regulations Samuel D. Fisher, of Cambridge, attempted to drive in the wrong direction in State street, was arrested, and his case came up to-day in the municipal court before Judge Parmenter.

In the trial, counsel for the defendant contended that there was no rule in effect, as the traffic rule had been annulled by the automobile law. Counsel for the city held that it was the intent of the Legislature in the section in question to do away only with regulations relating to automobiles, and that the traffic rules, which govern the use of the streets by all vehicles, are not within the classification referred to in the automobile law. In announcing his decision Judge Parmenter said: "It seems to me that the best interpretation of this statute is that it repeals only such special regulations as relate to the use of automobiles and does not repeal general traffic regulations." The case will be carried to the upper court.

The new Boston park auto rules have been approved by the Highway Commission. They exclude autos from some park roads and state what roadways shall be used in certain parts of the park system, but contain no speed limits.

THIRTY-ONE STATES NOW IN A. A. A.

While the A. A. A. officials and directors were in Detroit a week ago to witness the start of the Glidden Tour its membership was increased at the monthly meeting of the executive committee by the election of the Wyoming State Automobile Association, making the thirty-first affiliated state body in the National organization. President Lewis R. Speare, of Boston; Secretary Frederick H. Elliott and several other officials returned last week and expressed themselves as highly gratified at the enthusiasm displayed in the A. A. A.'s good roads movement, including the plans for the coming convention in Cleveland and the National Stock Car races to be held in Lowell, Mass., on Labor Day. At the meeting of the executive committee the membership of the good roads board was increased by the election of James R. Jackson, of Grand Rapids, Mich., and Col. W. D. Sohier, of the Mass. State highway commission.

President Lewis R. Speare, of Boston, presided at the meeting, there being in attendance Third Vice-President Frank M. Joyce, of Minneapolis, Minn.; George C. Diehl, of Buffalo, chairman of Good Roads Board; W. W. Brown, president of Automobile Club of Vermont; C. L. Bonifield, president of Automobile Club of Cincinnati; J. O. Heinze, president of Lowell (Mass.) Automobile Club; Percy F. Black, president of Montgomery (Ala.) Automobile Association; Edwin S. George, ex-president Michigan State Automobile Association; A. G. Batchelder, of New York, and Frederick H. Elliott, of New York, secretary.

MILWAUKEE CONTEMPLATES AN ORDINANCE

MILWAUKEE, WIS., July 19—The Common Council of this city is working on an ordinance designed to supplement the State laws regulating automobiles. One of the regulations proposed is that cars come to a full stop when a street car ahead stops to receive or discharge passengers, and another is to establish a speed limit of eight miles an hour in the downtown district. Members of the Milwaukee Automobile Club will watch developments carefully, as there are a number of Councilmen who have no love for automobiles.

WISCONSINITES SLOW IN RE-REGISTERING

MADISON, WIS., July 19—The Wisconsin Secretary of State reports that only a small percentage of owners have complied with the new registration law increasing the fee to $2 at this time. However, penalties will not be exacted until 90 days after the publication of the law, June 19.

REGISTRATIONS INCREASING IN OHIO

COLUMBUS, O., July 17—By the report of the State registrar of automobiles, Fred H. Caley, the receipts of the department for the month ending June 15 amounted to $21,129. The total receipts since the State automobile law became operative have been $120,-101.23. During the month, new registrations issued numbered 1,775 and manufacturers and dealers to the number of 25 were registered. Chauffeurs' licenses issued numbered 65. Renewals of registration numbered 2,175 and renewals of dealers and manufacturers numbered 48.

State Registrar Fred H. Caley has announced that the system in vogue in Pennsylvania of distributing numbers will be followed in Ohio next year. The system provides that numbers will be distributed in the order of the receipt of the application and no attention will be paid to requests for freak numbers, numbers corresponding to the date of birth, marriage, etc. But an exception is made that all applications received previous to December 1 will have the privilege of reserving the present year's number for 1910.

NEW NUTMEG LAW UP TO GOVERNOR

HARTFORD, CONN., July 19—As yet the protests of the circular letter issued by the Connecticut Automobile Association against the new automobile law seem to have no direct effect. The much-talked-of measure has reached the stage where the signature of the chief executive will make or break it and all are wondering just what the governor will do about it. It is a common impression that a veto would be overturned, for the Legislature has put in a lot of time on the measure. However, no one would mind it at all if the 1907 measure were to live another two years.

HEAVY JULY REGISTRATION IN INDIANA

Figures published by the Secretary of State of Indiana show that in the three months from April 1 to July 1 there were 2,591 automobile licenses issued during that time, and during the first eight days of July 249 licenses were issued, an average of 31 a day. A very large number of machines are being sold to farmers, especially to those who have retired from active farm work and moved into towns.

HARTFORD CLUB ISSUES YEAR BOOK

HARTFORD, CONN., July 12—The year book of the Automobile Club of Hartford has just been issued by Secretary A. G. Hinckley. It contains a fund of information, including the constitution and by-laws of the organization, its membership list, etc.

THE AUTOMOBILE

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INTERNATIONAL TOURING RECIPROCITY

Should the proposal to have all the countries of Europe join in a plan of international licensing really be carried out, the broadening influence of automobile traffic will have scored a remarkable triumph. Yet it is no mean triumph that such a thing should ever have been proposed. The officials of France and Germany are commonly supposed to be so bound, wreathed and entangled in red tape as to have long ago lost all power of acting or even thinking for themselves. However, a German official politely suggests to a French official that a simple little agreement of reciprocity would be mutually advantageous, and as France is the leader in the automobile industry, would France be pleased to make the suggestion to other countries? And the French official courteously replies that he will consider the matter; and he does consider it, to such good effect that it really seems as if such an agreement might be made.

Briefly, the proposal is that all European countries shall recognize each other's driving licenses and registrations, and that they shall recognize each other's customs' deposit certificates, provided the amount of the deposit is sufficient to cover the duty in the country in question. Thus an American tourist landing in England or France could pass one examination, receive one license tag, pay one customs deposit, and then proceed to travel anywhere in Europe without further inconvenience or red tape. Only one who has tried touring on the present plan can appreciate the immense amount of inconvenience and red tape now required at each frontier.

The countries of Europe have different languages, different tariff laws and different rulers. Our States have the same language, the same ruler and no tariffs to contend with. If Europe can have international licensing, why cannot we have interstate licensing? Governor Fort of New Jersey, who is rapidly redeeming that State's reputation, suggested a reciprocity agreement between Pennsylvania, New Jersey, New York and the New England States. As a starting wedge, the proposal is excellent, and its fulfillment would be an inestimable boon to all the automobilists of those States, not to mention their other inhabitants. Such a movement, too, would doubtless spread to other States until all that possessed any considerable number of automobiles would be included. But the reciprocity should not be dependent on the whim of an often prejudiced and partisan State legislature. What this country needs and must have is a national registration law.

REMEDIES FOR SKIDDING OR SIDE SLIP

In the rush of quantity production, the American manufacturer has little or no time to develop new ideas in automobile construction, hence it has come about that the cars on this side of the water carry with them little of that originality which is so prized on the other side.

As a single instance illustrating the point, the English constructors are now much agitated over the matter of side slip, or, as it is more usually called, skidding. In search for a preventive for this, a number of devices have been developed which seem to merit more than passing attention. Some experimentation was done with tires having a surface calculated to offset the slippery nature of pavements, but the only result of this was to develop the so-called Liversidge tire for heavy trucks.

Another scheme took into account the fact that side slip did not take place at all times but only occasionally. This, then, opened up a field for a device which could be brought into play at the driver's own time and was normally out of engagement. Since the slipping never takes place except under conditions which may be predetermined, it is both feasible and reasonable. This form worked out in the Newcomb attachment, which is attached to the rear axle and by means of a lever at the driver's side is dropped down into contact with the pavement or road surface by a simple movement of the hand.

Still beyond this, were the possibilities opened up by front driving. As against this solution, the fact looms up large that this does introduce many mechanical complications which are objectionable, in fact in the ordinary case more so than the skidding, since the complicated construction is always present, the side slip, very seldom.

This then was not a favored solution, and once more investigators turned away. Next and latest in point of actual construction is the matter of front brakes. These have been taken up, not by one or two builders, but by a large number, including many of the most prominent firms. The recognition of this form of a preventive by the larger firms following close upon extensive tests, leads one to think that there must be a good deal in it. The outcome of much agitation in this direction was a car especially built to overcome the objectionable feature.

REEVES PREDICTS WONDERFUL BUSINESS YEAR IN 1910

THAT automobiles are standard and that few changes will be made in the models for 1910, is the statement made by Alfred Reeves, general manager of the American Motor Car Manufacturers' Association, on his return to New York at the end of last week from the last of three trips occupying about six weeks, that took him into sixty-one of America's leading motor car factories. He repeats his recent estimate of at least 200,000 as the 1910 production, and says that while there will be no reduction in the price of the standard models, there will be more given in a car next year than ever before. In other words, while the price of materials has been advancing, the cost of manufacture is being reduced and the makers are making refinements that will bring out better cars without advancing prices.

A general review of the plans in automobiles for 1910 would indicate that improvements for next year will be confined almost entirely to the refinement of the present successful types. In the opinion of Mr. Reeves, the time which has long been wished for when motor cars would be standard has about arrived.

"In a general way," said Mr. Reeves, "I would say that the 1910 motor car will show a decided tendency toward standardization. The wonderful advances in gas engines during the past ten years has brought the present type of automobile almost to the perfection point, and improvements now must be almost entirely in the matter of details. While there will be some changes of models and designs by a few makers, the inclination is to improve on the present satisfactory type of motor. The future may see some radical changes in car construction, but certainly not for a couple of years. The 1910 car will see those refinements which make for silence and simplicity in operation, increased power without increasing the size of motors, more pleasing design, greater riding comfort and lower maintenance cost.

"One of the most important changes will be the use of a longer stroke in motors. A number of makers are using the same size of cylinder whether they be for a four or six model, which makes for standardization. Magnetos are now in universal use, some makers not even supplying a battery. High-tension and low-tension magnetos are used, each having its followers.

"Among other changes for next year will be larger wheels and tires, a longer wheelbase, especially in the moderate priced cars; the casting of cylinders in pairs and sometimes en bloc; the use of shaft drive, except on a small number of very large cars or buggyabouts; the increasing use of the thermo-syphon system of cooling, and the adoption of a direct drive on third speed in transmissions where four speeds are supplied.

"Most radical of all in the way of changes relates to the placing of the steering wheel on the left-hand side, which will be followed by two of the biggest producers next year and a number of smaller ones.

"In some cases motors are being cast with the exhaust pipe included. One maker will have only one pipe running from the carbureter to the motor, doing away with the manifold. Carbureters have been refined and studied with a view of securing more power and greater distance than heretofore.

"The design of bodies will be given more attention next year and the lines of the cars generally will be more pleasing to the eye. The use of ball or roller bearings is universal. While the four-cylinder motor continues to be the most popular, a number of big cars, and especially those of high power, will be equipped with six-cylinder motors. While a number of the small makers have given up the six-cylinder idea, there has been an increased demand for six-cylinder cars among the big car makers, especially those who turn out the high priced machines.

"It is a revelation to visit those factories which constitute the membership of the American Motor Car Manufacturers' Association, to see the plans, the preparations, the new buildings and the many other things that not alone indicate a great production, but a confidence in the business and the buying ability of the American public, which should result in a record year in 1910.

"While in the West I traveled a couple of days with the Glidden tourists, and I believe that the car which evolves a winner of that strenuous test can truthfully be called the champion touring car of America. A trip each day of from 150 to 200 miles over good, bad and very bad roads, at an average speed of close to twenty miles an hour, requires a car of more than ordinary quality to stand the pommeling. The tightening of a nut or the tying up of a broken fender involves a penalty which kills a perfect score, the gaining of which is the ambition of everyone. Cars that make even a fair showing in that test must be considered by the American public as well worth buying.

"As the hub of the automobile industry, Detroit certainly did itself proud in the line of entertaining the Glidden tourists. They were open-hearted in their care and reception of all who visited the city to see the start, and certainly the Dealers' Association, its officers and the automobile people in Detroit generally have set an example in the line of whole-soul entertaining that may be the aim in future motor events."

On the last of his three trips to the factories comprising the membership of the American Motor Car Manufacturers' Association, Mr. Reeves visited the concerns in Michigan and Wisconsin, which completed his round of the companies holding membership in the big organization of makers. More than sixty factories were included in his six weeks of travel. In speaking of his trip, Mr. Reeves said:

While I expected to see a whirl of industry at the Ford plant in Detroit, I was not prepared for the great work which the big organization there is doing. So busy have they been turning out cars that no effort has been made to move into the new plant on Woodward avenue, and it is believed now that an entire new equipment will be put into that place instead of moving anything from the old factory. The Model T cars are going through at a rate that would cheer the heart of any agent, the record being 1,954 cars during the month of June. They are now being completed at the rate of 450 to 500 a week, with the agents, of course, clamoring as usual for more cars. Henry Ford is famed as a producer, and he is holding up his reputation in every way. He was well pleased with the victory of the Ford car in the Seattle contest, and declares that such contests do more to prove the reliability and strength of a motor car than any other kind of a contest. The foreign business is on the increase, and James Couzens, the secretary and treasurer, will leave for Europe the latter part of this month to care for matters over there.

At the Brush runabout plant, Frank Briscoe, the president, stated that the business had so far outgrown the factory that a new plant would be put up, the dimensions of which will be 871x 150, which, he says, will be the biggest single factory in the automobile trade. The present plant has been working 21 hours a day for months, both in the place on Woodward avenue and at the addition on the Grand Trunk Railroad. They will make about 2,000 of the little Brush runabouts this year, and plan to double next year. There will be very few changes on the car for 1910, the present model having proven satisfactory in every way. In connection with the Briscoe Manufacturing Company, which makes radiators, Mr. Briscoe told me that he bought half a million pounds of copper when the price was only a little above 12 cents, which puts him in a fine position for low manufacturing cost in the future. The Brush plant has ordered $80,000 worth of new machinery.

F. W. Haines, the manager of the Regal Motor Car Company, is planning a new addition to the Detroit plant which will be 217 x 54, four stories, ready for occupancy by September 1. The car has been eminently satisfactory this year, and will have only a general refinement for 1910. The body will be changed somewhat, and the wheelbase lengthened. The car has a sliding gear transmission on the rear axle, and selling at $1,250, with a 30-horsepower motor and magneto, is considered excellent value. They are now turning out 18 engines a day, and have been working day and night since last November.

Another concern in Detroit which is making rapid headway is the Grabowsky Power Wagon Company, of which Max Grabowsky is president, and John Baker, secretary. The company has doubled its capital so that it is now $300,000, and is negotiating for a new factory site, although the present place on Champlain Street will be retained. It builds trucks of 30-35 horsepower, and also three-ton trucks of 40-45 horsepower. The detachable power plant has proven to be a happy thought, permitting a concern, by having an extra power plant, to keep all their trucks in operation. The Regal Motor Car Company recently bought a Grabowsky truck for use around its factory.

At the Hupp Motor Car Company, plans and preparations are under way for a record production next year to supply additional territory. During the past year the little Hupmobile runabout has been unusually successful in Detroit and other cities, but a comparatively limited production has prevented its appearing as strongly in the East as it will next year. The runabout sells at $850 with Bosch magneto.

The city of Pontiac, which is about 26 miles from Detroit, is fast becoming an important motor car center, having four prominent factories. The Rapid Motor Vehicle Company there has made gigantic strides during the past year or two. Morris Grabowsky, the secretary, showed me plans for a new addition, 670 x 60, and another one, 300 x 60. The company will install $100,000 worth of machinery during the next four months. It is making 30-horsepower, two-cylinder trucks of 1 ton and 1 1-2 tons, with 40 to 60-horsepower, four-cylinder motors in trucks of three and five tons. They had 25 trucks in the Detroit parade. H. G. Hamilton, the president of the company, said they now have 22 acres of ground for factory purposes. The Rapid people are now the acknowledged leaders in the commercial vehicle line. Incidently, Mr. Hamilton has also been elected treasurer, and has acquired an interest in the Cartercar Company.

The Welch Motor Car Company is now interested with the General Motors Company, although the same management continues. A. R. Welch and Mr. Pack are planning to continue their big Welch cars next year, but in addition will organize the Welch Company of Detroit, that will turn out a four-cylinder car selling at $3,200. The new company will occupy the plant in Detroit formerly used by the Oldsmobile Company. The Welch cars that have very properly grown famous for their speed and durability, will, for 1910, be a four-cylinder car of 50 horsepower; a six-cylinder car of 75 horsepower, and a large four-cylinder car of 70 horsepower.

The Oakland Motor Car Company is another plant that is included in the General Motors Company, but J. W. Murphy continues to be the guiding spirit. The company has had an unusually successful year, both in competitions, proving the worth of the car, and in general sales. Plans are under way for a production of 3,000 cars for next year, the line including a 40-horsepower machine, fully equipped, at $1,700, and a two-cylinder car. There will be few changes in general construction for next year. The company has over 200,000 square feet of floor space, and is well equipped for a big production. The factory was well pleased with the victory of the Oakland in the Cincinnati hill climb, when it captured the free-for-all and two other prizes.

The Cartercar Company is now settled in its new plant at Pontiac, taking over the factory formerly occupied by the Pontiac Buggy Company. R. A. Palmer, the secretary, with his associates, have laid out an ideal factory for accurate and rapid production. The friction drive fills a unique position in motordom, being in demand by a large number of people owing to its simplicity and ease of operation. So successful has it been during the past few years that there are few things to change for the 1910 product. There will be seven models for next year, although only three different types of chassis. The two-cylinder opposed motor will be continued in the taxicab and in a roadster, as well as in a delivery wagon and coupe. The company will also build a four-cylinder touring car of 30-35 horsepower, listing at $1,600, and a very racy looking runabout at $1,000. There will be a big advance in the production next year that should make the Cartercar agents contented in mind as well as in purse.

One never goes to the Reo plant in Lansing, Mich., without expecting some great things, and there was no exception on my visit this year. I don't know of any other factory in this country that has scored any better than Reo in manufacturing motor cars, taking into consideration the money made by the company itself, and those identified with it, and by the agents, to say nothing of the satisfaction of the users. The company recently closed a deal with R. M. Owen and Company that disposed of their product for the next five years. The factory system is as near perfect as men of the ability of Mr. Olds can make it. E. F. Peer, the secretary, conducted me through the factory, which seemed an endless journey among machines and other conditions that make for a big production. It is planned to turn out 10,000 cars for 1910, a limited number being of the present two-cylinder type which continue to be in demand among agents, but most of the cars being the new four cylinders. The cylinders are 4 x 4 1-2, cast in pairs. The steering control is on the left-hand side. The car has an I-beam front axle, overhead valves, 108-inch wheelbase, selective type of transmission, high-tension magneto, and multiple disc clutch. The company owns four square blocks of ground, and is fast covering them with new buildings. Three new buildings are going up, one of them a four-story building, 65 x 125; another of three stories, 65 x 100, and a third with three floors, 100 x 200. Robert Reushaw, well-known to all those who were in the bicycle business at the time he was connected with the Pope Company, represents R. M. Owen at the factory, and looks after the agents. Mr. Olds is now on his new 97-foot cruising yacht the "Reomar," having sailed from New York on Saturday for a trip with his family through the Thousand Islands. Aside from his presidency of the Reo Company, Mr. Olds is president of the Capitol National Bank of Lansing, the Michigan Screw Company, the Atlas Drop Forge Company, and a director in a dozen or more other institutions.

At Grand Rapids, Walter Austin and his father are enlarging their plant for the manufacture of the Austin car, which has an exclusive trade and which, for that reason, has not been turned out in very large numbers. The car's brown and cream color body is well known throughout the country, and the makers cater to those folks who only wish the very best in design and construction. This year, in addition to their high-powered cars, the Austin people will make a five-passenger car at $3,000 with complete equipment. It will be known as the "Little Six" and will have a 4 3-8 x 5 1-4 motor, with a rating of 45-60 horsepower. It should be an excellent seller. The company will only make six-cylinder cars next year, the other models being a 50-75-horsepower car at $4,500, and the luxurious five or seven-passenger job with a six-cylinder motor of 60-90 horsepower, the cylinders being 5 1-2 x 5 1-2. This car is of 140-inch wheelbase, with four speeds, and all other things that might be expected in a car selling at $6,000.

As a leader in what is known as the motor buggy business, the Holsman Company, of Chicago, might naturally be expected to have great plans for next year. Mr. Hildreth told me that the factory at Thirty-sixth and Morgan Streets has been working day and night, turning out the present model, and will have the 1910 cars ready for delivery on September 1. There will be only a general refinement of the present successful cars with the prices ranging from $500 to $1,000. The product has been pretty evenly distributed, the eastern trade and the expert trade increasing during the past year. The Holsman Company has been making automobiles for eight years, and have turned out more cars of that type than any other maker.

More changes have taken place at the Mitchell Motor Car Company's plant at Racine, Wis., than at any other plant I visited during the past six weeks. All the wooden buildings have been removed, and in their place are reenforced concrete structures of the most modern kind. A new office building, 125 x 120, is now under way. It will have two floors with a garage in the basement. J. W. Gilson and J. W. Bate were at the factory last week, while President Lewis and Secretary Rogers were on the coast attending the annual agents' jubilee. Judging from my talk with Mr. Gilson, the Bate plan for economical manufacture has worked out to perfection. The cylinders on all models are the same size so they can be placed in four-cylinder or a six-cylinder car. This means a standardization of connecting rods and pistons, and should result in a great saving in costs and in the securing of parts by agents. The cylinders are cast in pairs. Three models will be made next year—a 100-inch runabout, a touring car of four cylinders, and a seven-passenger car of six cylinders. The cylinders in all cases will be 4 1-4 x 5, and a magneto will be regular equipment. The standard colors will be dark blue and maroon, with buff running gear. The lines of the new cars are radically different from this year, and every possible improvement that could be made on this year's type has been cared for. The motor with its overhead valves is a very quiet running affair and among other details are a tubular torsion bar, straight line drive, single universal joint, lower hanging of the body and floating type of rear axle on all cars. Among the new buildings put up is one of 100 x 100 now being used for a motor assembly, while in construction is a new concrete affair 250 x 250 with a saw-tooth roof; another 450 x 250 with a duplicate to follow. Certainly the Mitchell Company will be equipped to carry out its production of 6,000 cars.

The Pierce Motor Company has been reorganized and next year will produce the "Pierce Thirty" and the "Pierce Forty." The price of the car has not been settled, but the smaller one will sell for less than $1,700 with the large car at something like $2,250. It will be a conventional car so far as general construction is concerned, but will have the Pierce motor which has been so successful in marine work, there being 20,000 Pierce motor boats in use now. The president of the new Pierce Motor Company is C. L. McIntosh, who is treasurer and part owner of the J. I. Case Threshing Machine Company, one of the biggest manufacturing concerns in the West. The vice-president is Fred Robinson; secretary, John Peebles; treasurer, C. J. McIntosh, while J. G. Cowling, for ten years with the Case Company, is general manager. A. J. Pierce, who has been making automobiles since 1893, continues as general superintendent.

The Jackson Automobile Company is preparing for a big production as a result of the new additions to their factories at Jackson, Mich. Two new buildings are in the course of erection, each 240 x 60 and four stories high. An addition is being built to the motor plant, 200 x 60, three stories. Charles Lewis, G. A. Matthews, and F. L. Holmes, of the company, were responsible for the hospitable reception given the Glidden tourists by the Jackson Chamber of Commerce when they passed through that city en route for Kalamazoo. The Jackson line next year will consist of three four-cylinder models, one selling at $2,250; another at $1,700, and a 20-horsepower car at $1,250. The changes for next year will include larger wheels and tires, and a longer wheelbase, other than which the Jackson construction will be continued. Mr. Matthews told me that the Fuller Buggy Company, which he owns, will turn out a motor buggy for 1910.

Before reaching New York, I visited the plant of the Maxwell-Briscoe Motor Company at Tarrytown, which is one of its big factories and the headquarters of that concern. Benjamin Briscoe' leadership in motor affairs generally is not to be wondered at when his success with the Maxwell-Briscoe Motor Company is considered. The manufacturing is down to the finest point, and a clean cut system generally prevails in all the departments. The company now owns all the real estate at Kingsland Point, and has covered it with factory buildings. They have also bought the old factory of the Rand Power Company in Tarrytown, and only recently purchased another big factory near Providence, R. I. These are in addition to the big plant at Newcastle, Ind. By their method of distribution, which is original with Mr. Briscoe, the company is able to care for all its agents on a fair basis. The percentage system prevails, and every agent knows just how many cars per month he is going to receive. The selling organization of the Maxwell-Briscoe Company is one of the best in the country. The little $500 car has been a great success, and will be continued next year to the tune of many thousands, while great things are expected of the new Model Q, equipped with a four-cylinder, 20-horsepower motor, embodying all the well-known Maxwell features, and yet sell for $850. Some other sensational models are planned for 1910, but in all of them the John D. Maxwell ideas, such as three-point suspension, thermo-syphon cooling, and unit engine clutch, and transmission construction will prevail. The company plans to make 18,000 to 20,000 cars in its four factories next year.

Great success has attended the efforts of the Atlas Motor Car Company at Springfield, Mass., in turning out their two-cycle motors. They are making heavy inroads on the taxicab trade in New York, the two-cycle, two-cylinder motor of 20 horsepower giving unexcelled service even in the hands of hard drivers. The New York branch sold 148 of these cabs during the past four months. The company also makes a three-cylinder, 30-horsepower touring car, and a six-cylinder, 50-horsepower runabout that has exceptional speed. The policy and line for 1910 has not been settled by Harry A. Knox and W. G. Morse, but it is not expected that there will be any radical changes from the satisfactory type of this year. The new addition to the factory was completed about a month ago, giving the needed additional facilities for making the 1910 cars.

Generally speaking, I found the entire trade in exceptionally fine shape, and full of optimism on 1910 as a record year for the sale of automobiles.

PUTTING STRENGTH AND ENDURING QUALITIES INTO THE AUTO

By HENRY SOUTHER, Association of Licensed Automobile Manufacturers.

It is probable that there has never been a period of such rapid development in the metal trades as has occurred in connection with the automobile industry. The work was largely started and carried through by those pioneer automobile manufacturers constituting the Association of Licensed Automobile Manufacturers.

In America, the tremendous importance of heat treatment of steel has been grasped and the principles involved therein carried to an ultimate conclusion. Intelligent heat treatment is quite as essential as the quality of steel; a commonplace steel may be given very good physical qualities by proper heat treatment, and the best of steel can be ruined by lack of it. There must be thoroughness in the various operations of annealing, hardening and tempering. Treatment carried on with sufficient care makes uniformity of product possible.

The difference between ordinary material and the best of material is a great one. For example, the elastic limit of ordinary steel is 40,000 pounds to the square inch, with, say, a reduction of area of 50 per cent. Properly heat-treated, nickel steel will have an elastic limit of two or two and one-half times this figure, and yet have 50 per cent. area reduction or more.

Brittleness does not follow intelligent heat treatment; and the enduring quality is increased in greater ratio than the elastic limit. Consequently crystallization, fatigue or whatever the cause of breakage we are to prevent, is called, is less likely in a properly heat-treated and tempered material than in an annealed and soft specimen. This having been discovered in the laboratory and established in actual practice, is now accepted by the metallurgical world, reversing previous general belief.

Another commonly accepted belief has been that the stronger a piece of steel is the stiffer it is; for example, that if one metal is twice as strong as another, it will bend only half as much under a given weight. But actual tests have shown that a chrome nickel steel, having an elastic limit of 150,000 or more pounds per square inch, bends under a given load the same amount as a carbon steel. This is true as long as the load is within the elastic limit of the weaker material.

The elastic limit of a well-tempered piece of spring steel is above 150,000 pounds per square inch. If a spring be made of soft steel and not loaded beyond its elastic limit, it would return every time to its original shape, but the deflection would not be sufficient to make a good spring; it would be hardly noticeable. The automobile industry has forced the spring maker to depart from his old materials and methods.

Assume that a good .20 carbon steel has been used with satisfaction for a year or two on a given design of crankshaft, neither bending nor breaking through long-continued use. Assume the bearing surfaces are as small in area as possible to run properly. A crankshaft of highly treated chrome nickel steel, having an elastic limit four or five times as high as the .20 carbon material would be no stiffer, but would have increased life and last much longer.

Really sound knowledge as to steel has been spreading fast among the intelligent manufacturers, who use much discrimination in separating the false from the good. They have established testing laboratories and examine for themselves what materials they buy. There are, perhaps, a dozen first-class grades of steel in the market (and America has a market at least as good as any in the world, with, of course, always the option of buying abroad for any real or fancied reason) suitable for the highest class of automobile construction.

Bronze is still an important factor. Here the casting method is all important.

Aluminum alloys are of great interest.

Where any form of plain journal is used the bearing metal question seems to have settled down, to a high grade tin-antimony alloy, running against a soft shaft; a hardened shaft running on a good phosphor-bronze; or a soft shaft running on a white bronze. All of these combinations are giving good results.

The larger part of the expense of an automobile engine cylinder is in the finishing labor, and not in the iron. In the foundries there are many complex conditions arising from what a layman would think trifling matters, in the production of first-class, sound cylinders.

QUAKER CITY APPOINTS ITS SHOW COMMITTEE

Philadelphia, July 19—The initial steps were taken last week by President J. A. Wister, of the Philadelphia Automobile Trade Association, in preparing for next winter's show. He appointed W. J. Foss, of the Pierce-Arrow agency, and James L. Gibney, who represents Continental and Gibney tires in the Quaker City, a committee to run the exhibition, which will be held between the New York and Chicago shows, if that week can be secured—possibly from Wednesday to Wednesday, as was the case last year. Secretary J. H. Beck, without whom a Philadelphia show could hardly be a success, will, as before, look after the details and manage the show proper. At this writing, it seems as if the promoters would again be compelled to labor under the handicap of a hall about 50 per cent short of the space requirements, the local armories being about the only available buildings in sight.

G. W. Butler and Winton That Won 1909 Upkeep Contest

WINNERS ANNOUNCED IN WINTON CONTEST

The $1,000 first prize in the annual Winton upkeep contest was won by G. W. Butler, who drove his car 17,003 miles without spending a single cent for repairs. Butler's record is all the more remarkable because his car was also a prize winner in last year's contest, when it had a score of 5,155 miles without repairs, and also because the car carries a limousine body. During the contest, the competing chauffeurs were required to file monthly reports, attested by their employers, and at the end of the contest both chauffeurs and employers were asked for sworn affidavits. The list of prize winners follows:

First prize, $1,000—G. W. Butler, chauffeur for J. E. Clenny, Chicago; 17,003 miles, no expense.
Second prize, $500—J. J. Boyce, chauffeur for Isaac Bacharach, Atlantic City, N. J.: 11,000 miles, expense 30 cents.
Third prize, $250—W. L. Losee, chauffeur for G. W. Frost, Verona, N. J.; 10,595 miles, no expense.
Fourth prize, $150—J. W. Tracy, chauffeur for T. N. Barnsdale, Pittsburg: 15,669 miles, expense $31.15.

Six other prizes of $100 each were awarded to Arthur Donovan, New York; L. Avenmarg, Cleveland; William Richards, New York; John Wilson, Cleveland; Miles Fellers, Cleveland, and Harry Rosander, Chicago.

The total mileage of the prize winners was 118,503 miles, and their total repair expense $127.30, which makes the average expense per car per 1,000 miles $1.07.

MAXWELL-BRISCOE AGENTS' CONVENTION

Newcastle, Ind., July 19—The 1909 convention of the district supervisors and managers of the Maxwell-Briscoe Motor Company went into session at this city last week. Most of the delegates arrived from Detroit, where they had witnessed the start of the Glidden tour, on a special train, accompanied by the Maxwell band. The first day's session included the discussion of the selling policy of the company and other matters of interest to the closer family circle of the Maxwell organization. Afterward the Maxwell men were the guests of the city, which had prepared an elaborate entertainment at the Country Club. Fireworks, a band concert and a general jollification at Maxwell Park were attended by some five thousand people.

Among the delegates were Benjamin Briscoe, J. D. Maxwell, F. D. Dorman, A. B. Barkman, A. R. Gormully, Ernest Coler and J. D. Moore, of the company's home office; Col. K. C. Pardee, New York City; J. M. Austin, Atlanta, Ga.; C. E. Munroe, Buffalo; A. I. McLeod and Bob Davis, Detroit; F. J. Linz, San Francisco; Thos. Dunn, Pittsburgh; F. J. Tyler, Boston; C. G. Bleasdale, Cleveland; B. E. Stimson, Minneapolis, Minn.; J. I. Handley and R. I. Creek, Chicago; W. S. Hathaway, Kansas City, Mo.; Gabriel Chier, Detroit; T. E. Lester, Dallas, Tex.; H. E. Rooklidge, Kansas City, Mo.; F. R. Tate, St. Louis; E. E. Cohen, Portland, Ore.; M. A. Stacksteder, Dallas, Tex.; C. J. Simons, St. Louis.

SOUTHERN SHOW WILL HAVE OVERFLOW

Atlanta, Ga., July 20—They are going to exhibit automobiles out in the street at the big show here in November. General Manager S. A. Miles, of the National Association of Automobile Manufacturers, has been here looking over the ground, and making a scouting trip through and about the Atlanta Auditorium-Armory in search of more space. He expects nearly 100 exhibitors at the coming show, and has space for hardly more than two-thirds of that number. To meet the requirements of the show management Atlanta will turn over one whole block of Courtland street, adjoining the Auditorium, and this space will be roofed over with canvas and a number of exhibits will be placed in the enclosure. In this manner it is possible that most if not all of the intending exhibitors can be accommodated. The people here intend to have a real show at any cost.

CONVENTION OF AJAX-GRIEB MANAGERS

The branch managers and agents of the Ajax-Grieb Rubber Company will meet at the factory at Trenton, N. J., July 28-31. The representatives from Seattle and San Francisco are already on the way. Together with the more pressing business of the convention those attending will be present at the Brighton Beach 24-hour race.

Dallas, Texas.—The White Steamer Automobile Company has made plans for the erection of a two-story and basement fireproof garage building. It will cost $50,000, and will be equipped with steam heat, electric light and power and electric elevators.

New Testing Track of the Maxwell-Briscoe Motor Company, Just Completed for the Newcastle, Indiana, Plant

E-M-F BUYS DE LUXE PLANT—WILL BUILD SMALL CAR

DETROIT, July 19—Million-dollar deals are coming so close together in the local automobile field that they no longer excite more than passing comment, although the changes effected thereby are of widespread importance. Following close on the acquisition by the General Motors Company of the Cadillac Motor Car Company, the price paid being approximately $4,500,000, comes the announcement that the E-M-F Company has purchased the plant and business of the De Luxe Motor Car Company at Clark and River streets, Detroit. The price paid is not made public, but is in the neighborhood of $800,000, the plant carrying that amount of insurance and representing a far heavier investment in the way of buildings and machinery. All the land, buildings and machinery are included in the buy as also are patents, drawings, tools and fixtures for making the Car De Luxe, to the manufacture of which the plant has hitherto been exclusively devoted.

The land comprises something over fifteen acres, about half of which is at present covered with modern factory buildings admirably suited to the purpose for which it will be used. Beside the property of the De Luxe Motor Company the E-M-F Company also purchased about four acres additional. This latter lies between the Wabash Railroad tracks and Fort street and adjoins the plant of the Timken Axle Company.

Several other parties had been dickering for the De Luxe plant, which is a valuable one, but Walter E. Flanders, president and general manager of the E-M-F Company, shattered all previous speed records by opening negotiations in the morning and turning over the cash in the afternoon, closing the deal before others knew what was transpiring.

Coincident with this transfer comes the news that the E-M-F Company will next season put on the market a new car to be known as the Studebaker-Flanders "20," and which will sell for less than $750, the exact price yet to be determined. The Studebaker-Flanders "20," which will be marketed by the Studebaker Company, now handling the entire E-M-F output, will be a four-cylinder car, 3 5-8-inch bore by 3 3-4-inch stroke, with a 100-inch wheelbase. It will have a sliding gear rear axle transmission, 32-inch wheels, pressed steel frame and the regular equipment will include magneto. It will be made in two styles, a two-passenger runabout and a four-passenger suburban. Twenty-five thousand of these cars will be made during the twelve months beginning January 1 next, according to Mr. Flanders, and to show that the concern means business 150 workmen were rushed from the E-M-F plant over to the new acquisition almost before the ink was dry on the papers closing the deal.

Meanwhile the E-M-F Company is more than doubling the size of its present plant on Piquette avenue, the structures now utilized being increased in height to four stories, an addition 70 x 480 feet, and four stories in height being built to connect the present buildings. The manufacture of De Luxe cars will, it is announced, be continued on a limited scale in the plant just taken over by the E-M-F Company, but the greater part of the plant will be devoted to the new "Twenty."

SEVERAL BIG DEALS ON IN INDIANAPOLIS, TOO

INDIANAPOLIS, IND., July 19—David M. Parry, for almost thirty years one of the leading carriage manufacturers of the country, has decided to enter the automobile manufacturing field. He has announced plans for a factory to be located in this city to cost about $100,000, while the company will be capitalized at about $1,000,000. As a preliminary to entering the auto making business, Mr. Parry resigned as president of the Parry Manufacturing Company a few weeks ago, although he still retains his interests there. The new concern will be known as the Parry Motor Car Company.

Two models, to be known as the Parry, will be manufactured. They will consist of two cylinder and four cylinder models, selling at $1,250 and $1,400, respectively. It is Mr. Parry's aim to make his plant the largest of its kind in this city.

The first cars will be ready for the market in September. Machinery is being ordered and plans are under way for the factory buildings, the erection of which will start almost immediately and will be pushed vigorously.

Popular-Priced Cars by Cole Motor Car Company

Another company recently formed in this city is the Cole Motor Car Company, which will manufacture two popular priced types of cars. J. J. Cole, the well-known and successful carriage builder, is president of the new company.

The Cole "30" and "20" four-cylinder cars are the result of two years' careful study and experimentation with different types of cars, the present model having been subjected for several months to the most severe road tests that could be devised.

That the car as it now stands is a success is partly due to the fact that Mr. Cole has been able to associate with his company one of the leading mechanical superintendents of the country, who for fifteen years has been connected with leading automobile manufacturers.

The output of the Cole Motor Car Company will be marketed by the Henderson Motor Sales Company, of which Charles P. Henderson, formerly of the Henderson-Hull Company, Savannah, Ga., is vice-president and manager. Mr. Henderson, who is closing his first season in the automobile business, has been connected with the carriage trade for many years.

With him actively will be H. C. Lathrop, formerly manager Indiana branch of the A. D. Baker Company, who is secretary and treasurer of the company. Also, as stockholders, Leonard Carter, Jesup, Ga., Dr. A. B. Lathrop, Swanton, Ohio, and J. J. Cole, Indianapolis, Ind.

DETROIT'S ENVIABLE POSITION IN THE INDUSTRY

DETROIT, July 19—Gliddenites and other visitors during the days preceding the start of the A.A.A. contest were given a new insight into the importance of this city as the center of the automobile industry, being given entree to all the local plants and provided with easy means of reaching any or all of them. Nevertheless, even those who looked over the field cannot fail to be still further impressed with the magnitude of the industry as shown in the figures just compiled by an expert statistician connected with the Detroit Board of Commerce.

These show that Detroit possesses fourteen factories devoted exclusively to the manufacture of automobiles, this statement not taking into account the scores of institutions engaged in making motor car sundries and accessories, chief of which is the immense tire plant of Morgan & Wright. These fourteen factories at the time the canvass was made employed 14,670 men, with an annual payroll of $9,882,000. The companies are capitalized for $6,250,000. The value of the output this season will be $54,325,000, of which $2,000,000 is represented in exports.

Elmer Lovejoy, with His Franklin, Makes Good in a Wild Goose Chase

A Wild-Goose Chase—The first automobile ever used in the State of Wyoming, and, it is believed, anywhere west of the Mississippi River, was built by Elmer Lovejoy, of Laramie. He is now president of the Laramie Automobile Club, and in his hours of recreation is a hunter as well as an autoist. Not long ago he set out upon what was literally a wild-goose chase; but he bagged the geese and bore them back home as a proof that this cbase, proverbially vain, was not futile and fruitless if undertaken with an automobile. He made a forty-mile run from Laramie through a rough country in an hour and a quarter, and came upon the geese in flight. By running bis car under them as they were rising from their feeding grounds he was enabled to bring down seven. Mr. Lovejoy looks back with considerable pride on the old car with which he, in the early days of automobiling, opened the eyes of the people of Wyoming. His present car, however, is a Franklin of the latest design, which is handled in Laramie by a company of which he is a stockholder.

Firestone Truck Carried Signs, not Tires—Published reports that the truck whose accident near Valparaiso, Ind., held up the Glidden Tour nearly an hour was loaded with Firestone tires is hotly denied by H. S. Firestone, who says: "This particular truck was carrying a load of Firestone signs, not tires, from Detroit to Chicago, and had nothing to do with the Glidden Tour. Contesting cars using Firestone tires have never yet felt the need of being accompanied by loads of fresh tires, as Firestone tires are not made that way. For instance, in the New York to Seattle race two of the cars started and finished without carrying any extra tire equipment whatever, and I rather think that this 4,000-mile race was a somewhat stiffer proposition on tires than the Glidden Tour has ever been. We are interested in the Glidden contest only as a car test, and not from a tire standpoint, as the management ruled against making a record of competitive tire service."

Some Mile-a-Minute Baseball—The bewhiskered Harlem goats who browse on the rocks and tomato cans in the vicinity of 142d street and Lenox avenue were startled from their dinners last Saturday by a fierce bombardment of three-baggers and home runs. The shrieking of fans—both radiator and flywheel types—filled the air with a weird music, and the voice of the umpire was heard calling "Strike tuh!" The Harlem goats are accustomed to baseball of the usual variety, but tbe brand dished out by the members of the New York Automobile Trade Baseball Association filled them with awe and trepidation. However, it was only the Thomas Company walloping the Studebaker Company to the tune of 16 to 3. During this slaughter the Republic Rubber Company was battling with the Pierce-Arrowites, whom they finally downed, 8 to 6. Sunday afternoon the Diamond Rubber Company scored a 15 to 1 victory over the Packard team.

The Horsefly Takes Revenge—F. M. Hoblitt, of the American Locomotive Company, is responsible for this marvelous tale. "I have seen one coyote stampede 2,000 steers, a mouse an elephant and a bumblebee a gang of harvest hands," says Mr. Hoblitt, "but I never saw a horsefly stop an automobile till yesterday. On the road between Cleveland and Columbus our car suddenly came to a dead stop. All mechanical minds instantly set to work, and it was soon found that the engine was getting no gas. Further investigation showed that in some way a large horsefly had been drawn into the auxiliary air inlet in such a way as to shut off the air and choke the engine to a standstill."

Atlantic City's Auto Patrol—Manager "Billy" Taylor, of the Philadelphia branch of the Olds Motor Works, announces the early completion of a patrol wagon which is being built wholly at the branch house for the Atlantic City police department. It will have a 132 1-2-inch wheel-base with a special frame, upon which will be mounted a 4-cylinder, 40-horsepower engine. Manager Taylor has just closed with James S. Boyd to represent the Oldsmobile in Norristown and Montgomery county, Pa., during 1910. The latter is just about finishing the big new Keystone garage, which has been in course of erection for six weeks, and which the contractors have just turned over.

Novel Factory for Hupmobile—The Hupp Motor Car Company is just finishing the removal of its equipment and the installation of new machinery in its new factory at Jefferson avenue and Concord street, Detroit. The building is in the shape of a capital U, each of the wings being 350 x 50 feet and the connecting portion 131 x 60 feet. It is one story high, except the part facing Jefferson avenue, where the offices will be located, so that it will not be necessary to pass any of the work from floor to floor. The capacity of the enlarged factory is conservatively designed to be at least 25 cars a day.

Diamond Tires Distinguished—Diamond tires played a leading part in two recent events of a widely dissimilar character. On July 10 Hanshue on an Apperson and Dingley on a Chalmers-Detroit won the two road races at Santa Monica, Cal., both using Diamonds. On July 12, at the start of the Glidden tour, Diamond tires were observed on the rims of fourteen of the forty-one starters. One of the contestants on the list was the McIntyre buggyabout, which used a special type of solid tires recently brought out by the Diamond company.

Gary Company Incorporates.—The Gary Motor Company has just been incorporated in Muskegon, Mich., for the manufacture of automobiles, and, later, of motor trucks. The incorporators are Alfred C. Gary, nephew of Judge Gary, of the steel trust; William L. Simonton and James L. Maloney, of Chicago. Work will be commenced within a week on a factory building and it is expected to have the plant in operation October 1.

Keystone Grease Lubricated Maxwell Non-Stop—On the recent run of the Maxwell car which recently covered 10,000 miles of road travel without stopping the motor, Keystone grease, the product of tbe Keystone Lubricating Company, of Philadelphia, was used exclusively. The test covered a period of three weeks, and is a world's record for non-stop runs.

Record of Locomobile Patrol—The city authorities of Baltimore have had a Locomobile patrol wagon in service since May 19, and are much satisfied with its performance. The car, in addition to patrol work, responds to all fire and ambulance calls in the central district. It has covered about 2,500 miles and has never been out of commission.

New Weston-Mott Factory—The Weston-Mott Company of Flint, Mich., manufacturer of automobile wheels, has nearly completed an addition to its factory, 300 x 165 feet, and is already planning a second addition, 500 x 75 feet, two stories high. The company expects to have 1,600 men on its payroll by October 1.

Another Puncture-Proof—The Cleveland Puncture-Proof Tire Company, of Cleveland, was incorporated last week with a capital of $20,000. The company controls the patents on a tire which, it is claimed, has been found puncture-proof in tests lasting over two years, and will probably erect a factory in Cleveland.

New Departure Company Busy—The New Departure Mfg. Co., manufacturer of "Two-in-One" ball bearings, is working its factory at Bristol, Conn., 22 hours daily on day and night shifts to keep up with its orders. Large contracts are reported for bearings to be used in 1910 models.

IN AND ABOUT THE AGENCIES

Benz, Atlanta, Ga.—The Benz Import Company of America has placed the agency for the State of Georgia with the Georgia Motor Car Company, 68-70 Edgewood avenue, Atlanta. G. W. Hanson, well known in Southern auto circles, will give his personal attention to marketing the car.

White, Baltimore—The White Automobile Company has been organized in this city and has bought out the White Garage Company, at Park avenue and Biddle street. The new company will continue as representative of the White steamer, and is planning a modern two-story garage.

Hudson, Scranton, Pa.—The Lackawanna Automobile Company, 245 Wyoming avenue, already agent for the Matheson and Chalmers-Detroit, has taken the agency for the Hudson roadster.

PERSONAL TRADE MENTION

C. J. Corkhill, for the past eight years Western sales manager for the Olds Motor Works, recently resigned that position and joined the Apperson Bros. Automobile Company. He will have charge of the sales of the Apperson "Jack Rabbit" in the territory west of the Mississippi River, making his headquarters at Omaha, Neb.

L. P. Halladay, formerly general manager of the Streator Motor Car Company, Streator, Ill., has been appointed manager of the automobile department of the Staver Carriage Company of Chicago.

A. A. Jones, long identified with the Philadelphia branch of the Ford Motor Company, has succeeded to the local sales managership of the Maxwell branch in the same city.

C. E. Davis, superintendent of the American Locomotive Company's plant at Providence, R. I., has resigned his position and gone West.

DEATH CLAIMS A PIONEER

George T. Robie, president and founder of the Excelsior Supply Company, and one of the leading business men of Chicago, died at the Chicago Hospital early Sunday morning. Mr. Robie became ill late in the week and late Saturday night it was found that an operation for appendicitis would be necessary. He was immediately removed from the Hotel Windermere to the hospital, where the operation was performed. Owing to the advanced stage of the trouble, Mr. Robie was unable to survive and passed away early Sunday morning. Mr. Robie was born in Walworth, N. Y., March 26, 1853, and came to Chicago at the age of 20. In 1876 he established the Excelsior Supply Company and soon became a leading dealer in sewing machine supplies and equipment. When the bicycle became prominent Mr. Robie took on bicycle supplies and in a short time became the leader in that line. Following his policy of aggressiveness, as soon as the automobile became an established element, the Excelsior Company assumed the same position in the motor car supply business that it had previously held in the line of sewing machine and bicycle supplies. Mr. Robie held a prominent position in the National Association of Manufacturers and in the Chicago Association of Commerce. He was one of those who made the recent trip to Seattle. He was a member of the Union League, Chicago Athletic, South Shore and Chicago Automobile Clubs. Mr. Robie also was prominent in Masonic circles. He leaves a widow and one son, Fred C. Robie, who has for some time past been the working head of the Excelsior Supply Company. Funeral services were held on Tuesday at Englewood Masonic Temple.

TAXICABS AND TRANSIT

Bagdad, Turkey—A company has been formed to run a line of buses from Khanikin, on the Persian frontier, via Bagdad to Kerbela, the sacred city of the Shiite sect of Mohammedans. There are no roads, but the country is perfectly level and smooth and fairly high speed may be maintained.

New Orleans, La.—The Taxicab Company of New Orleans, Ltd., has been incorporated with a capital stock of $125,000. The officers are E. R. Thomas, president; Pierre Crabites, vice-president and treasurer, and L. M. Vitoli, secretary.

Boston, Mass.—The Taxa-cab Company, of Boston, has been incorporated to do a general cab and truck business, with a capital stock of $250,000. The president is R. F. Guild and the treasurer and clerk F. H. Mesmithe, 53 State street.

Cleveland, O.—Two auto buses owned by Conger and Langdon have been put in service in the Cleveland park system between Euclid Avenue and Gordon Park, along the East Boulevard. The fare for the twenty-minute ride is 10 cents.

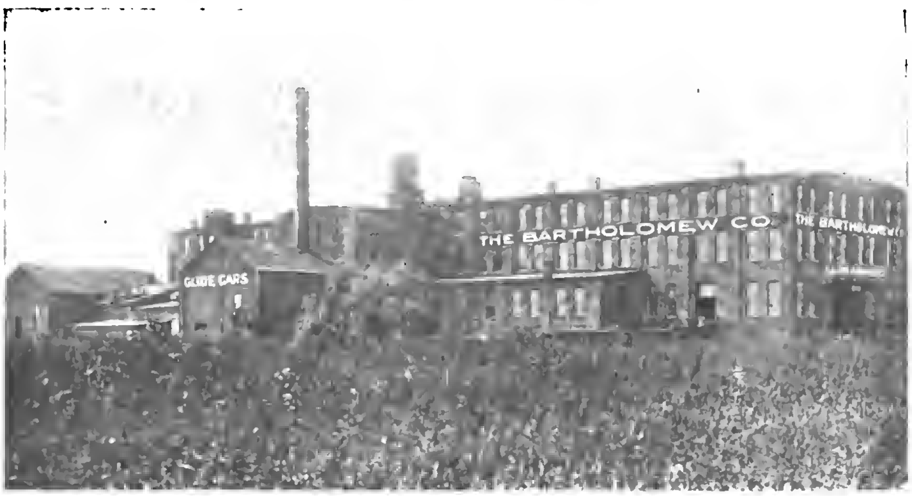
Memphis, Tenn.—Local men have incorporated the Corbitt Taxicab Company with $180,000 capital stock. S. R. Corbitt is president, J. J. Freeman, secretary, W. H. Kyle, treasurer, and Ben Peebles, general manager.

RECENT PUBLICATIONS

Packard Motor Car Company, Detroit—In thorough keeping with the quality and reputation of its product is the appearance and matter of the catalogue of 1910 Packard cars. In all ways one of the masterpieces of automobile factory publications, the new edition is an advance over the make-up of the general booklets descriptive of the automobile trade. E. Ralph Estep is responsible for the new one, as he has been in the past of the Packard publicity and advertising, and as usual he has succeeded in publishing one of the neatest, most conservative and pleasing editions of the year. The binding is in heavy gray card, and the stock is of exceptionally heavy carded paper, with the typography and illustrations in harmony. There is no color used, as has been prominent heretofore, the entire appearance being of white and gray, the latter accentuated by a grayish border. Packard Thirty and Packard Eighteen are illustrated in many full and part-page cuts, in all body styles—touring cars, roadsters, close-coupled, landaulets, limousines and a newcomer called the phaeton. Different tops give another series, intermingled with the straight and familiar types. Birds'-eye views show the seating capacities and arrangements of the various bodies, while three-quarter approaches indicate the methods of control, the fender systems, and many other points of interest to the prospective customer. The **Packard truck,** an important member of the family, is also given detailed attention of the same quality as that bestowed so liberally upon the pleasure vehicles. Chassis construction is taken up at length, with line cuts of the completed cars and of the various assemblies, accompanied by accurate notes. The reader is not bothered by the matter of prices, the most evident part of some makers' catalogues, and is apt to be accordingly more interested. Tables near the rear cover contain the selling price of all models, with the different body or top extras, and the specifications.

Westinghouse Electric Motors—The Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., has issued a handsomely printed little booklet describing the application of its line of small motors to varied uses in office, store and shop. From it many useful suggestions may be obtained. All sorts of small machines can be economically driven by these motors, especially buffing machines, small drills, hack saws and blowers.

New Chicago Agency of the Renault



St. Louis Company's Factory, Now Occupied by Bartholomew

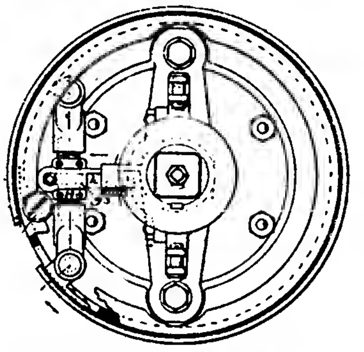
The Bartholomew Company, maker of the Glide cars, has just purchased the factory of the St. Louis Motor Car Company at Peoria, Ill., which it will operate together with its present plant. This acquisition will double the company's capacity and will enable it to take care of an increased output in 1910.

SOME SELECTED AUTOMOBILE PATENTS

Issue of June 29

926,141. Clutch—Charles Schmidt, Cleveland, O. Filed Jan. 15, 1906.

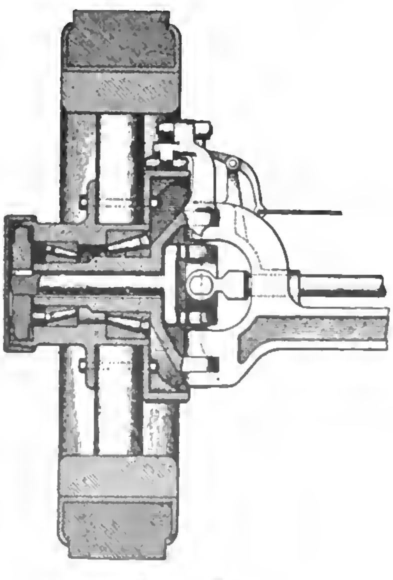
This would appear to be the clutch used on the Peerless cars with slight structural modifications, in the means of supporting the clutch members on the shaft. The clutch is of the internal expanding type, the band being expanded by means of right- and left-screw working in corresponding nuts in the ends of the band and actuated by a lever under the action of a collar and spring. The collar is provided with suitable forks for connecting with a stirrup upon the shaft carrying the operating pedal whereby the said collar may be withdrawn or released and the clutch contracted or expanded at will.



Peerless Clutch Modification.

926,313. Traction Wheel—Chester T. Bangs, Chicago, Ill. Filed Dec. 10, 1906.

A combination steering and driving wheel for heavy vehicles with braking means which will operate in any position that the wheel may assume with regard to the axis of the vehicle is the subject of the above patent. The drive is communicated from a lateral shaft to a central spindle within the wheel hub by means of a universal joint. The wheel is clutch-driven as in ordinary practice. A supporting shell is fitted with a pair of radial arms which pivot in a yoke attached to the axle. The brake apparatus is suspended from an extension of the supporting shell and actuated by a bent lever on the yoke. The wheel revolves on bearings on the shell, the brake drum being bolted to the spokes and serving as part of the nave box.



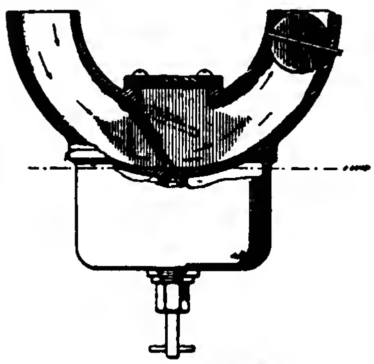
Bangs' Heavy Traction Wheel.

926,330. Electric Ignition Device—Theodore Hubert, New York, N. Y. Filed April 4, 1906.

This refers to the Splitdorf magneto which is of the low tension type, the current being transformed in a separate coil. The means of altering the time of sparking by rocking a collar on the armature axis consists of a pin upon the internal surface of the collar acting in a spiral groove in the axis so that the axial motion of a handle attached to the collar gives the desired advance or retardation of the time. Connections whereby a dual system of ignition can be used without interference with each other and employing the same distributer for both systems are also features of the specification.

926,533. Carbureter—Alexander Winton and Harold B. Anderson, Cleveland, O. Filed March 9, 1907.

This refers to a carbureter combining a float chamber and means for regulating the level of the fuel therein, the chamber being integral with a casting comprising a curved air inlet and mixture passage in which is fitted a check-valve. This valve rises with the suction of the motor and in so doing uncovers the opening from the float chamber to the mixture passage, closing the same when suction ceases. The lower portion of the said passage is fashioned to contain a body of fluid therein so that volatilization is rendered easy and sure.



Winton Carbureter Arrangement

926,540. Engine—Hendrik E. B. Blomgren, Palmyra, N. J. Filed Jan. 27, 1906.

This is an inverted internal combustion motor of the four-cylinder two crank type. Each pair of pistons is attached to a weighted plate provided with bearings which permit it to slide up and down on circular shafts fitted in a frame constructed for the purpose. A connecting-rod serves to connect this plate with the corresponding crank and works within a channel between the two cylinders of the pair. The valves are arranged in the head of the cylinders. The construction of the engine is designed to enable any part to be replaced in case of accident and to allow accessibility of all parts.

926,157. Turbine Engine—Carl W. Weiss, New York, N. Y. Filed Sept. 19, 1903.

Weiss here shows an internal combustion turbine, consisting of a rotating drum provided with peripheral curved blades revolving in a casing, and two nozzles in communication with the interior of this casing, the one delivering a continuous stream of products of combustion and the other to deliver simultaneously a stream of steam. No cooling means is provided for the products of combustion before impinging on the curved blades, but the inventor relies on the lower temperature of the steam to reduce the temperature within the casing. The first nozzle is fed from a receiver and exhaust ports are arranged at various points on the circumference of the casing.

926,134. Compound Internal Combustion Engine—Sidney A. Reeve, Worcester, Mass. Filed June 30, 1905.

Reeve here utilizes the exhaust from the high-pressure cylinder to operate a low-pressure cylinder with automatic governors and devices for regulating the inlets of both cylinders according to the load thereon. This engine was recently fully described in these columns.

Issue of July 6, 1909

926,769. Spring-Wheel—James E. Reilley, Newark, N. J. Filed Nov. 2, 1907.

In this, Reilley interposes between the felloe and the tire a series of blocks, over which springs are wound. These connect every fourth pair of external blocks, and every pair of internal. Since the wire springs are the only parts which prevent the rotation of the rim relative to the felloe, an unusual strain is placed upon them. That is, the springs must act as springs and carry the driving strain, as well.

926,771. Ball-Bearing—Ernst Sachs, Schweinfurt, Germany. Filed Apr. 17, 1907.

A form of ball retainer used on the well-known Fichtel and Sachs ball bearings, or more correctly a means of assembling and dissembling the same. The internal race is made with a deep central groove, into which an oblique groove leads. Through the medium of the diagonal groove the race is really screwed into place.

926,797. Transmission-Gearing for Automobiles—Martin L. Williams, South Bend, Ind. Filed Feb. 12, 1906.

This is a plan to combine the engine, transmission, clutch and other parts of the power plant into a single unit. In doing this, the engine is set across the frame, and back of it in a parallel line is the transmission shafts two in number. Since there are three separate drives from the engine to the transmission shaft and two or three differentials, it seems fair to say that this is a complicated device.

926,848. Carbureter—John A. Carlson, Denver, Colo. Filed Mar. 27, 1908.

For simplicity, Carlson's carbureter takes the cake, since it comprises but an angle-shaped pipe, with an air inlet at the bottom, governed by a spring, which is inter-connected with the fuel inlet in the side of the pipe. As the speed of the engine draws in more air, the opening of the air valve also opens the fuel passage, so more fuel enters.

926,892. Explosion-Engine—John Peterson and Frederick O. Peterson, Detroit, Mich. Filed Feb. 24, 1908.

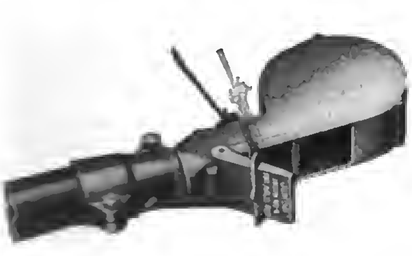
A two-cycle engine with fuel injection. This is arranged so that the carbureter is mounted high up on the side of the engine where it has communication with the crank case. The latter has the usual air inlet, and after compressing the air, it is blown through the carbureter, which is little more than a float chamber with a fuel-regulating device. In action, then, the suction stroke does not really draw in anything, for the feed is by pressure, the mixed air and gasoline vapor being forced in. This should result in a very complete charge, although it would doubtless be rather wasteful of the fuel.

926,919. Gearing—Alfred N. Adams, Omaha, Neb. Filed Dec. 28, 1908.

This is a four-wheel drive and steer arrangement, in which the usual transmission is replaced by no less than four small transmissions, one on each stub axle. From the drawing it would appear as if the plan was to locate the engine in the center of the frame.

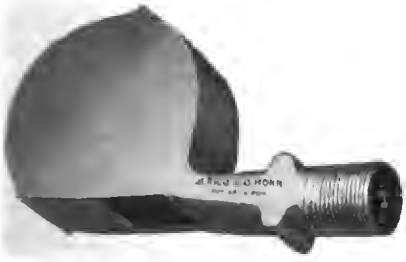
Information for Auto Users

"Jericho" the Horn—In response to the demand for an inexpensive exhaust horn, the Randall-Faichney Company of Boston has brought out a horn designed to be attached to the exhaust pipe at the rear of the muffler, thus doing away with the complication and expense of the usual cut-out. The device fits on the extreme rear end of the exhaust pipe, so that no cutting of the



JERICHO HORN SHOWN OPEN

pipe is required; the connection is made by means of a clamp coupling which is furnished in sizes to fit any pipe. The construction of the horn itself is novel. It contains no reeds to choke or become clogged, and as the opening is on the under side, obstructions will fall out of themselves, instead of being trapped and retained. The construction and method of attachment will be obvious at once from the cut. Its tone is quite unique. At low speed, for town use, it is said to resemble the call of a loon; but for country driving it becomes far-reaching and insistent. The horn is made in four sizes, some one of which will be found suitable for any size of motor. For cars which are so constructed that there is not room for the horn at the rear of

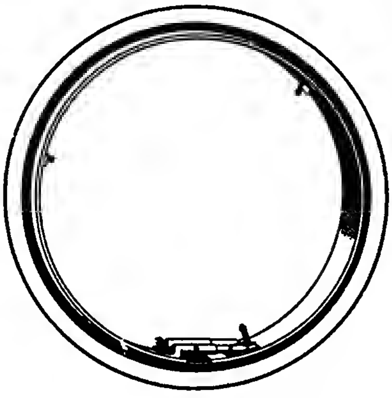


SPECIAL DESIGN OF JERICHO HORN

the muffler a special design is made in which the connection requires the use of a cut-out; otherwise the horn is on the same principle. The stem of this horn is threaded with one-inch standard pipe thread, and fits the standard cut-out devices. The non-clogging feature and the unique tone make this an ideal horn.

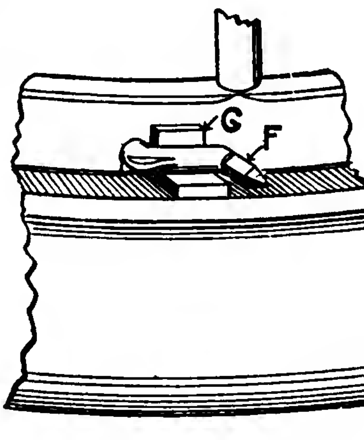
Crawford's "Special" Oil—The William J. Crawford Company, 14 Wood street Pittsburg, Pa., has put on the market a brand of oil under this name specially adapted for automobile use. It is a light-colored, filtered, pure mineral oil, with high viscosity, flash and fire tests, and is claimed to give good lubrication with a minimum of carbon deposit. Another brand is made for steam cars. The oil is put up in barrels, half-barrels and cases, with freight prepaid in the East and in the Mississippi Valley. The prices are especially reasonable.

Doolittle Demountable Rim—This addition to the ranks of the demountable rims is built on a new principle, which seems to have several features of merit. The rim is made in a single piece, but is sawed right across. To place it on the wheel the sawed edges are forced apart, expanding the rim so that it slips over the felloe and then is drawn together,



COMPLETE DOOLITTLE DEMOUNTABLE

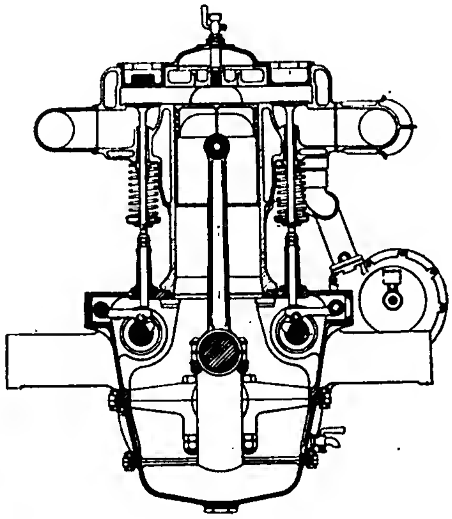
contracting it and setting it tightly into place. The expansion and contraction are effected by means of two turnbuckles, placed side by side and operated at the same time by a double-socketed ratchet wrench. To make it additionally secure two other locks are provided, as shown in the cut, in which F is the locking arm and G the side stop. This construction also facilitates removing the tire from the rim. It is impossible for the rim to



DETAIL OF DOOLITTLE RIM LOCK

stick to the wheel from rust or other causes, as the turnbuckles expand it with a force which immediately loosens it. The turnbuckles are enclosed in telescoping sleeves, so that they are not exposed to mud and dust, and the wheel as a whole presents a very neat appearance. The rims are sold in sets of five, the extra one carrying a fully inflated tire ready for the road.

New T-Head Motor—Since the modern tendency is toward specilization, many automobile firms are now buying their engines from an engine specialist. A newcomer in this line is the North Ameri-



SECTION NORTH AMERICAN MOTOR

can Motor Corporation, 79 Broad street, Stapleton, Borough of Richmond, New York City, with a motor called the North American. This is of the T-head type, which has gained much favor of recent years, due to the fact that it allows of very large valves, which, in turn, permit of very high and very low speeds. This makes a very flexible engine. As in this item, so also in others, the engines, two in number, are right up to date. The two engines now built are both of four cylinders, the sizes being 4 by 4 1-2 for low powers and 5 by 5 1-2 for higher powers. Other sizes can be made to special order, and, in fact, these two motors can be had in six-cylinder form if desired. An especial feature to which attention is called is the arrangement of the crankcase. This is divided into three compartments, the upper carrying the supporting arms, and to which the cylinders are attached as well as the crankshaft bearings. The next section below that is really but an intermediate section, although it carries the lower halves of the shaft bearings. Below that in turn is the bottom section, which really is but an oil pan. Drain cocks are provided to drain off the oil and, in addition, several large plugs which allow of emptying the pan very rapidly. When emptied of oil, the removal of about a dozen small bolts permits of removing this, in which case it serves as a hand hole or inspection port. This construction allows the running of the engine with the oil pan removed, so that trouble can be instantly detected.

Between the cams and push-rods are interposed small levers which take the thrust and are removable from the exterior.

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VOL. XXI NEW YORK—THURSDAY, JULY 29, 1909—CHICAGO No. 5

THE AUTOMOBILE

Glidden Tour nearing Finish

Greeted by a "Prairie Schooner" in Colorado.

Ready for the night's rest at Council Bluffs

Where Nebraska Quicksands were Treacherous

Substantial Western Hospitality

HUGO, COL., July 27—Thirteen of the thirty cars which started from Detroit on the morning of July 12 in the Sixth A. A. A. Tour to-day renewed the struggle with perfect scores: twelve others are in a more or less penalized condition; and five have been withdrawn, though three are still participating as non-contestants. Four running days remain, during which 740.5 miles are to be covered of the 2,643 grand total mileage. One of these four days—the final one from

Entering Denver, the Extreme Western Limit of the Tour, at the End of the Week's Run from Minneapolis

Salina to Kansas City—is said to be the hardest of the entire tour. This day is looked upon as the one which will send some of the clean score contingent to the hands of the technical examiners with blemished records, though it is most probable that this concluding looking-over by the experts will prevent any such thing as a tie for any one of the three trophies. This is the list of unmarked cars which this morning started for Hugo, Colorado:

GLIDDEN

No. 1 Premier (Jay).
No. 2 Premier (Hammond).
No. 5 Marmon (Marmon).
No. 6 Maxwell (Gager).
No. 8 Pierce-Arrow (Dey).
No. 9 Pierce-Arrow (Winchester).
No. 14 White Steamer (Searles).

DETROIT

No. 51 American Simplex (Woods).

HOWER

No. 101 Moline (Wicke).
No. 105 Chalmers-Detroit (Machesky).
No. 108 Pierce-Arrow (Williams).
No. 109 Pierce-Arrow (Schofeld).
No. 114 Lexington (Moore).

Denver has given the party a wealth of entertainment, and the program has been diversified, well planned, and carried out. The Denver Motor Club appointed committees which have been on their job ever since the grime-complexioned tourists Saturday last entered the hospitable confines of this energetic city of the Rockies, and if one had complaint to file it, would take note of the fact that the hosts were determined that the good things provided should not pass unheeded. Of course the visitors had to be shown what a first-class city looked like, this happening the greater part of Sunday; next came the banquet in the evening at Lakeside; on Monday followed the trip to Mt. McClellan, where a grand view of the Rockies unfolded itself, and in the evening was a finale at the rooms of the club.

Fording a Stream That Intersected the Colorado Prairie

Second Week Was a Hard One

The second week of the tour was considerably harder than the first one in that the cars had six days of steady going, covering 1077.2 miles at approximately a 20-mile schedule for the class A or big cars. The route was over dirt and gumbo roads, with not a drop of rain, hot weather and dry roads being the standing order for all six days. Dirt roads generally mean good roads in dry weather with plenty of dust, but the Glidden army met miles of bad dust roads, with deep ruts, waterbreakers, and high culverts that tested springs and shook tonneau occupants to desperation. For the first time in a Glidden tour, three of the daily trips have exceeded the double century mark, and a fourth was within four miles of the 200 mark.

It was freely predicted that the second week would be the real car tester, but such was not the case, and the cars made a better showing on the six days of the second week than they did on the five of the opening one, and besides traveled 1077.2 miles as compared with but 822.8 on the first week.

In all seventeen perfect scores out of the thirty starters have gone, leaving an unlucky thirteen to face the four-day eastward leg to Kansas City. Of the seventeen penalized nine were in the first week and only eight in the second week.

The past week saw four Glidden perfects go, namely: Frank Wing's Marmon, O. P. Bernhart's Jewel, A. Y. Bartholomew's Glide, and Buse's Thomas.

The Glidden ranks suffered more last week than did the Hower contingent, and the week proved a veritable Waterloo for the Detroit trophy class in that two of the three lost their clean standing. But two perfect-score Hower contestants lost out, Molines Nos. 100 and 102; and in the Detroit class the two losers are Bemp's Chalmers-Detroit and Waltman's Premier.

The troubles that arose last week in a majority of cases were of a different nature from those of the preceding week, and undoubtedly were the result of the continued knocking the cars received from day to day, whereas those of the opening week were in the majority of cases the result of an extreme incident which might be termed a minor accident. One example will suffice. During the present week three perfect scores have been lost due to breaking or leaking of the gasoline line. One was due to the gasoline pipe rubbing against the apron, another to a loosened flange, and a third to vibration.

The much-talked-of spring trouble at last appeared, though only one car had trouble in this respect, it being No. 10 Glide. Before the run it was decided that spring breakings would be legion, but the exact opposite is proving to be the case. Heretofore spring breaking has been a factor in car troubles, but not so this year, and it is reasonable to assume that the experiences of former years have proven a benefit. There have been a couple of cases of bolts breaking in wheel hubs and other cases of nuts on these bolts coming loose and new bolts being used. This is undoubtedly due to continued road use.

It is interesting to note that of the nine cars that were penalized during the first week everyone of them excepting the No. 112 Mason had additional penalties added during last week. This is an expected condition, and the Mason exception may be explained in that its penalty on the opening week was simply for breaking a pet cock.

The honors of the tour so far go to the Pierce entry of four cars, all of which are running with perfect scores, and the majority of which have trailed the chairman's car into the night stop nearly every day. The Pierce is the only multiple entry—an entry of more than one—which has a 100 per cent. perfect score standing. There are, however, several cases of individual perfect scores standing where makers entered one car and which is still perfect, examples of this being White, American, Simplex, and Lexington. Several of the entrants of more than one car, while not 100 per cent., are in good shape. Two of the three Premier entries are perfect; two out of the three Chalmers-Detroits are perfect. One of the two Maxwells remains perfect, as does one of the two Marmons.

The thirteen perfect score cars have been making remarkable running from day to day. The majority of them are first in at the checking stations, and they are often away early in the morning. The Lexington has been an early arrival at the night stops, the Pierces have generally been well in the van, and the Premiers have been well up, but the drivers have not been taking any chances. The Moline cars generally keep well bunched. The White has been run conservatively from the start, going out well toward the last end of the cavalcade each day, and not checking in much ahead of the scheduled time.

Pullman Train Where the Tourists Ate and Slept

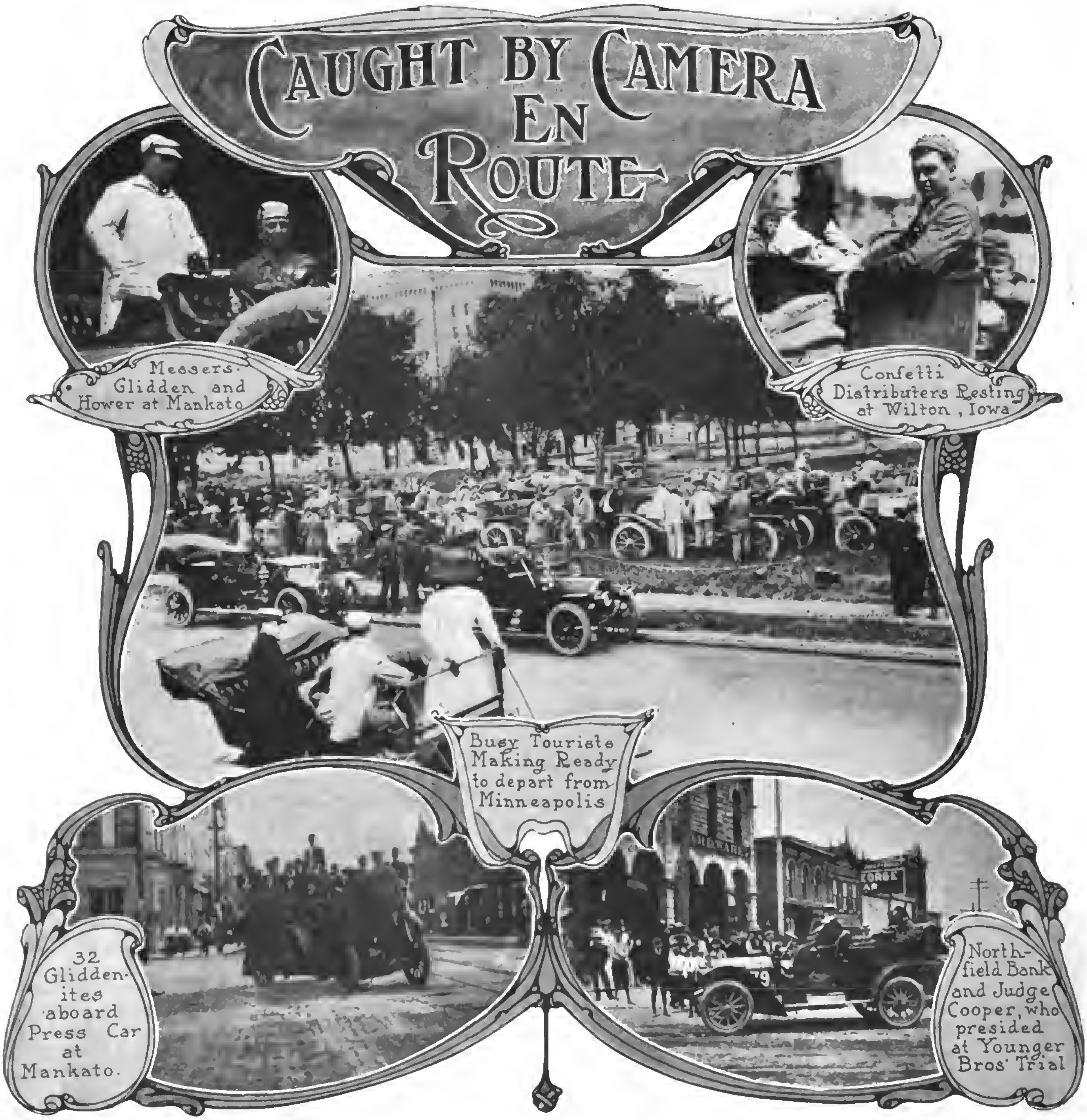
NOTED ALONG THE WESTERN TRAIL

At a Little Colorado Town, consisting of a store and two or three houses and unlimited prairie land all around, named Bignell, the press car stopped. Immediately the dozen inhabitants were about the car. "Our town," said one, "is but a few weeks old, but come back next year (somehow these boomers in the West like to talk one for themselves all the time) and we will show you a town of several thousand people." When asked in regard to the name Bignell, a genuine cowgirl on horseback, if ever there was one, modestly said that the city—she called it so—was hers.

In a Town 50 Miles from Kearney an old man reverently laid his hands upon a press car, stepped back, and said: "My, but I wish they had had those when I was young. You fellers look healthy. I was that way when a man kicked me out of the side door of a Pullman car twenty-five years ago, and here I am. I've never been away since." All of which goes to show that some fellows stick close to locations that are forced upon them by circumstances.

The Three R's, reading, 'riting and 'rithmetic, enter into some of the daily paper stories from the tour. The press men know from reading what their papers want; they know how to write; and the multiplication does the rest. Incidents are frequently magnified and sent broadcast over the country to worry the folks of the men most interested.

The Prairie Roads in Some Sections Had Bridges That Required Repairs Before Risking Passage—Simplex on Bridge



DAILY PROGRESS FROM FORT DODGE, IA., TO HUGO, COL.

MORE strenuous work and a settling down to the reality that it was a contest, not a pleasure jaunt, marked the third and hardest week of the tour. Passing through but three States, the tourists saw considerable change in the road surfaces, which changed for the worse, and a particularly noticeable difference in the elevation, a rise of about eight feet per mile marking over half of the distance traveled. While the penalties were few, still a number of cars were taken out of the perfect class.

EIGHTH DAY—FT. DODGE TO COUNCIL BLUFFS

(196.0 Miles)

COUNCIL BLUFFS, IA., July 21—Despite two detours which swelled the mileage somewhat, and an advance alarum that the run would be a "sockdologer," the journey here from Fort Dodge was accomplished almost without a whimper from the sturdy motor travelers. The 9 hours 42 minutes schedule allowance proved more than ample for all concerned. It's a fair guess that the two-car delegation from the Council Bluffs Automobile Club, which went to Fort Dodge to escort Pilot Lewis in his confetti strewing, underestimated the capabilities of the present tour participants, and mayhaps they did not give sufficient credit to the really excellent roads contained in to-day's route. While there were occasional stretches that were not strictly first class, and grades now and then intruded that caused the use of secondary speeds, the highway averaged as a whole better than anything yet met with on the tour.

Before departure from Fort Dodge, Pathfinder Lewis received a letter from Henry Haag, an autoing good roads enthusiast of Jefferson, who wrote as follows:

"It is a hard matter to make good roads when the weather conditions are constantly against us. However, I have made a special effort to have Greene county roads good for the Glidden tourists. The entire 35 miles through Greene county have been gone over several times with the big grader, and I have been over the roads repeatedly in the past week, filled all the approaches to bridges and culverts and fixed all the bad places. I have a full force out to-day for the final smoothing, and I believe you will find the 35 miles as good, if not better, than any other stretch of 35 miles in the State. We want to do all we can to make your trip through our county pleasant, safe and fast."

It is safe to say that every car to-day put in its best licks over this 35-mile stretch, and they were sorry when it came to an end. As the flying procession passed through Jefferson, only a couple of the cars took time to stop and express appreciation to Mr. Haag for his labors in their behalf, though all gave absent thanks later when they learned that he was the man responsible for their enjoyment.

Glidden was a sleepy sort of town which figured in to-day's route, and it was natural to suppose that there might be some "doings" when the trophy donor passed through. But when he did come along in Chairman Hower's car the only sight that the half-awake people of Glidden saw of Glidden was a streak of dust in the center of which floated an American flag. In consequence there is no mention here of what Glidden said to the good people of Glidden.

Originally to-night's stop was placed at Omaha. But that city is yet a dead one, as far as the A. A. A. is concerned, and the vigorous insistence of Council Bluffs, through its club member of the national body, made the selection of this hustling city an imperative proposition. As soon as the dust-caked visitors arrived in the public square, they were escorted to the Elks' club, where there was opportunity for exterior and interior washing. A band concert in Bayliss Park enlivened the finishing of the run, after which the entire party were conveyed to Lake Manawa for a good swim and a boat ride. In the evening came a banquet at the Grand Hotel, where in addition to Glidden, Hower, Lewis, and other tour notables, there sat Dr. T. B. Lacey, president of the Iowa State Automobile Association; Dr. Donald Macrae, president of the Council Bluffs Club, and W. R. McKeen, president of the Omaha Automobile Club. Of course there was speechmaking and compliments galore, and as a wind-up of the entertaining there followed a fine display of fireworks from the highest point in Fairmount Park.

Eight Cars Met with Penalizations—High speed was not conducive to the maintaining of perfect records, as it soon became evident, for the penalizations fell thicker and in more important parts than in any previous day of this tour. Eight cars were touched when the observers' cards were given full consideration, though none were late. All through the day the men at the wheel had been driving hard, with the expectation of finding terrible conditions ahead. In addition to there being so many marks scattered about, was the fact that six had previously been unsmirched. They were the Marmon, driven by Wing; the Jewel, driven by Bernhart; the Glide, driven by Bartholomew; the Premier, driven by Waltman, and the Molines, driven by Van Der Voort and Gregory. The other two cars which had received penalties before to-day were the Chalmers-Detroit touring car and the Jewel roadster.

The Chalmers was given 19.1 points, divided as follows: 1.6 points, for a new connecting rod bearing; 2.9 points, for inspecting two crankshaft bearings; 14 points, for labor in putting in the new bearing, and .6 point, for the use of an outside tool, a socket wrench. For tightening the hub flange bolts, and the material used—bolts—the Jewel touring car, driven by Bernhart, was given 16 marks. The Glide touring car, with Bartholomew up, had to have its steering arm repaired, the penalty being 8 points for labor and the same amount for material, the total being a loss of 16 points.

When the Premier toy tonneau car was penalized .8 of a point for labor connected with slipping a hose over a leaking gasoline feed pipe, it was the first of the Detroit trophy trio to receive a penalty. The pipe had chafed on the dust pan, and inasmuch as the piece of rubber used was taken from the gas lamp connections, no marks were given for material.

In the Hower trophy class there were three sets of marks, two being against the Molines, which had a three-car perfect team until then. The car driven by C. H. Van Der Voort had to open its crankcase to remove a piece of steel which was making itself heard, and the labor required 31 minutes, consequently a loss of 3.1 points. The other car, driven by Gregory, was stopped to replace a taper pin in the camshaft gear hub, and to replace a cap screw in the water inlet flange, the total points being 16.1. The third Howerite to have additions made to its

Fort Dodge, Iowa, Turned Out En Masse to Greet the Gliddenites on Their Arrival in That Hustling Burg

W. C. Marmon Assumes the Role of Good Samaritan

score was the Jewel roadster, which had an encounter with a sand bank a few miles from the finish. A curve which was taken too sharply resulted in a dished wheel, a bent steering knuckle, and a broken spring clip. The total penalty was 8.4 points, which brought its record for the trip to 29.2 points.

NINTH DAY—COUNCIL BLUFFS TO KEARNEY

(200.2 Miles)

KEARNEY, NEB., July 22—"Alfalfaville" is the other name for this bustling little Nebraska city, which to-day gave a most hearty welcome to the "Gliddenites," for such is the designation of the participants in the big tour, as far as the inhabitants of the West are concerned. They may have heard of the A. A. A., read of Hower, and a select few may have knowledge of the fact that a Detroit trophy is involved in the three-sided contesting; but all know that one Charles J. Glidden has poked about the world most industriously with an automobile and has made the fact known to millions of people. And so the cavalcade, one and all, are spoken of as "Gliddenites," and such they will be to the end of the chapter.

According to the measurements of the rotund Lewis, it is just 200 miles and one-fifth from the Iowa town where we slept last night to this energetic burg, where a local club is in the process of formation and a nucleus of it extended courtesies that met with satisfied acceptance. The real prize of the festivities was the temporary installation in a local plumbing store of several shower baths which found quick patronage as soon as their location was learned. This committee deserves to have their names printed, and so they are herewith given in a thankful spirit: Joseph Wingard, chairman; Dr. G. H. Wade, Dr. A. A. Munn, G. R. Kibler, and Dr. John Cameron. At a smoker held in the city hall in the evening, Mayor Patterson presided, and Judge Oldham delivered a stirring address of welcome. Several "Gliddenites" added to the oratory, and all joined in the singing.

While Omaha took an interest in this morning's passage of the tour through its streets, it can't be said that any vast hilarity greeted the occasion, for the spending of the night in Council Bluffs had in it a distinct disappointment to the residents of the city nearest to the banks of the Missouri. Hills added to the beauty of the scenery in the vicinity of Omaha, but after a score of miles the country flattened out and thus it remained with variations not worth mentioning all the way here. Fremont had a circus, and many horse-drawn vehicles were moving townward, and there resulted an inning of excitement for some of the farmers. Not before on the tour were so many frightened horses encountered.

Cattle grazing along the highways became frequent, and now and then one caught sight of what looked like a real cowboy. The alfalfa fields extended on all sides, and corn grew in plenty, thus indicating the two principal crops of the section traversed. The roads averaged up exceedingly well—in fact, so well that the nine-hour schedule proved utterly inadequate to inconvenience the sustained speed of the contestants, who arrived an hour and more in advance of checking-in time, and then after an impatient crawling behind the pacemaking car, which to-day had "Sammy" Stevens in the chairman's seat. The ruler of the contest board was suffering from a weather indisposition that caused him to stick to the Pullman train, but he instructed the acting pacemaker not to reach Kearney until 4 P. M.; and Stevens always obeys a ruling. While there were roads that must be set down as poor, the average to-day came as a pleasant surprise, and especially enjoyable was the concluding score of miles.

This cleanly young city of Kearney appreciates the motor-driven vehicle, as is attested by the fact that over 200 of its 9,000 odd inhabitants are the owners of cars. This would give an average of an automobile for every 45 people, which would appear to be a record, though there is a story floating about to the effect that another Nebraska town of less than a thousand population has over a hundred autoists.

But the cars are beginning to feel the effects of the long daily runs and the meager attention permitted without penalization. In consequence it is more than likely that the official announcements will contain demerit points more plentifully than has been the case up to the present time. Those to suffer in to-day's run included two that had previously been in the perfect class.

Only Two Penalties Were Inflicted—In spite of the fine roads where, as yesterday, the cars might have been given a free rein, the result to-day was not nearly as disastrous to perfect records as was the trip into the Bluffs. Only two penalties were inflicted, and there was one withdrawal. A penalty which had especial bearing on the contest was that given to the Chalmers-Detroit competing for the Detroit trophy, because now there remains but the American Simplex in that section with its desirable goose egg. The car driven by Cliff Waltman developed trouble with its commutator shaft connections, and tightening these gave it a penalty of 5.8 points for labor. An addition of .2 was made for work in tightening a motor bolt. The Detroit class is now ranked according to score as: American Simplex, Premier, and Chalmers-Detroit.

The other daily account was with the Jewel roadster, which had to change a spark plug, the points being 1.4, of which the .4 is for labor. The Chalmers-Detroit touring car withdrew, its previous penalties of 225.5 being thus increased to 1,000.

A single diverting occurrence happened during the day, and that was to the big six-cylinder Thomas touring car, which is participating in its second Glidden. There was a mudhole about halfway between the two cities of starting and stopping, and though it was short, it was mighty. A bed of quicksand was hidden by the black clay, and most of the cars were able to cross by rushing, but the Thomas sang to its hub and it took block and tackle to get it out. Webb Jay did the pulling with his Premier, using the Rapid truck as an anchor for the block.

Starter Ferguson Checking Out No. 53 Premier

This car is driven by C. Waltman, and is contesting for the Detroit Trophy. H. O. Smith, head of the Premier Company, is seated alongside the driver.

TENTH DAY—KEARNEY TO JULESBURG

(206.2 Miles)

JULESBURG, COL., July 23—Nebraska's roads did not hold out on the second day for the entire route, and after getting out of the county of which Kearney is the seat, the highways fluctuated from one kind to another, finally becoming little more than a prairie trail. Acres of alfalfa stretched in all directions in and about Kearney, soon after leaving which was seen the post marking the halfway mark between Boston and San Francisco.

Both the Union Pacific railroad and the Platte River intermittently paralleled the route, and the wide stream was crossed near Gothenburg over a bridge a mile long. The river is shallow and mostly mud-bottomed, but it and its two forks are invaluable for irrigating purposes and rescue thousands of acres of land from disuse. As an indication of the country included in to-day's run, it is only necessary to refer to one of Dai Lewis' route-book notations, where, at 76.6 miles, he called attention to 14 mail boxes at a turn where it was impossible to see a house.

Kearney, Nebraska, Which Is Half Way Between Boston and San Francisco, Greeting the Tourists

Of course, good-sized towns were discovered now and then, but in not a few instances they were often forty miles and more apart. North Platte had a single auto agency, but on a basis of population there is a substantial number of owners.

After about a hundred miles of the 206.2 had been covered, the going for the most part consisted of what looked nothing more than paths through pasture land, the center of the road being grass-sown. Rabbits frequently scurried across the front of the cars, quail popped into and out of view, and gophers were disturbed in their sunning. Occasionally patches of wild flowers enlivened the otherwise rather monotonous landscape, which, it must be confessed, bore a desolate appearance in the open country, and only fifteen towns were passed through in the two hundred miles.

Near Sutherland several sandy and steep grades exercised the full horsepower of some of the cars. Here one of the confetti craft suffered a strain that caused a stop of a couple of hours, while in several other instances the aid of a good team was enlisted.

The story had been current the night before that Ogallala intended to do some "trapping" in case the speed law was not respected. Pilot Lewis investigated the tale and found out that it was fiction. Nevertheless, there was an incident at Ogallala which involved No. 7 Jewel, "Ollie" Bernhart driving, and, apparently, a new owner of a Ford. The latter became rattled and there was a collision. It naturally followed that the visitor must be to blame, and so a telephone to Brule, the next town, resulted in the holding of the tour driver until the arrival of the sheriff in an auto. Realizing that the placing of the blame would be more trouble than a settlement for alleged damage, Bernhart told the sheriff to telephone back that his company would foot the bill after the repairman had completed his estimate. This closed the affair for the time being.

Once to-day the round-the-world experience of George Schuster, who is driving the Thomas Sixty which carried the editorial complement of THE AUTOMOBILE and *Motor Age*, came into play. Near North Platte, an amateur owner had slid into the ditch in giving too much of the road to the contesting cars. The right kind of a knot and a pull soon made one man a happy individual again, to say nothing of those he was transporting. This is the third job of the kind in which the Thomas has participated since the beginning of the tour.

This night stop finds the tourists most comfortably located in their Pullman train in the outskirts of this little Colorado village of scarcely more than 1,200 souls, and as this story is finding form, a cooling breeze is filtering through the car window, assuring a good night's sleep in an altitude that has increased to-day about eight feet with every mile traveled. On arrival, the local entertainment committee presented each tourist with a brilliant red badge, welcoming them to Julesburg, "The Gateway to Colorado," and further conveying the information that "We have Julesburg reservoir, capacity of 1,200,000,000 gallons; 28,000 acres of irrigated land that produces 20 tons of sugar beets, 200 bushels of potatoes, and 5 tons of alfalfa. Unirrigated wheat and corn lands pay for themselves with one crop."

None of Perfect Scores Disturbed—In the matter of penalties, that sinister report to which the contestants look each day to see how they fare, there were few. Perhaps any derangements of the day will appear to-morrow, as is frequently the case. There were three cars which have raised their numerical standing, none of them being among the perfect contenders. They were the Jewel touring car, driven by O. P. Bernhart, which lost .1 of a point for work in fixing a bent fender, sustained in its Ogallala collision; another was the Glide which replaced a spring, and its 9.2 points were divided into 5 for labor and the remainder for the new spring, and the third penalty was given to the Moline driven by Gregory, which had to fix a fender, the work being rated at .8 and a new bolt at .2 points. There has been some question as to the reason for such heavy penalties for fender troubles, and the authorities have answered

A. Y. Bartholomew Driving No. 10 Glide, at Kearney

that there is perhaps no part of an automobile which has more effect upon its appearance than its mudguards. To make these sufficiently strong should be an aim of the manufacturer, say the rulemakers.

ELEVENTH DAY—JULESBURG TO DENVER

(204.8 Miles)

DENVER, COL., July 24—There was much variety in the double century of to-day, though for the most it related to the living things seen in the prairie section of the run. For the first hundred miles, the route paralleled the South Platte river, with the shallow stream visible little of the time. Its irrigating ditches constantly reminded one of the immense value of this unpicturesque river, for fields stretched in all directions which benefited from its water, sugar beets being, perhaps, the principal thing grown. At Sterling, the largest town passed through, a mammoth sugar-making factory told the resultant story of the reclamation of former arid acres. Cattle grazed by the hundred, and most of the so-called towns were nothing more than livestock runways alongside the railroad tracks, which stuck close to the highway.

At Fort Morgan, which has a prosperous appearance, the plunge was made away from the semblance of civilization, and the long, hot and dusty ride began across the prairie. For a while the effete Easterners enjoyed the wide expanse of country and cussed the intervals of rut-infested trails. Then Old Sol got in his work good and strong, and one lost interest in the scamperings of prairie dogs and jack rabbits, the alarmed soarings of the meadow larks and bobolinks, and the killing of an occasional snake. Some of the touring party saw many other things that had life, the list embracing antelopes, coyotes, owls, hawks, quail and minor birds in great quantity. The monotonous landscape had frequent colorings in patches of sunflówers, wild asters, and white primroses.

The "roads" were many and complex, and it required the exercise of no small skill on the part of Pilot Lewis to lay the route and for those who came behind, to follow it. Every few miles it was a necessity to open wire gates, which were always closed again, as there is a fine in the State of $500 for failing so to do.

Moreville—it needs considerable more to make it a place on the map—consisted of a shaft which the optimistic prospector has started for the bowels of the earth in search of coal. Even he was not in evidence to speed the passing guests, who at the moment were laboring over one of the roughest stretches navigated during the day.

Soon after leaving Fort Morgan eyes had been strained to catch the first glimpse of the Rockies, and those with imagination saw the mountains many miles in advance of the less far-sighted. Clouds mercifully shifted about and frequently lessened the rays of the sun, which about midday supplied scorching heat. As a matter of fact, the Rockies did not show to advantage to-day, and few appreciated their bigness until nearing Bennett, previous to which the worst bit of the run had been encountered in the way of a shaky bridge across a small rivulet. The first cars weakened the structure, and THE AUTOMOBILE and *Motor Age* Thomas broke through. Schuster had tackled harder jobs before, and the big "60" was quickly rescued from its temporary predicament.

In several spots the carelessness of the farmers had permitted the irrigating ditches to overflow, and progress through these places had to be made cautiously. Once the E-M-F pilot car got stuck in one of its investigations, but Meinzinger extricated it, and the "spaghetti" then took the contesting cars around the miniature bog.

The desolateness of the scene at times caused one to wonder how one could find any value in life with such surroundings, the mud huts presenting a woebegone appearance with no treeless adornment and invariably the next similar "home" was so far away as to be out of sight. Of course it must be a matter of existence, not living.

Nearing Bennett, some twenty-five miles from Denver, the country renewed its appearance of being habitable, but even to the city limits, trees were few and far between, only the cactus and sage brush showing signs of growth. Of people there were none.

About fifteen miles from the mile-high city, at a ford in a stream, were the first big party of welcoming Denverites in their automobiles, though a couple of newspaper cars had said hello at Bennett. From that point into the finish the roads and, later, streets were lined. Bombs were fired to announce the arrival of the contestants, one being fired when they were ten miles from

Surprising Prevalence of Automobiles Along the Prairie Route Demonstrates Their Growing Popularity

Denver, two when they were five miles out, and another as each one entered the city limits. To see that the preparations were well carried out, the tourists were met by the official committee, consisting of: Dr. Ralph L. Taylor, chairman; Joseph McDuffie, George Wahlgreen, Tom Botterill, T. J. O'Donnell, Judge Grant L. Hudson, E. E. Sommers, and Dr. E. P. Geggenbach. The entry was over the Mountview boulevard, and through City Park to East Eighteenth avenue.

Only Two Cars Penalized—In view of the hardness of the route, considered the most difficult of the trip to date, it was expected that the penalties would be numerous and heavy. There was much surprise, therefore, when it was learned that only two cars had received marks against their scores. One of these was the perfect-score six-cylinder Thomas, driven by Gus Buse, Jr. Out on the deserted plains it was necessary to make a repair upon the gasoline feed line, where it had worn through. One point was the result. The other car was the Glide, which broke a spring, and did not arrive until evening. All manner of dire stories had arisen as to its delay, from broken bridges to "lady" bandits, and the latter yarn found publication in a Denver daily.

The trouble at the bridge might have delayed many of the contestants had it not been understood that time might be taken out if the delay was so great as to make a car tardy. At the broken bridge each contestant was instructed to wait for the next car, and the observer took out time.

TWELFTH DAY—DENVER TO HUGO, COL.

(173.5 Miles)

Hugo, Col., July 27—En route to this little village of the prairie, 173 miles from hospitable Denver, a two-hour control was put into effect at Colorado Springs, so that the contesting tourists could visit the Garden of the Gods and other points of interest in the vicinity. The ride to the springs from Denver is credited one of the most beautiful, scenically, in the country, the route paralleling the rocks with a good road. Pike's Peak to-day was visible over 500 miles. Soon after leaving the springs, the plunge began across the prairie, which supplied all kinds of going, some excellent, and much proving more annoying than difficult. At this time nothing living was visible, not even a prairie dog. The elevation of this new and possibly booming town, is some four thousand nine feet above sea level, and it is cool and comfortable in the Pullman sleeping cars, which answer for hotel accommodations.

For amusement to-night, the party patronized a church ice-cream festival and danced. Everybody in the village attended, for the population does not much exceed 500. The run across the plains led to the loss of two previously perfect scores, one in the Glidden class and the other the only clean-record machine of the Detroit class. The former is the White Steamer driven by H. N. Searles, in which sand found its way into the lubricator pipe and necessitated a cleaning. The labor spent cost 2.2 points, and lateness from the same source, 16 points, a total of 18.2. This leaves six cars still with perfect scores, out of the thirteen starters.

The American Simplex was the most unfortunate car of the day, however, for it dropped into a deep gulley and had its steering gear and radiator seriously injured. The gulley was hard to see and several machines narrowly escaped dropping in, instead of turning with the ditch to a more accessible place. The car driven by J. A. Wood was travelling at a speed of about thirty miles an hour when the danger was seen, and quick application of brakes reduced to speed to fifteen. Block and tackle were necessary in order to get out, and then the steering gear had to be straightened, and it was found that the bottom of the radiator was stove in and leaking badly. The penalty for labor and grease used was 1.4 points, and though the car was sixty-one minutes behind its schedule seventy miles out, it was able to check in ten minutes ahead of time. The little Brush runabout, now a non-contestant, driven by Trinkle, turned turtle before reaching Colorado Springs. It was righted by some of the contestants and will rejoin the party when it has had its steering apparatus repaired. Near the same place the Hupmobile, another non-contestant, broke a connecting rod, and it will have to hurry to catch up with the procession.

Freight Crew Greeting White Steamer in Nebraska

The Glide touring car has been experiencing trouble with light springs, and its penalty for Saturday, the run to Denver, was to-day announced at 119.3 points, of which 113 were for lateness

No. 8 Pierce Under Sycamores at Silver Creek, Neb.

and the other 6.3 points for labor on the fan belt and front springs. The standing of this car for to-day has not been given out, but will be announced to-morrow.

The Jewel touring car driven by O. P. Bernhart, has had its score re-arranged, beating it down from 16.1 to 8.9 points. There had been a miscalculation in the penalty inflicted on the run from Fort Dodge into Council Bluffs.

Mason Car Taking on Supplies at Council Bluffs

THE TABULAR STORY OF THE BIG TOUR AS IT PROGRESSES

No.	Car	H.P.	Cyl.	Bore	Stroke	Driver	1st Day	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
	GLIDDEN TROPHY																	
1	Premier	32.4	4	4½	5¼	Webb Jay	0	0	0	0	0	0	0	0	0	0	0	0
2	Premier	32.4	4	4½	5¼	H. Hammond	0	0	0	0	0	0	0	0	0	0	0	0
3	Chalmers-Detroit	40	4	5	4¾	William Bolger	1	0.4	0	0	0	0	204	19.1	Withdrawn			
4	Marmon	32.4	4	4½	4½	F. E. Wing	0	0	0	0	0	0	0	6.8	0	0	0	0
5	Marmon	32.4	4	4½	4½	H. C. Marmon	0	0	0	0	0	0	0	0	0	0	0	0
6	Maxwell	28.9	4	4¼	4¼	E. G. Gager	0	0	0	0	0	0	0	0	0	0	0	0
7	Jewel	36.1	4	4¾	5	O. P. Bernhardt	0	0	0	0	0	0	0	16	0	0.1	0	0
8	Pierce-Arrow	48.6	6	4½	4¾	F. S. Dey	0	0	0	0	0	0	0	0	0	0	0	0
9	Pierce-Arrow	48.6	6	4½	4¾	W. F. Winchester	0	0	0	0	0	0	0	0	0	0	0	0
10	Glide	36.1	4	4¾	5	A. Y. Bartholomew	0	0	0	0	0	0	0	16	0	9.2	119.3	*
11	Thomas	72.6	6	5½	5½	G. B. Buse	0	0	0	0	0	0	0	0	0	0	1.0	0
12	Midland	32.4	4	4½	5¼	E. O. Hayes	0	0	0	3.7	0	0	0.6	0	0	0	0	0
14	White	40	..	...	...	H. N. Searles	0	0	0	0	0	0	0	0	0	0	0	18.2
	DETROIT TROPHY																	
51	American Simplex	50	4	5	5	W. A. Wood	0	0	0	0	0	0	0	0	0	0	0	1.4
52	Chalmers-Detroit	40	4	5	4¾	Jean Bemb	0	0	0	0	0	0	0	0	0	0	0	0
53	Premier	32.4	4	4½	5¼	Cliff Waltman	0	0	0	0	0	0	0	0.8	0	0	0	0
	HOWER TROPHY																	
100	Moline	32.4	4	4½	5	C. H. Van DerVoort	0	0	0	0	0	0	0	3.1	0	1	0	0
101	Moline	32.4	4	4½	5	J. A. Wicke	0	0	0	0	0	0	0	0	0	0	0	0
102	Moline	32.4	4	4½	5	W. S. Gregory	0	0	0	0	0	0	0	16.1	0	0	0	0
103	Brush	7	1	4	4½	F. A. Trinkle	0	0.4	0	3.0	2.2	Withdrawn						
104	Brush	7	1	4	4½	D. B. Huss	40.8	149.3	423.6	343.9	294	Withdrawn						
105	Chalmers-Detroit	40	4	5	4¾	John Machesky	0	0	0	0	0	0	0	0	0	0	0	0
106	Hupmobile	16.9	4	3¼	3⅜	E. A. Nelson	0	0	0	358	1000	Withdrawn						
107	Maxwell	28.9	4	4¼	4¼	C. E. Goldthwaite	0	0	0	2.6	0	0	1.6	0	0	0	0	0
108	Pierce-Arrow	38.4	6	4	4¾	J. S. Williams	0	0	0	0	0	0	0	0	0	0	0	0
109	Pierce-Arrow	38.4	6	4	4¾	Chas. Schofield	0	0	0	0	0	0	0	0	0	0	0	0
110	McIntyre	18	2	4¾	4¾	Frank Goodwin	29	423.7	1000	Withdrawn								
111	Jewel	36.1	4	4¾	5	John Shimp	0	0	0	9	6	5.6	0	8.4	1.4	0	0	0
112	Mason	20	2	5	5	R. Snyder	0	0	0	2.4	0	1.9	0	0	0	0	0	0
114	Lexington	36.1	4	4¾	5	J. C. Moore	0	0	0	0	0	0	0	0	0	0	0	0

John Williams' Pierce Arrow went into the same hole that brought the American Simplex to grief, but as he applied his brakes and swung about when he reached it the car rested in the sand bank on its front axle and afterwards pulled itself off. This washout was at the bottom of a declivity, so that the drivers could not see it until they were but a few feet distant. There were several other washouts on the way, but none of them were as deep or as hard to locate as this one, and nobody had any trouble with them. In two places the cars were forced to travel through the deep sand of dry creek beds, and they also met a stretch of two miles across the unbroken prairie, on account of the closing of a road. Otherwise the going was considered fairly good by the drivers, who, however, have become pretty well inured to rocks, ruts and bumps. Pike's Peak remained in sight until the caravan was but a mile from Hugo, and when it finally dropped below the horizon it was like losing a good friend.

Word was received at Colorado Springs last night that the Rapid truck, which left Denver on Sunday on an attempt to climb Pike's Peak, got stuck when two miles from the top and had to turn back. It is expected to arrive here during the night and to continue with the tour.

Little Brush Runabouts Plugging Along—The two smallest members of the tour are the little Brush runabouts, which found the contesting pace too severe for a single-cylinder machine. Since their withdrawal they have been running each day as non-contestants and making good. The drivers leave each morning about 5 o'clock, and it is rarely that the completing cars catch up to them until near the end of each day's tour. Inasmuch as the newspapers of the large towns and cities en route are carrying admonitions to "Watch the little gray cars with the black stripes," a large number of Brush owners have been seen along the route. Drivers Huss and Trinkle have been accorded an ovation throughout the trip for their determination, and for the way in which they handle the little runabouts each day. **J. J. Evans**, the Brush sales manager, sees to it that in each city there is a goodly amount of publicity forthcoming.

Along the Banks of the "Father of Waters"—the Mississippi River—as Viewed from "The Automobile" Car

Walter Winchester in No. 9 Pierce-Arrow F. E. Wing Piloting No. 4 Marmon G. G. Buse Driving No. 11 Thomas "Six"

SOME ODDS AND ENDS ABOUT THE BIG TOUR

Newspaper Men Who Have Stuck—Journalists are not always expected to undergo the hardships of real autoing, if the statements of the rocking-chair correspondents are to be believed. The complement which left Detroit is not unbroken, for there have been a number of changes, both of addition and withdrawal. Among those who have not taken the entire trip are: "Jim" Sullivan of the Boston *Globe;* E. G. Westlake, Chicago *Evening Post;* J. S. Patterson, Chicago *Examiner;* Dick Tucker. Minneapolis *Tribune.* Of course THE AUTOMOBILE and *Motor Age* staffs with their own special car have used it every day. Among the daily paper representatives who are on the job are: J. C. Kerrison, Boston *American;* H. G. Reynolds, Boston *Post;* "Jack" McNamara, Boston *Herald;* "Jack" Wade, Boston *Journal;* Guy Shields, Chicago *Daily News;* Pete Estey, Chicago *Examiner;* Walter Birmingham, Chicago *Inter-Ocean;* "Jimmie" Fulton, Chicago *Record-Herald;* W. S. Gilbert, Cleveland *Plain Dealer;* Frank Lowry, Indianapolis *Star;* J. T. Sullivan, Buffalo *News;* Chas. G. Steinhauer, Cleveland *Leader;* Harry Smith. New York *Times.* Joseph Alphabet Ryan is one of the chair-car tourists who appears every now and then.

Tire Men Well in Evidence—There are fewer makes of tires in the contest this year than formerly, but the ones represented have better conveniences than ever before, and factory men are along to attend to the wants of the contestants. Diamond tires are dealt out by L. K. Rittenhouse, assisted by George Davidson; Goodrich interests are in charge of W. O. Rutherford, aided by C. E. Bonnett; Morgan & Wright tires are looked after by Harry Clinton, who also keeps a supply of yellow kid dusters for use on boys in the cities; and Goodyear air bottles with the Rapid truck, are dispensed by W. Simons, T. P. Meyer, and James Carey. Ajax tires are used by the Brushes and the Maxwells, and inasmuch as each of these automobile concerns has factory officials en route, they attend to the pneumatic wants of their machines. There is another tire man along in the capacity of mechanic on Bemb's Chalmers-Detroit car. This is John V. Mowe, manager of the Buffalo branch of the Firestone Company, who is taking the tour as a cure for weight. His friends think that the cure is not working as it was intended.

White Steamer Pictures in Many Papers—Kerosene as a fuel for automobiles has proven an interesting point to those along the way who are always looking for something new and good. The White Steamer, driven by the former secret service man, H. N. Searles, is the one using kerosene, and it obtains its supplies at any country store. The fact that the car is in the contest, with a perfect score, is kept well known by R. H. Johnston, the wideawake advertising manager of the White Company. Mr. Johnston sometimes rides with the White and sometimes a la Pullman, but at all times he has his photographs and cuts ready for the papers in the cities visited.

Crops Have Been Better all through the West this year than for twelve years past, and the fall will find the farmers well supplied with money. "Their interest has been aroused in motoring by the present tour," said H. O. Smith, "and they will look at automobiles now. I am told that out in this section the people have talked of little else than the tour for the past several months, and therefore the interest in the cavalcade and the warm welcome." Others who participated in the tour were well pleased, as the publicity obtained along the route of the tour was not purchasable at any price.

Train Brigade Each Day—Predictions were made that as soon as the comfortable train of Pullmans was installed there would be a following by rail. This was correct, but there are few who do travel in the cleaner manner. Some of the tour officials, Hotel Manager Glen Fargo, and W. F. Smith, of the Maxwell-Briscoe Company, are the regulars. Then there are generally half a dozen tourists who take a rest. It is claimed that more of the tour has been seen this way than by going in the automobiles, for the railroad has been paralleled for many miles.

H. O. Smith, of the Premier, on rejoining the party, was more than pleased with the train arrangements. "I have had a good night's sleep," said he, "and I am greatly surprised to know that from the outset there has been no roystering on the car. Things seem to be quieter even than at a hotel where numbers of men are put together in the same room. On the train everyone seems to be on his good behavior, and I believe that the special train solved the problem nicely and that it will make this tour a great success."

C. H. Van Der Voort, of the Moline, says his company will have three entries for the Glidden tour of next year, regardless of the route decided upon. The three cars of this Glidden will be in the Munsey tour from Washington to Boston and return in September, and perhaps in the Flag-to-Flag tour in October. Mr. Van Der Voort is also preparing two cars for the Algonquin Hill climb. "I believe in contests," said he, while at dinner on the special train, "and shall be very active in the field from this time on."

Soothing Lotions for Sunburn in Demand—Throughout the trip to the plain country the tourists who did not burn under the hot sun of Iowa and Nebraska, considerably joked with those who did. When Denver was reached, however, all joking was laid aside and there was a large purchase of cold cream, cocoa butter, and other preparations alleged to remove the sting of alkali bronzing. Everyone in the cars, except those wearing actual sun-bonnets, felt the touch of the sun and dust.

Hower Has Daily Guests—The pacemaking Premier used by Chairman Hower and Trophy-donor Glidden is each day occupied, also, by some guest of the chairman. Sometimes he has newspaper men, once a tire man, and all the time Sam B. Stevens, of Rome, N. Y., a member of the contest board. "Jim" Sullivan, of the Boston *Globe*, and "Jack" Kerrison, of the Boston *American*, were elected on alternate days, and W. O. Rutherford, of the Goodrich Company, on another one.

Hupmobile in Non-Contesting Division—The "little Hup," as it is generally known, is now with the tour as a non-contestant, and is traveling each day with the main body of the cars or directly behind them. Since leaving Minneapolis it has been going along steadily and without any difficulty, crossing the sandy stretches, climbing the steep hills, and showing speed on the fine stretches. At present the Hupmobile is one of the three non-contestants, all from the smallest car class.

"Please Send Me Postal Cards!" was written on a lot of notes thrown into cars along the way. Away back in the Pittsburg tour of 1903 the high school girls of Chagrin Falls handed apples to the tourists from the end of fish lines, dangled from poles over the road, and one of the tourists got an address to which he wrote, and the result was matrimony. Perhaps some of the tourists of to-day may also be fortunate.

Vermont Autoists Represented by President Brown—From the Green Mountain State comes the president of its automobile association, W. W. Brown, who declares that he is just taking a joy ride, and is riding as a passenger in No. 4 Marmon. The amount of good roads in the West has been a surprise to him, as to most of the tourists, and he says that he will so report when he returns to New England.

Never Heard of Father George—Up in Minnesota there is a town called Morristown, and one of the tourists said to a native there: "Is this where George Washington had his headquarters during the Revolution?" The answer finally emanated—"Well! I think you must mean Morristown, Iowa, for I don't recollect having heard of anybody by that name living here."

Nels Hamilton, of Central City, Neb., was so enthusiastic over the tour that he walked many miles from his ranch to erect two posts out of corn stalks and stretch across the road a welcoming banner and a lot of American flags. The demonstration was appreciated, for there was not a house in sight for miles and miles out on that broad prairie.

Dwight Huss First Gained Fame by driving a little 10-horsepower single cylinder Oldsmobile tonneau car to St. Louis in 1904 at an average of 20 1-2 miles an hour, and now Huss, contrary to the usual rule, has taken up a car of even smaller horsepower, the 7-horsepower Brush. "I drive this because it is worth my while," said Huss with a smile.

Charles J. Glidden Has Not Abandoned his around the world journey, but will renew it very shortly and complete it in 1911. Mr. Glidden will then have driven fifty thousand miles, and his book will contain two hundred thousand words and illustrations galore.

"I Sort of Like This Party," said a veteran journalist who has been on every big tour. "Why, there are no hard feelings that I know of in the 'bunch,' and everything is so pleasant that it reminds me of other tours—for the reason that it is different."

Church Steps Are Crowded frequently with people, but there is a noticeable lack of smiles when the tourists almost invariably shout: "Waiting at the Church?" It soon became evident that this worn-out song has not yet invaded the West.

All Along the Route to Denver local people seemed to like to supply what is known as a "scare," and every day's run was faster, as every driver beat it trying to reach the bad roads early, then only to find no really bad roads.

MITCHELLITES IN CALIFORNIA CELEBRATE

San Jose, Cal., July 26—Mitchell owners from all over the State gathered in San Jose for the third annual jubilee of their "family." The day was perfect, and the roads in almost every instance were reported in the best of condition. The principal event of the jubilee was the hill climb over Alum Rock Hill. The course was a mile long, a steady grade of 8 per cent., with an almost perfect surface. Miss Marion Walcott won the ladies' class, in the fast time of 1.19 4-5. The fastest time, 1.06, was made by L. P. Brassey, in the old model class. W. M. Lewis and Vernon Rogers, of the Mitchell Company, were present and handled the details.

POPE RECEIVERS FINALLY DISCHARGED

Newark, N. J., July 27—Vice-Chancellor Howell to-day officially discharged the receivers of the Pope Mfg. Co., and ordered them to turn over the balance of cash on hand, amounting to $7,598.87, to the officials of the new company. This ends the receivership and completes the reorganization of the Pope Mfg. Co.

Building an Aeroplane in Newburgh, N. Y.—That stonecutters may fly is the belief of David Lowers, a stonecutter, and his son, David M. Lowers, who are building an aeroplane in the city on the Hudson, and which has given evidence of its ability to navigate the air. The machine is now being completed and will be equipped with a 30-horsepower engine. New ideas in steering and in the distribution of weight are features.

CURTISS FLIER STILL IN REPAIR SHOP

Mineola, L. I., July 26—Glenn Curtiss' aeroplane, which flew so successfully last week, only to be wrecked by a novice, is still laid up. It was expected that Curtiss might have it ready for further tests to-day, but the damage was found greater than at first supposed. When the canvas was removed from the skeleton framework it was found that twenty-nine of the forty ribs had been broken, and there was also considerable injury to the running gear. However, it is hoped that it will be in shape Wednesday. Mr. Curtiss will try to better his present record of 52 minutes 30 seconds before leaving for Europe to contest in the international races at Rheims, France.

FRENCH AEROPLANES WRECKED BY STORM

Vichy, France, July 25—A violent storm wrecked the aeroplane sheds here to-day and scattered a great crowd which was present at the grounds. Paul Tissandier's Wright aeroplane was demolished, and M. Paulham's Wright and the machines of MM. Zipfel and De la Rue were much damaged.

MORE PRIZES OFFERED FOR AVIATORS

London, July 25—Baron de Forest has offered a prize of £4,000 for the first Englishman to cross the Channel on an English-built aeroplane, provided he beats the existing record in time. William Waldorf Astor has contributed £1,000 to the national airship fund held by the *Morning Post*.

Bleriot Starting Across the Channel from Sangatte Cliff on His Epoch-Making Flight

DOVER, ENGLAND, July 25—Louis Bleriot this morning flew across the English Channel from Calais to this city in his monoplane. The distance is about twenty-four miles, and he was in the air thirty-seven minutes. The flight was accomplished without incident, and apparently with the greatest ease.

Bleriot left the Terminus hotel, at Calais, at three o'clock this morning and drove out in an automobile to Baraques, where his aeroplane was housed. As the weather seemed favorable, he ordered out the torpedo boat which the French government had assigned to him, and began preparations for the flight. The aeroplane, which is Bleriot's eleventh, was found in good condition; the motor ran smoothly and powerfully. At 4 o'clock he mounted his seat and made a short trial flight of a quarter of an hour, landing near the edge of the cliffs. There he waited for the sun to rise. The weather was foggy, so that the coast of England could not be seen, and there was a light southwest breeze.

At 4:30 Bleriot, clad in a khaki suit with a close-fitting cap, again climbed into the car. He had injured his foot several days before, and laid aside a pair of crutches as he took his seat. Anzani, the designer of the motor, himself cranked it, and at 4:35 the aeroplane shot into the air. Bleriot rose rapidly to clear the telegraph wires strung along the edge of the cliff, and sailed out over the water at an elevation of about 250 feet.

The torpedo boat put on full steam and headed for Dover, but Bleriot, making over forty miles an hour, quickly passed it. In his own story, printed in the London *Daily Mail,* he says that after flying for about ten minutes the chalk cliffs on both sides and the torpedo boat were completely lost in the fog, and as he had no compass he was compelled to let the aeroplane take its own course. As a consequence the wind took him out of his way, and when the English coast became visible he made out Dover castle far to the west. He had to turn the machine almost at right angles. Now, too, the air currents set up by the cliffs began to be troublesome. This was by far the most difficult part of the trip.

However, he reached safely a green meadow two miles east of Dover, which had been marked with a big French flag as a suitable landing place. A sudden wind whirled the machine around, and Bleriot shut off the motor and descended sharply from a height of sixty-five feet. He struck the ground with a severe bump, breaking the propellor, but without harm to himself. Two Frenchmen who had been expecting his arrival were the first to welcome him and to help him from the machine. His injured foot gave rise to the report that he had been hurt in landing, but this was incorrect. An automobile quickly took him to Dover, where the torpedo boat, with his wife on board, had just hove in sight. Mme. Bleriot came ashore in a small boat, and the couple were heartily cheered.

A guard of police was necessary to protect the aeroplane from souvenir hunters, who would quickly have wrecked it and carried away the last fragment. As it was, the wings were covered with autographs. Soon the enterprising city officials erected a tent over it, and charged sixpence admission.

LONDON, July 26—Bleriot and his aeroplane reached here this morning, the aeroplane to go on exhibition and the aviator to receive the £1000 prize of the *Daily Mail* which he won by his flight. The prize was awarded at a luncheon at the Savoy, and Mr. Haldane, the Secretary for War, was the principal speaker. The Aero Club has decided to present M. Bleriot with a gold medal similar to that which it conferred on the Wrights. M. Bleriot received his honors modestly, and managed to stammer "Thank you" in English.

Bleriot and His Epoch-Making Aeroplane

Bleriot is a successful inventor, and has long been interested in the problems of aviation. Unlike Latham, his rival, he is of pure French descent, and is 37 years old. He is a graduate of the famous Central School of Engineering at Paris. In 1896 he invented one of the first practicable acetylene lamps, and Bleriot automobile headlights are now used the world over. He made his first full-sized model of an aeroplane in 1900, and for a long time it was kept in his factory at Paris. Since then he has spent much money and time on the subject.

Last year he attained his first noteworthy success in a cross-country flight from Tours to Athenay, the first of its kind ever made in an aeroplane, and a monument was erected in his honor. Quite recently he made another flight from Etampes to Chevilly, a distance of twenty-five miles. His record for time is 50 minutes 8 seconds, made at Juvisy July 4. When Latham failed in his recent attempt, Bleriot hastened to Calais to try the passage himself. He has always been noted for his recklessness, and it has been predicted many times that he would be killed; but although he has been in innumerable smash-ups and has wrecked half a dozen aeroplanes he has always managed to escape without serious injury. Only last week one of his machines caught fire and Bleriot's foot was painfully burned. It was this accident that caused him to be walking on crutches before he started.

The monoplane which performed so well is one of the smallest and lightest ever built. It is only about twenty feet across the wings, and weighs 400 pounds. The motor, which is a three-cylinder air-cooled design of 25 horsepower, made by Anzani, rests between the wings and carried the two-bladed propellor on the front end of its shaft. The propellor is thus the foremost part of the machine. A tail extends some distance to the rear, and carries horizontal and vertical rudders. The operator sits in a skiff-like body between the wings, and to the rear of the motor. In previous flights M. Bleriot was troubled by the hot oil from the motor which blew back into his face, but this defect has doubtless been remedied. Control is by a single lever, which moves backward and forward to turn the machine up or down, and sidewise for steering to the right or left. The wings can be

Bleriot Awaiting the Signal for the Start

folded up, if desired, and in this condition the machine can be towed along behind an automobile.

The aeroplane is popularly described as resembling a huge dragon fly. Its wings are covered with an opaque material like vellum, making them seem very light and fragile.

Experts here regard Bleriot's performance as a vindication of the monoplane type. The machine has much less surface in proportion to weight than is usual, which makes it more stable.

LATHAM AGAIN FALLS IN CHANNEL

DOVER, ENGLAND, July 27—Hubert Latham, whose gallant attempt to cross the Channel last week prepared the way for Bleriot's successful trip, was caught napping, literally as well as figuratively, and lost by a few minutes his chance to tie with Bleriot for the *Daily Mail* prize. The two aviators had agreed that if both made the flight the same day they would divide the prize, regardless of which was actually the first to touch English soil. When on the morning of the 25th he found that Bleriot had actually started, he made a desperate attempt to follow, but the rising wind compelled him to descend. He swallowed his disappointment as best he could, and when the news of Bleriot's landing was flashed across to Calais he sent back the message: "Hearty congratulations. I hope to follow you soon."

True to his word, Latham made a second trial this evening, and moreover announced his intention of continuing straight on to London, if he succeeded in crossing the Channel. A great crowd gathered on the cliffs and roofs of Dover when the wireless announced that he had left Calais. Presently those with glasses made out a black spot in the sky, approaching rapidly. It was Latham, and he seemed headed straight for the landing place that had been prepared for him. The ships in the harbor set up a terrific din with their whistles. But suddenly the machine faltered, recovered for a moment, then settled swiftly down on the water, still two miles from its goal. The aviator was picked up, wet through and with a bad cut on his head. The cause of the failure was the motor, which stopped for no apparent reason.

WRIGHT SUCCEEDS WITH PASSENGER IN OFFICIAL TRIAL

WASHINGTON, D. C., July 27—Orville Wright fulfilled the first part of the government requirements to-day by a flight of 1 hour 12 minutes and 40 seconds, carrying a passenger. Incidentally he broke his brother's best record for a flight with passenger, made in France last year. President Taft witnessed the trial.

During the early afternoon there was a high wind, and flight seemed impossible, but it suddenly dropped away within half an hour, and the sun came out and shone brightly. The aeroplane was at once brought out and placed on its rail. Lieut. Lahm, the passenger, took his seat, and a moment later Orville climbed in beside him. He gave the signal, and the car was released and shot away. It seemed to rise as easily as usual, despite the extra weight, and made a beautiful turn at the end of the field. As it passed the northern end of the field the crowd cheered, and President Taft looked on with interest.

The machine sailed on smoothly, a little lower than usual, but making its circuits with the regularity of clock-work. Only once the machine tilted badly in a sudden gust of air, but it easily righted itself and kept on. The performance grew almost monotonous. Lieut Lahm sat quietly in his seat, keenly watching the operation; apparently he spoke to the aviator at times. The colors of the brilliant sunset faded, and the half moon grew brighter. When the hour required by the government specifications had elapsed, the crowd burst into cheers, and the automobiles honked in unison. Orville waved his hand, but kept on. Ten minutes more, and they cheered again as Wilbur Wright's record was broken. On the next round Wilbur stepped out and waved his hat as the signal to come down. It was now quite dark and further flight would have been dangerous.

Orville was talking to Lieut. Lahm as they came down, and the aeroplane touched the ground before he had expected, bouncing up quite sharply and settling again fifty yards further on. No damage was done.

After the brothers had a talk with President Taft, who congratulated them and said that it was an honor to have been present. He laughingly hoped that Lieut. Lahm had behaved well and had not talked to the motorman.

The brothers were much pleased with the flight, and Wilbur estimated that the speed was about forty miles an hour. Tomorrow, if conditions are favorable, they will attempt the straightaway speed trial of five miles and return. The flight will be made in the direction of Alexandria, to the south of Fort Myer, and a small balloon will mark the turning point. Lieut. Foulois will be the passenger. To meet the requirements, the aeroplane must make a speed of thirty-six miles an hour, and a bonus will be paid over the contract price if this is exceeded.

Wright Aeroplane Again Breaks Skid

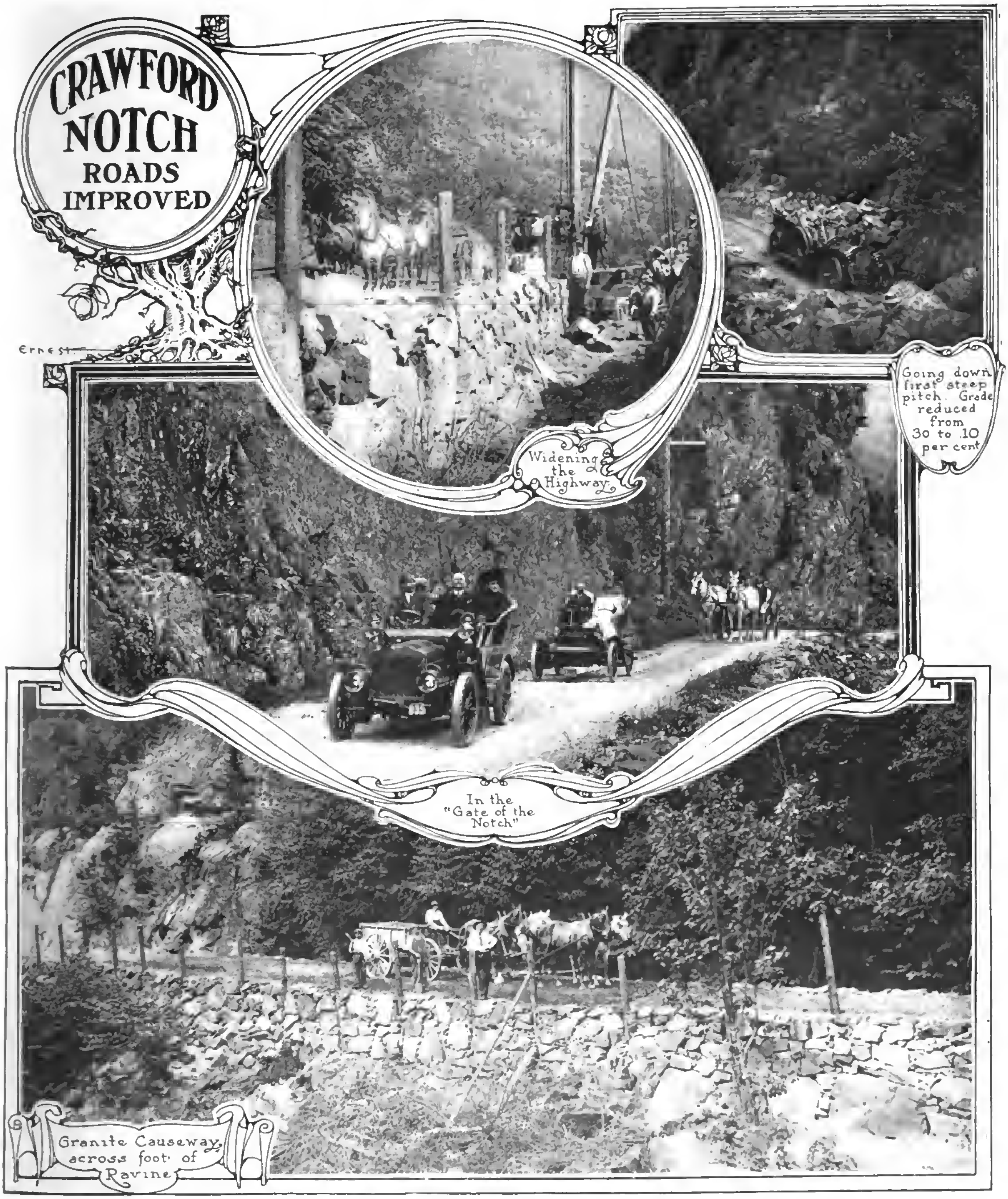
WASHINGTON, D. C., July 24—The Wright brothers had intended to take up one of the Signal Corps officers as a passenger to-day, but a vagrant gust of wind as Orville was alighting from a trial flight put an abrupt end to their plans. After a flight of twenty minutes the aeroplane was settling down when a sudden breeze caught it and brought it to earth with a crash, snapping the left skid. Repairs will be completed by Monday.

Last Wednesday a break in the machinery compelled a descent when the machine was speeding along at a forty-five-mile gait. It was on its third lap when a small object was seen to fall from it, and instantly the motor stopped. Orville glided easily down. The small object was found in the grass and turned out to be the magneto pinion. It was put back on its shaft and brazed in place, and Orville went up again. The next flight lasted only eleven minutes, but Wilbur announced that a speed of 44 miles an hour had been attained.

Orville Wright Flies in Taft's Presence

WASHINGTON, D. C., July 26—President Taft, Vice-President Sherman and a crowd of ten thousand saw Orville Wright fly this evening in the teeth of a eighteen-mile breeze. Aided by the wind, the aeroplane succeeded in rising from its starting rail without the use of the falling weight. It made three and a half circuits of the field; no time was announced. The President had a short talk with the brothers and examined the machine carefully. The flight was made for his especial benefit, although it had been first decided to postpone it on account of the wind. It was the first time the President had seen the machine in flight.

CRAWFORD NOTCH ROADS IMPROVED



Widening the Highway

Going down first steep pitch. Grade reduced from 30 to 10 per cent

In the "Gate of the Notch"

Granite Causeway across foot of Ravine

THE central pass of the White Mountains in New Hampshire, known as Crawford Notch, has always been noted for its scenic attractions. With the advent of automobile touring its fame became more widely disseminated than ever, with consequent benefit to those who live in the State, and those particularly who live near the fascinating routes through the high hills. The State has appreciated this fact, and to make automobiling easier, without lessening the grandeur of the surroundings, has made changes of a considerable nature in the roadways of that section within the past few months. Under the supervision of the New Hampshire Highway Commission causeways have been built, steep grades have been cut down, and roads have been widened wherever possible.

During the month of June the work was focussed in Crawford Notch, and notably in "The Gate of the Notch," where the ravine at the foot of the first very steep rise has been bridged by a granite causeway, reducing the grade from 30 to 10 per cent. This will be pleasing to all who tour there, for although the cars have generally been able to get up on their lower gears, or by rushing, they will not be so inconvenienced hereafter.

Under A. W. Dean, the State engineer, with George D. Howland of Crawfords, in actual charge of the work, the highway forces and the Maine Central railroad's derrick crew have constructed the highway-waterway-railway improvements. The loose rock obtained from widening the highway at the top of the pass and from the railroad dump was utilized in constructing large retaining walls for the highway on one side and the railroad on the other, allowing the water to flow between them. This gives a width of between 18 and 20 feet for the road, with occasional places where 15 feet was the limit.

ROAD BETTERMENT IN CONNECTICUT

Hartford, Conn., July 26—State Highway Commissioner James H. MacDonald has purchased a large quantity of crude oil and distributing apparatus, and in the very near future will spray sections of the main heavy traveled highway in an endeavor to render the roads of the Nutmeg State dustless and fit to tour over. The Commissioner thinks well of the oiling proposition, if properly done, and he has taken every precaution to see that Connecticut's oiled thoroughfares will be the best ever. When it is realized that it costs approximately $500 per mile to water a macadam highway and the treatment is of but temporary benefit only, it is obvious that two or three coats of oil judiciously applied in the course of a season would prove far superior. If after this exhaustive trial of the oiling system the results are not eminently satisfactory, some other mode of dust laying will probably be resorted to. Tar is an admirable dust layer, but little of it has been used as yet. The best illustration of the utility of a well-tarred road is afforded by the stretch about the Capitol grounds used almost exclusively by high-powered cars. This road was treated two seasons ago and the road to-day, for the most part, is in excellent condition and practically dustless at high speed.

The Commissioner is carrying out the Summer plan of road betterment as fast as possible. Two stretches in Manchester, and one of three miles along the old Albany turnpike, through the town of Bloomfield, are now receiving attention. The ferry road from Saybrook to the Lyme ferry, one of the most abominable stretches in the State, will shortly be improved, of interest to motorists using the shore route.

A fine stretch over Weatogue Mountain, one of the most picturesque sections of the State, has recently been improved. A long stretch through the town of Milford, a portion of the uncompleted link between the New York and Massachusetts State lines, and another short stretch between Greenwich and Stamford will soon be in first class condition. An excellent gravel road of three miles has just been completed in the town of Windham. The gravel roads of the State seem to have withstood motoring travel very well indeed, as for instance, that portion between the towns of Norwalk and Wilton, which is now in good condition, though it has been built twelve years.

BETTER ROAD AROUND NORRISTOWN, PA.

Philadelphia, July 26—Automobilists en route from this city to Pottstown, Reading and Harrisburg are beginning to use a comparatively new through route which goes around Norristown, Pa. Instead of running into the Montgomery County seat, approaching it from Chestnut Hill and Plymouth Meeting, the cars are continuing on the Germantown pike, joining the old Reading pike at the Collegeville Bridge over the Perkiomen. The usual longer route out of Norristown, over the Reading pike, is in very bad condition, the roads being rough and full of bumps, while the Germantown pike is in splendid shape. The Norristown Automobile Club has its house on the old road, and Harry B. Lasher, formerly a Philadelphia newspaper man, has opened the Fairview Inn, first established in 1732, on the new route. Both directions are equally fine for views of the beautiful Schuylkill and Perkiomen valleys.

ROAD CONDITIONS IN CENTRAL NEW YORK

The Automobile Club of Rochester is doing good work in its club publication toward keeping its members posted on road conditions and changes in Central New York. As many tourists are using the roads between Albany and Buffalo, it may be interesting to know some of the desirable changes. On the road from Syracuse to Geneva, for instance, a bad stretch of road through Seneca Falls and Waterloo can be avoided by taking the road north from Geneva along the New York Central Railroad tracks, about 3 1-2 miles out, turning east at right angles to Free Bridge. Going from Oswego to Binghamton it is advised that the south side of the river be followed. Between Little Falls and Fonda the road is being turnpiked. Road work is in progress between Chili and Churchville. As a detour it is suggested that tourists take the westerly road half a mile east of Chili and follow to the end of the road, turning to the left, which will eventually bring the tourist back on the main Buffalo road. All the roads around Albany are reported in good condition, and the entire route from Auburn to Syracuse is in fine shape.

SOME NEWS ABOUT NEW JERSEY'S ROADS

Some helpful information has been supplied to prospective tourists in New Jersey by the good roads observers of the New Jersey Automobile and Motor Club. Extensive repairs being made on the road between Fort Colden, one mile east of Washington, N. J., and its junction with the Hackensack and German Valley roads, about one mile beyond Hackettstown, have necessitated the closing of that road for automobiles until about October 15. Tourists visiting the popular Pompton Lake section will be glad to know that sections of the road near the Pompton station have been coated with oil, but care should be exercised in crossing the bridge near Mountain station. The bridge is being rebuilt and a temporary one is in use, red flags being placed on both sides of the temporary structure.

SPEED TRAPS UNPROFITABLE IN CANADA

Montreal, July 26—The small towns in this province have nearly all abandoned their speed traps, as the new automobile law has made them decidedly unprofitable. The law now provides that all the revenue from automobile prosecutions shall go to the province, and all municipal speed regulations are cancelled by the clause that speed shall be "reasonable" but not in excess of nine miles an hour in cities, towns and villages, and fifteen miles on the open road. Although the use of "reasonable" in connection with these limits may seem strange, the law has freed automobilists from all fear of petty persecution.

BUILD BRICK ROADS INSTEAD OF MACADAM

Pittsburgh, Pa., July 26—The Road Commissioners of Allegheny County have decided to build no more macadamized roads. During the past five years more than 300 miles of macadam has been laid in this county. However, the wear on the macadam has made the question of repairs very serious, and the commissioners now intend to resurface all the macadam roads with brick as fast as the top dressing wears off, and to build all new roads of brick on a concrete base. They believe that this surface will last twenty years without repairs. The initial cost will be about one-third more than for macadam, but the contractors are willing to guarantee no repairs for five years.

NEW BRIDGE TO BE BUILT OVER CONNECTICUT

Hartford, Conn., July 12—The Lyme bridge bill has now passed both houses of the Connecticut legislature, and to become effective but awaits the signature of the Governor. The new bridge, when completed, will relegate the old flat-bottomed ferry boat to oblivion, much to the satisfaction of motorists who have been compelled to use the craft. An issue of bonds will provide the necessary funds for construction.

Functions and Frailties of Motor Cylinders

BY THOS. J. FAY

LIMITING weight of the reciprocating parts is necessary, in order that the speed of the motor will be sufficiently high to afford power adequate to realize a high weight efficiency. Accelerating a considerable reciprocating mass will result in a loss of power, but the stresses in the crankshaft section are the most likely to demand a limitation of speed on account of inertia. It has been found in practice, under the several conditions obtaining, tbat pistons may be much lighter than would be indicated by superficial mathematical means ready to hand for use in determining tbe dimensions of sections.

Inertia of the Piston—For each square inch of piston area, the inertia will be as follows:

$$I = \frac{F}{a} = \text{inertia component, per square inch of piston.}$$

Amplified,

$$I = \frac{W}{a} = N^2 r\,(\cos\theta + a' \cos 2\theta)$$

and.

$$\frac{W}{a} = \text{weight of reciprocating mass in pounds per square inch.}$$

when, N = crank revolutions per minute.
θ = crank angle.
r = crank radius in feet.
W = effective weight of reciprocating mass.
a = area of piston in square inches.

The effective weight of the reciprocating mass will be composed of weights as follows:

The piston.
Piston rings.
Wristpin and fastenings.
Reciprocating part of connecting rod.

In practice, the sum of these weights is as variable as between the respective designs of motors, and in motors in general, increasing as follows:

(A) with bore, and
(B) stroke.

Inertia increases as the square of the crankshaft speed, in revolutions per unit of time. The value of $\frac{F}{a}$ will be a maximum at o degrees of the crank, which is taken to be the top and bottom dead centers, and since inertia is induced by changing the motion of mass, as when the reciprocating parts are stopped and started, as they must be in the region of the dead centers, it follows that the tendency will be to react on the section of the cranksbaft, rather than to introduce serious complications by way of undue friction, growing out of side pressure, of the piston against the cylinder walls, which will result in uneven wear of the cylinder bore.

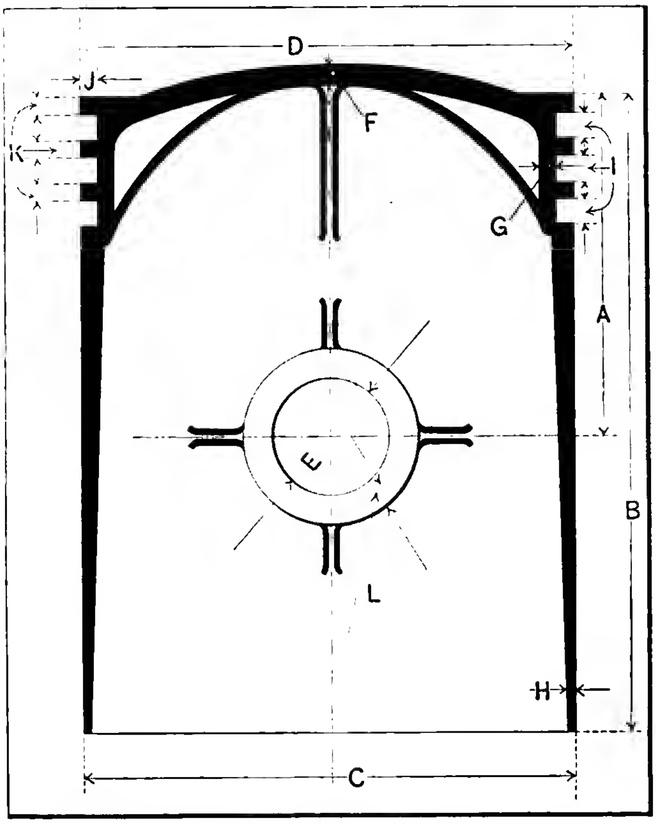


Fig. 28—Diagrammatic piston, serviceable in conjunction with the table of proportions of pistons

Referring to Fig. 28, and to the table for piston proportions, the prime dimensions, allowable in practice, will be noted. It is not believed that these dimensions are absolute, nor can it be claimed that they are likely to result in the lightest pistons possible to use, but it is the aim, in the table, to approximate averages, within the zone of good practice.

APPROXIMATE DIMENSIONS OF PISTONS

Bore of cylinder	4	4.5	5	5.5	6
**A	3	3.375	3.75	4.125	4.5
B	6	6.75	7.5	8.25	9
C	3.995	4.4925	4.990	5.4825	5.985
D	3.990	4.485	4.980	5.475	5.970
E	1 9-16	1 13-16	2	2 1-4	2 3-8
*F	5-16	11-32	3-8	13-32	7-16
G	7-64	1-8	5-32	3-16	7-32
H	7-64	1-8	5-32	3-16	7-32
I	9-32	5-16	11-32	3-8	13-32
J	19-64	21-64	23-64	25-64	27-64
K	1-8	1-8	5-32	5-32	3-16
L	5-16	3-8	13-32	15-32	15-32

*F, as stated is maximum; if ribs are placed around the circle, of a thickness equal to that of the head, this value may be reduced somewhat.

**The distance A is a variable depending upon the amount of offset of the crankshaft. All dimensions are in inches.

The thickness of the heads are not readily determined by means of formula, for the reason that none is available such as can be recommended. In any case, the heads are usually slightly domed, which is a vast factor for strength, and ribs act as supports in compression, which is satisfactory when cast iron is used. The thickness given in the table is for unsupported flat heads, and a formula which may be used to approximate the thickness under these conditions was derived from the Ericsson formula for flat plates, by Prof. William Harkness, as follows:

Let,
T = thickness of head in inches.
D = diameter of head in inches.
P = pressure of gas in pounds per square inch.

when,

$$T = 0.00439\,D\sqrt{P}$$

Were it not for the difficulty involved in ascertaining the life of a piston in service, from the point of view of wear due to friction, it would be possible to calculate the results of friction with considerable accuracy, and by limiting the lengths of pistons, reduce the weight. Then, by having only one piston ring, the same to be tight against compression, the reduction in weight in this direction would be marked; unfortunately, it does not seem to be possible in practice to do witb only one ring, and even the pistons which are fitted with three rings are sometimes in question.

To assure long life, the retention

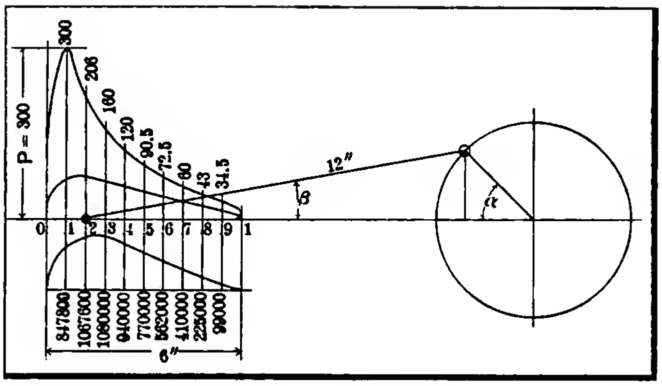


Fig. 29—Characteristic wave of pressure indicating point of maximum coming on power stroke

of compression, the pistons have to be long and the rings tight; the reason for using four rings is merely to be sure that one of them will be tight at all times. The dimensions given in the table allow for a slightly conical shape of the pistons, since the diameter at C, Fig. 28, is greater than at D. The difference is but slight, and the main reason for so finishing is to assure that pistons will not stick, as a result of unequal expansion due to heat and possible deformation.

Rings are supposed to bare on their top and bottom edges, and since the distance *J* is greater than the thickness of the rings, they will not be tight against the wall. The rings, since they must expand in the slots, working in and out, as the occasion requires, hence they must be a bearing fit, or they will stick, and fail to expand in answer to the inequalities. The right fit of the piston rings, under the circumstances, is that which will enable the fitter to move them freely when they are in place.

Cylinders Are Likely to Be Slightly Conical—No matter how well the work is done, cylinders are likely to be slightly conical, which is due to deformation of the boring bar, as it reaches into the bore, in the absence of a back bearing for the bar, and too, expansion, due to heat, and internal strains will be present to some extent, as a rule. Under the circumstances, while the cylinder is supposed to be true in the bore, it departs from this condition enough to demand that the rings in the piston be perfectly free to respond to the different diameters to be encountered throughout the stroke.

Thin pistons may deform slightly, and since there is no way of determining as to the extent of this deformation, all that can be done is to allow sufficient clearance to assure free action, which clearance should be closely held, for, in operation, if the clearance is excessive, the pistons will slap against the walls, and make a decided noise. The maximum side pressure of the pistons against the cylinder walls should be within 40 pounds per square inch as an outside figure, and were it not for the ills of excess weight, even 20 pounds per square inch would be desirable. The higher the pressure, the greater will be the difficulty in lubricating, and that the life of the motor will shorten, from the same cause, is reasonable to assume. The point of greatest pressure, in the bore of the cylinder, will depend upon a variety of circumstances, as angle of advance of the ignition, inflammability of the charge, etc. As a general proposition the wave of pressure will be as shown in Fig. 29, and maximum pressure will occur at about 1-4 of the power stroke. On the compression stroke, the maximum pressure will come when the crank is at 45 degrees, and since this will bring the piston at the same point it follows that maximum pressure, wear, and compression will tend to reduce the bore in about the same position. Fig. 30 is a characteristic diagram of piston pressure and illustrates the variations in the wave of pressure during the four cycles. This same curve shows how the maximum pressure during each cycle falls so nearly at the same point in the bore of the cylinder that it is necessary to limit the maximum pressure to that which will not squeeze the oil out from between the surfaces and allow them to run dry.

Offsetting the Crankshaft Helps to Relieve Pressure—In order to reduce wear of the cylinder wall, the crankshaft is offset sufficiently to equalize the thrust. Since the thrust to one side is greater on the down (power) stroke, by the simple expedient of offsetting the crankshaft, the excess of thrust may be delivered to the side of least thrust, hence the equalization. With a very short connecting rod, the offset should be a maximum, and in fine, increasing the length of the connecting rod, reduces the necessity for offsetting the crankshaft. Offsetting seems to be required when the length of the connecting rod is less than double the length of the stroke, and when the length of the connecting rod is three times that of the stroke, there is no advantage at all in resorting to this practice.

Wristpin Will Feel the Effect of Inertia—Since the piston is related to the connecting rod through the wristpin, the weight of the piston will induce inertia effects on the section of the wristpin, in magnitude, relatively feeble as compared with the stresses which will be set up in the section of the crankshaft. In a general way, since the weight of pistons represents about 50 per cent. of the total effective weight, from the inertia point of view, it follows that the sectional area of the wristpin should be at least 50 per cent. of the sectional area of the crankpin, when the section of the crankpin is adequate to sustain without undue fiber strain at the maximum speed at which the crankshaft is likely to rotate. It will be a simple problem to calculate the section of the wristpin in view of inertia, when the weight of the piston is known in any given case, just as the whole inertia is taken into account when it is desired to investigate the merits of a given crankshaft in view of inertia considering maximum speed as when a motor is relieved of its load.

Wristpins Are Difficult to Hold in Place—Since the ends of wristpins are in close proximity to the cylinder walls, should a pin float, even a little, it will score the cylinder wall, and then the compressed mixture will leak by, thus destroying the good relation of the same, and lowering the power of the motor. Fig. 31 depicts four methods of holding wristpins in place, and A shows the most defective one. The pin is tapered at one end, and the resultant of the pressure tends to press the pin towards the cylinder wall, while the set screw resists the effort; should the set screw back away, which is within the possibilities, the pin will back away from the taper and do much damage. B, of

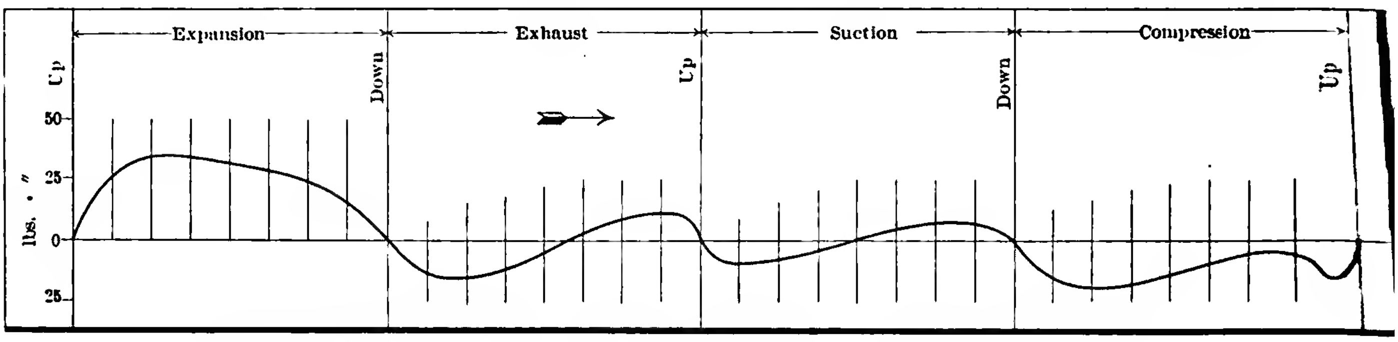


Fig. 30—Characteristic diagram of pressure on pistons during four cycles, indicating variations

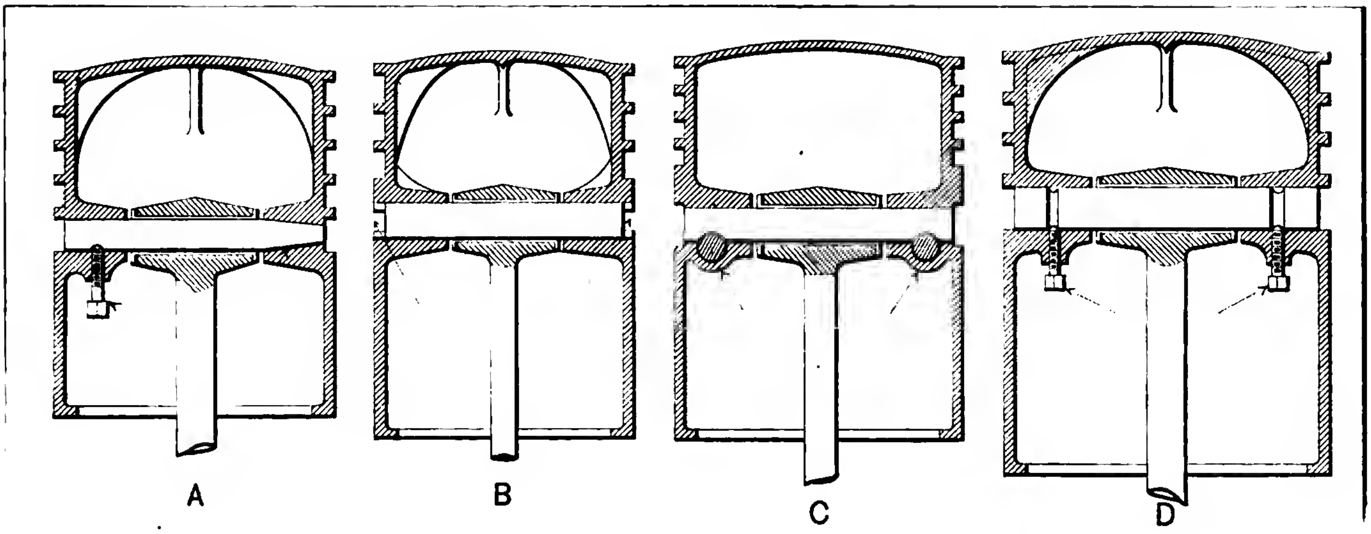


Fig. 31—Illustrating methods of fastening wristpins to prevent them from floating out

the same figure, is of a plan which works very well, in that a piston ring encircles the piston over the wristpin holes, and the pin cannot migrate out because the ring is in the way. C represents another security method of great competence, in which two bolts are passed through the boss, cutting the wristpin, and preventing it from turning, or floating out. D is a scheme involving the use of set screws, and grooves in the wristpin in which the ends of the set screws enter, and the pin will stay in place just so long as the set screws remain in the relation as shown; even one of the screws will suffice for the purpose.

Fig. 32 represents another series of methods of holding wristpins in place, and A of this series is probably the most secure method, involving the use of but one set screw, which passes through the boss and into a socket in the wristpin; the set screw is prevented from backing out by means of a cotter pin, which in turn is prevented from backing out. B represents a scheme, of recent origin, used in a well-known German product, and the disadvantage is by way of excess weight of the piston, owing to the amount of metal allowed for the taper pins to pass through. C shows a case in which the wristpin is fastened to the connecting rod, and the bearings are in the piston. A tapered pin is placed to prevent the wristpin from backing out, or turning in the connecting rod. D is of a two diameter wristpin, which is superior to a tapered end, since the fits are parallel, and the pin is free from the tendency to drift out.

Wristpins should be as light as possible consistent with strength, taking into account the nature of the stresses, which are mostly in shear. The diameter is fixed in view of bearing pressure, rather than to afford strength in shear, and it is a natural sequence that a hole will be permissible through the pin. It is never a risk to make the hole equal to half the diameter of the pin, and by calculating for shear, it is generally possible to enlarge upon this measure of the diameter of the hole.

As a rule wristpins are made of alloy steel in order to be able to make them very light, and to afford an extremely hard surface to withstand the high and variable pressure. Kinetic ability, in view of the shock nature of the load, is also one of the requirements, and on this account the older practice of employing tool steel is being eliminated. Even when alloy steel of accentuated kinetic ability is used, it is desirable to heat-treat the same with a view to affording the greatest possible measure of kinetic ability, without diminishing the surface hardness or the strength to adequately resist shear.

The wrist-pin bearing, or bushing, is sometimes made of case-hardened steel tubing, ground to size, allowing sufficient clearance to accommodate a double film of oil, which will approximate 0.006 inch. In other cases the bushings are of phosphor-bronze, with very thin walls (3-32 inch), the idea being to afford the good qualities of this material, and to abort deformation by having the walls as thin as possible. A certain amount of end play is allowed for the connecting rod, which is necessary in view of the end play of the crankshaft.

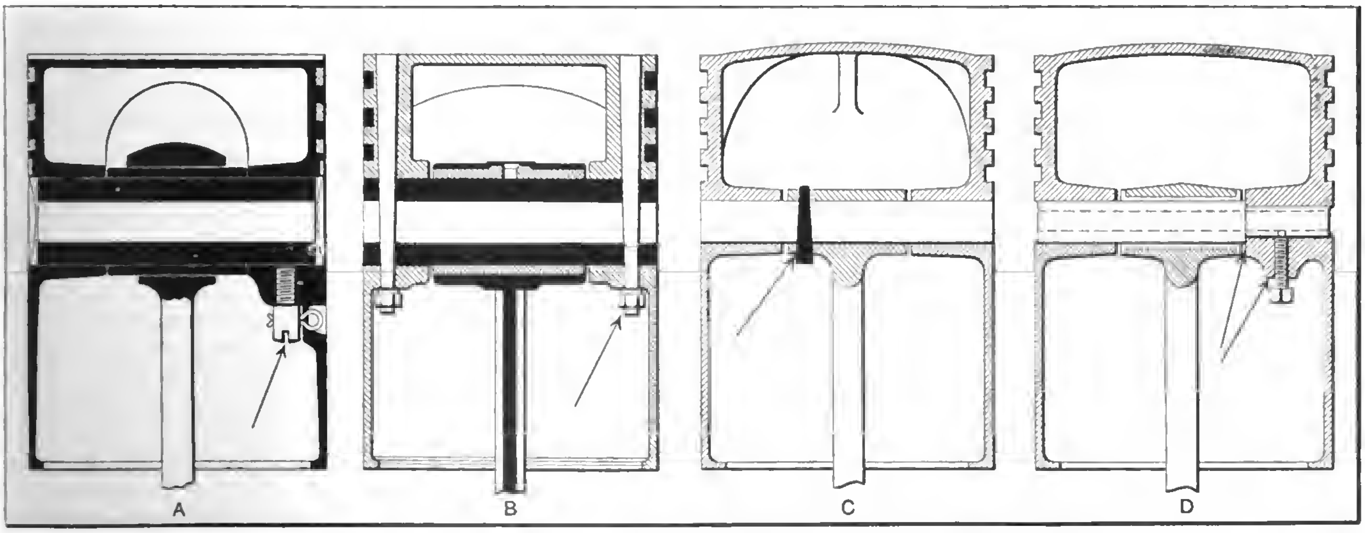


Fig. 32—Indicating additional methods of securing wristpins to prevent them from drifting

REQUIREMENTS OF THE PHYSICIAN'S IDEAL CAR

By A. D. HARD, M. D.

AUTOS specialized for particular work are becoming available for various uses. The police patrol wagon, the fire automobile, the hospital ambulance and the auto-hearse are now in use, and we hear of the traveling salesman's auto and the physician's motor vehicle. It is of the last named that I wish to speak, as I have been investigating along this line for the past eleven years. The first motor vehicle used by me for taking me as a physician to my country calls was a steam "Mobile," made at Tarrytown, N. Y. It was the fifty-second machine put out by that maker, and was undeveloped in a great many ways. It would get out of order on the slightest provocation, and was about as near being just what a physician does NOT want for service as one can imagine. But many of the faults of that primitive machine are still in evidence in the automobiles which are offered as very suitable for physicians' use to-day.

The physician who does practise in the country of the Western States requires definite factors of a special nature in the motor vehicle which is called upon to do him service. A request to come at once to relieve human distress, or to attend at a birth, or to attend the victim of some accident requires that the physician shall be taken with absolute certainty with speed and peace of mind to the scene of his work. There must not be troubles on the road to jeopardize the patient's life nor disturb the physician's cool, deliberative frame of mind which may be so very essential.

For generations past the scrub team and old buggy have been doing this work until a standard of certainty has been established below which the automobile must not fall if it is to supplant these almost relics of by-gone days.

In order that the automobile shall be specialized for the country physician's use, it must be developed along the lines which provide against uncertain service. This is of far more importance than that it shall make unusual speed. The most common uncertainties connected with ordinary automobile use on country roads, where service and not pleasure is the main requirement, consist of pneumatic tire failure, lack of road clearance, involving unusual care in running, and lack of car ability in getting out of soft roadway spots where the drive wheels lack traction and gradually bury themselves until they are not only powerless, but are very difficult to get out by outside help. These three factors tend toward distrust of the automobile for physicians' use. They must be eliminated before the automobile can be a perfect service machine practical for physicians' everyday use.

I have tried to solve these three problems, with a reasonable degree of success, but there is not at present any market supply for the demands of the physician who desires the advantages which I describe. In order to render pneumatic tires as nearly proof against uncertain service as solid tires, I have placed inside my tire casing an inner shoe composed of several layers of canvas fabric imbedded in rubber, and covered the outside of the casing with a steel rivet-studded chrome leather protector, of which the Brickstin cover and several others are found on the market. This renders my tire almost proof against road injuries, and, while it decreases somewhat the resiliency of the tire, it still is far better than a solid rubber tire for use. I get better traction, less skidding, freedom from punctures, wear resistance and pneumatic softness. This gives me the most dependable tire that I have ever had. In order to get proper speed reduction from motor to driving axle—a reduction which will afford speed enough of the motor to get good service, and yet not too much speed for the driving wheels, and at the same time get proper clearance under the car to avoid the worry of using great care in running—I consider shaft drive to a jack shaft and double chain drive to rear wheels as the very best for our country roads. There are such cars on the market, and they are very desirable where boulders and section mile stones project from six to twelve inches amid grass and weeds in the center of the road at frequent intervals.

In order to render my progress certain and independent of outside help in case of stalling, I have devised a small iron windlass, arranged with an anchor that can be crowded into the ground with the foot, by means of which I can wind up a small wire rope and drag the car with great force, though slow speed, out of any ordinary mudhole or deep obstructing rut. With this device I can get through many places in thirty minutes which otherwise would require hours of trouble and delay, and I do not have to humbly implore some farmer to hitch up his team and pull me out.

If the time comes when we can have four-wheel drive to our cars the physician should buy such a car. The maximum speed needed for a physician's use need not exceed thirty miles per hour. This would give a better delivery of traction power than to throttle down a high ratio. The weight of a doctor's car need not be as great as is common with present roadsters. There are many little unnecessary things in the common car that add weight and can be avoided. In my present car I have found sixteen bolts which might be left out entirely by slight variations, permitting one bolt to do double service. There are many parts that are not carefully thought out so as to get proper strength with minimum weight. There are several parts which do not add to the actual effectiveness, but add considerable to the weight which must be carried around to the great disadvantage of the tires, the power consumption and the handling of the car in general. Thousands of physicians are waiting for the automobile that will give proper service in their work, and until the troubles which I have indicated are obviated they will not dare to give up the horse-drawn rig that has stood the test of time.

PRODUCTS OF DISTILLATION OF PETROLEUM

In testing gasoline, as it is used in automobile motor work for fuel, since it will be necessary to distill off the fractions, they can be divided in the manner as follows:

Temperatures	Name	Percentage	Density
45	rigolene	trace	0.590 min.
45-60	chymogene	trace	0.625 max.
60-70	gasoline	1.5	0.657 "
70-120	naphtha C	10	0.700 "
120-175	naphtha B and A	5	0.737 "
175-250	kerosene	50	0.820 "

Decane, which has a density of 0.738, should be about the limit, as an outside figure, in automobile gasoline, rigolene should approximate butane, the density of which is 0.600, chymogene approximates pentane, the density of which is 0.626. Gasoline ranges around hexane, the density of which is 0.674, heptane stands between gasoline and benzine, the density of heptane being 0.688; benzine belongs in the class with octane, the density of which is 0.719.

ADVANTAGE OF THE GRINDING OF CYLINDERS

In the machining process, if cylinders are to be ground, it is unnecessary to do the machining work with great accuracy, and the effect of rapid tooling is of no consequence, since the bore will be rendered true in the final grinding process. Grinding results in a true bore, because the work is not done at such a rapid rate as to cause the cylinder to warp, and the grinder will cut the hard spots as well as it will the soft; this is not so true when the bore is finished by tooling, because the tool cannot be rigidly held, and it will back off (a little) when it butts into a hard spot. It may not be generally well understood, but cast iron may be very hard in spots, due to "chill" which brings on a mottling of white iron, in zones, or over the whole surface of the gray iron casting. Chill is not a sign of the best castings for the purpose, but it is bound to be present sufficiently to make grinding an advantage. In grinding, modern machines are designed for the especial purpose.

LETTERS INTERESTING AND INSTRUCTIVE

FRONT BRAKE DISADVANTAGE

Editor THE AUTOMOBILE:

[1,957]—Will you please inform me through "Letters Interesting and Instructive" what are the drawbacks in having the brakes on the front wheels as per your article in the June 24 issue, stating that they were being tried out in England. A. E. B.

Watch Hill, R. I.

The principal reason why front brakes are not more generally adopted is because of the complications attendant upon their use. This will be apparent to you if you consider that the brakes must be so rigged up as to operate at whatever angle the wheels set; that is, the brakes themselves and their operating mechanism must rotate, or at least turn with the front wheels when they turn. This really is the only reason of weight which can be cited against their use. On the other hand, superior braking effort, prevention of skidding and other reasons are claimed for them.

Since their first trial on the other side several very large and important firms have taken them up, and no less than four or five English cars may be purchased in the open market so equipped. If they are successful in England, why not here?

MAGNETO NOW UNIVERSAL

Editor THE AUTOMOBILE:

[1,958]—I have a small bet with a friend which I would like to have answered through "Letters Interesting and Instructive."

The bet is that 75 per cent. of the standard makes of automobiles listing from $1,500 up in the 1909 models have a magneto as a part of the regular equipment and without extra charge from the list price. C. B. CONRAD.

Richfield Springs, N. Y.

In the February 4 issue of THE AUTOMOBILE you will find a very complete list of the cars for 1909. Taking this list as a basis, it is found that there are 264 cars above $1,500 in price, and that of these just thirteen do *not* fit a magneto as a regular equipment, or at least without an extra charge. This is but 4.9 per cent. of the total number, or, to put it as you did in your letter, 95.1 per cent. of the cars above $1,500 in price fit a magneto regularly. Of those which do not there are four Elmores in the list, and these cars are equipped with a Spark Generator, which is the practical equivalent of a magneto. To give some idea of the cars which do not fit a magneto as per the list spoken of above, it might be stated that seven are two-cycle, four air-cooled, and the other two friction-driven.

CARBURETER TROUBLE

Editor THE AUTOMOBILE:

1,959]—I have made it a practice to cut out any article which I read in your paper and paste it in a little scrap book, that is, if I think it is an article which will come in handy at some future time. I have been greatly helped on more than one occasion by these articles, but of course instructions for any particular work are not always clear when an adjustment on an article of an entirely different make or manufacturer is under consideration.

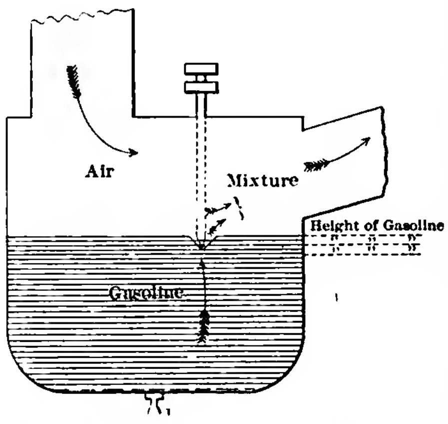
I am having trouble with my Holley carbureter after it has given me good satisfaction for two years (1907 make). After having gone all over my engine, I was fully convinced that the knock and sluggishness must be in my carbureter. I took the float out and found the shellac had disappeared from many parts of the cork float which permitted it to absorb the gasoline, making the float heavy and slow of action.

After scraping and reshellacking the float, I cannot seem to get the height of the gasoline at exactly the proper place to give me the old-time power and satisfaction.

The gasoline is forced upward through a counter-sunk hole in the bottom of the air chamber. The question is, with the car not running, how high is the gasoline to be in this countersunk hole; at the very bottom, halfway up, or flush with the bottom of air chamber? If you can enlighten me on this subject, I should be greatly obliged. No. 1,169 does not give me the desired information. F. H. THOMPSON.

New York City.

Your trouble apparently lies in the float which got soaked with gasoline and was never dried out, so that even if it were



Carbureter Has V-Shaped Fuel Inlet

scraped and re-shellacked the float was still heavy and consequently sluggish from the gasoline within. The best way to fix it will be to throw the old float away and put in another, which can be given an extra coat of shellac to avoid future trouble of the same sort.

In so far as your last question is concerned, the float should give the same level, whether the car is running or not, its function being to admit the fluid to the chamber as fast as the engine uses it up. This level should be the top of the small countersink of which you speak. The reason for this is that there should be an appreciable amount of gasoline in the bottom of the air passage for the air to draw on in starting up the motor. If there is no puddle of fuel there, in this type of carbureter it will be necessary to turn the motor over about a dozen times before enough fuel is drawn to start it.

With the gasoline level at the bottom of the countersink this would be the case, and with the level but half way up the matter will not be much improved, so the top is the proper level, and the float adjustment should be such as to attain this level.

SLIDING GEAR OR PROGRESSIVE?

Editor THE AUTOMOBILE:

[1,960]—Will you kindly tell me through "Letters Interesting and Instructive" the advantages of a four-speed selective transmission over a three-speed progressive, such as the Stevens-Duryea, for a six-cylinder car weighing 3,800 pounds and having 55 horsepower. REX C. EATON.

Estes Park, Col.

Over the selective type of gear, the progressive form has these advantages: a single shifting lever, shifting in a single direction; that is, being way forward, a continuous backward pull will give in order every successive speed; since it is necessary to shift into low to start, and then pick up the various speeds as the car gains headway, the lever continues to move in the one direction with no chance for a mistake.

On the other hand, the advocates of the sliding gearset with selective changing claim that the progressive gear box is very long, and consequently very heavy; that in stopping it is necessary to remember always to shift backward through all speeds to low, so that when starting again the gears are in the low position; that more gear changing is necessary with the progressive form than with the selective, and that for this and other reasons novices damage more gears.

Principal among the advocates of the progressive gear in this country are Packard, Stevens-Duryea, Royal, Franklin (1), Middleby, Studebaker (1), Sultan, Gaeth and Acme (1). Among the French constructors these prefer the progressive form: Renault, C. G. V. (all but 2), Panhard, etc.

As for the three-speed and four-speed proposition, that is an entirely separate matter, since both forms of transmission may be constructed with two, three, four or more speeds. The argument for a large number of speeds, regardless of the form of transmission, is this: The greater the speed range of the engine—that is, the greater the difference between the slowest and highest speeds possible—the greater the necessity for many changes, since without them the large range is divided over but few intervals, which means that the engine must run very slow at the bottom of each interval and very high near the top of each interval to maintain a constantly accelerating rate of speed, or the reverse when slowing down. By dividing the interval into a larger number of steps the action of the engine in covering each step and overlapping into the next higher or lower is more constant.

Introducing the six-cylinder engine changes the problem very materially. Without going into that here and now, it may be said that the more flexible the engine the less the necessity for a transmission, as witness the very flexible steamers made without one. So, with the most flexible gasoline engine it seems reasonable to think that a lesser number of speed changes would be needed, rather than more. From this viewpoint it would seem as if the proper transmission for a "six" would be a three-speed.

CONDEMNS STILZ ENGINE

Editor THE AUTOMOBILE:

[1,961]—If the notice of the Stilz engine and the enthusiastic editorial thereon in your issue of July 8 is cunningly contrived to arouse controversy, then it is well timed; for, at the present time there is no more interesting subject in the sphere of the automobile all over the world than the engine. From reports received it is evident that the Old World is exercising its mind strenuously on this subject.

The reason for this is evident, the rest of the automobile being a matter of mechanics only while the engine involves physics, deep and hard to understand; at any rate, rendering the attainment of perfection extremely difficult.

Your editorial is an indication of this, for, while showing the interest, yet it is likely to lead inventors and investors astray. My criticism is based upon your suggestion that there may be value in the Brayton or "Constant Pressure" type of engine, this type having an air, or mixture, pump, a passage or reservoir for conveying or holding the working fluid, and a working cylinder; the working fluid being maintained at a constant pressure from the time it leaves the air pump until the supply to the working cylinder is cut off.

The rotation of the engine is produced by the differential action of the pump and working cylinders, that is to say, that it is necessary that the working cylinder be larger than the pump, otherwise the engine will not operate. Hence the work done can only be in proportion to the difference of displacement of these cylinders.

The pump is negative, and the working cylinder positive, but only usefully so by the difference of displacement. This means that the mechanical efficiency of the combination must be low, even if we consider only the losses by fluid friction, neglecting the friction losses of the many moving parts of large size, such as pistons.

From the above it is seen that, no matter at what pressure the engine is operated, it is bound to be much heavier than one in which the pumping and power producing operations are both carried out by one simple mechanism, such as the trunk piston in the ordinary four or two-cycle engine.

As to thermal efficiency. The loss of heat in the cooling of the pumped air or charge, as described, is so much lost work. This is easily seen when one considers that supposing the pumped air were not cooled, then its pressure would be so much higher and less work would have to be done to attain the same result. The recovery of heat from the exhaust gas heater mentioned in the article is of no value to the thermal efficiency of the engine, for the heat loss I refer to has gone to the atmosphere, and cannot be recovered.

By far the greater heat loss, and that which renders this type of engine so extremely inefficient, is that to the working cylinder walls, this loss becoming greater as the size of the cylinder is reduced.

The theoretic thermal efficiency of a Brayton engine, neglecting all heat losses is 30 per cent.

The actual thermal efficiency so far obtained is not more than 8 per cent.

The ordinary four-cycle stationary engine can be relied on to give 25 per cent.

The average automobile engine shows 15 to 18 per cent.

The Diesel engine has actually shown 45 per cent.

It seems waste of time to work on a system so defective, although the allurement of the analogy "like a steam engine" is very enticing so long as one does not consider the cost in weight of engine and volume of fuel per horse power, which actually render such an engine useless for the purpose.

HUGO C. GIBSON.

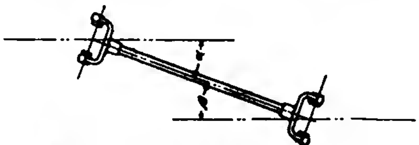
New York City.

Mr. Gibson pays us a great compliment in his opening inference that the article relative to the engine in question was only published to start a controversy, which of course was not the case. The closing sentence of his letter, in which he says: "* * on a system so defective," seems to stand without proof unless he imagined that the previous statements of the results obtained from a Brayton engine in 1873 can be considered as positive proof. Since this statement is directed against a type and not against any individual form or shape which experimenters have seen fit to give it, it is not fair to judge the type as a whole by the worst example. The inference, too, in the statement, "Not consider the cost in weight of engine and volume of fuel per horsepower," is that the form under discussion is both heavy and wasteful of fuel, neither one of which have been proven, so that they must be regarded as Gibson estimates.

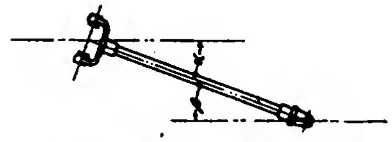
CLEARS UP UNIVERSAL JOINTS

Editor THE AUTOMOBILE:

[1,962]—Referring to your answer to No. 1,915, in the June 17 issue of "The Automobile," I am inclined to take the same view of your answer as Mr. Vanderbeek in his letter (No. 1,930) in your July 1 issue.



When $\alpha = \beta$ each __corrects__ the variation in angular velocity of the other.



When $\alpha = \beta$ each __adds__ its variation to that of the other, thus doubling it.

Sketch of Joints in Inclined Plane

Possibly another sketch, considering the middle section only, would make the matter more clear to the non-technical reader. I am adding this suggestion to what has already been said, for the reason that I consider the point a very important one, and one with which all manufacturers, garages, or others who are liable to have to do with the assembling of propeller shafts, should be familiar.

SPICER UNIVERSAL JOINT MFG. CO.
Plainfield, N. J. C. W. SPICER.

MORE ABOUT BUICK TROUBLE

Editor THE AUTOMOBILE:

[1,963]—In answer to No. 1,926, I would suggest that Don S. Numbers remove the left wheel and, by hammering the washers on the studs which hold the expanding band, restrict the side play of the brake band. It is also advisable to clean off the brake facing with gasoline and make sure that the brake spring is not only sound, but tight enough; as a weak spring will sometimes cause the rattle he mentions.

MURRY FAHNESTOCK.

Allegheny, Pa.

This gives another view of the trouble experienced by a Western correspondent with a Buick Model 10. Thus far, the three remedies suggested by those who have suffered in the same way have been: Bolts so long as to strike brake mechanism; loose emergency brake bands; and now, brake band holding washers and weak brake springs. Surely with these numerous helpful suggestions at hand, no owner of one of these cars should ever need towing home.

HAS NUMEROUS TROUBLES

Editor THE AUTOMOBILE:

[1,964]—Will you kindly advise me the cause and remedy for a knock in my engine which occurs only when running on partly open throttle. My automobile is a two-cylinder opposed 22 horsepower. This knock seems to occur when I shut off throttle (as in going over a rough place in road or around a corner), and open it quickly. Engine seems to respond quickly to throttle when standing still, but not when running as mentioned above.

My engine has just been cleaned, and is a new one, having been used only three months. Could the cause be faulty carbureter adjustment? I have a Schebler carbureter, Model D. Please explain how to adjust properly, the air valve to carbureter. How can you tell when you have too much air or not enough?

I also have a Remy magneto Type L on my car, and I find I have to run on my batteries almost all the time unless engine is speeded up; then magneto works all right, but when running idle, engine will die unless switched on to batteries. I have only had my magneto about two months; bought it from a garage for a new magneto. Is it likely I was sold a second-hand one—one that has lost its power, or is it faulty adjustment?

ROY N. CHELF.

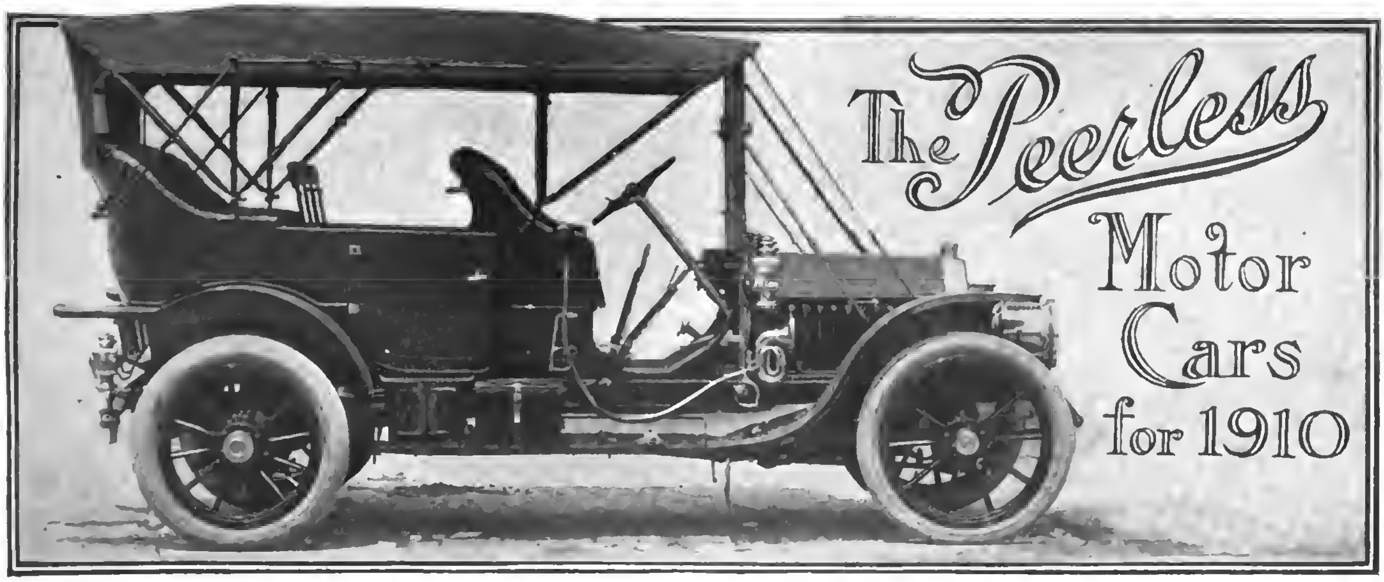
Brooksville, Fla.

From the way in which you describe your trouble it would appear as if there was too much play in the connecting rod bearings, which can only be fixed by taking the entire engine down, scraping the bearings and tightening the connecting rod caps, which should be done so as to decrease the amount of clearance between the pin and the bearing. It is barely possible that this can be accomplished by simply pulling the connecting rod bolts up tighter.

On the Schebler carbureter the air valve stands vertically, with the adjustment at the bottom. There is an adjusting nut and a locking nut. To adjust, run your engine as rapidly as is possible, with the throttle wide open, and vary the auxiliary air adjustment, noticing as you do so whether the engine runs better—that is, faster, or not. In doing this you will soon notice an approximate point at which the motor will act best; then, confining your efforts to this point, determining it as closely as possible. It is doubtful if you will get this exactly right the first time you try to adjust, but by getting it very closely and then running the car with it that way you can readily determine whether the engine needs more or less air.

Your magneto trouble sounds like faulty adjustment, and it would be well for you to seek advice from the manufacturer. This is a good make of magneto, and when properly adjusted it should ignite the motor charges in a proper manner—not for a short time, as you state, but continuously and regularly. Moreover, other things being equal, it should work better, rather than more poorly, at high speeds. If the garage sold you an old magneto, representing it to be a new one, you should be able to get redress in a legal manner and in such amount as would reimburse you for expense incurred with it, even to the extent of payment for sending it to the factory to have it examined and made right.

It is just possible that part of the knock which you experience is due to opening and closing the throttle too quickly, as this always makes an old engine knock.



As Model 27 Peerless Four-Cylinder Touring Car Appears in Its Latest Form

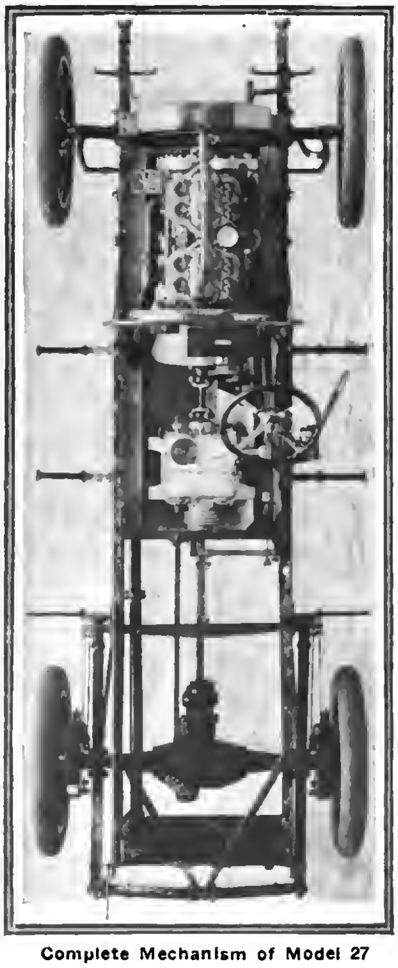
ALL that the name implies, is a catchy phrase which applies with peculiar force to the product of the Peerless Motor Car Company, of Cleveland, O., since the makers try in all of the shop methods, purchases of material, and even in the sale of finished cars, to attain the very highest, or peerless, grade. That this has been successful is now beyond question and the product of this concern's shop, shown complete on another page as it appears to-day, is fairly granted a premier place in the list of good cars, whether foreign or domestic.

In the purchase of raw materials, not only has this country been gone over as with a fine-toothed comb, but all of Europe has been drawn upon to secure the best materials, so that every part of the car, no matter how small, will be up to the standard set for the whole, namely, without a peer.

If the result of this active campaign for the best in materials and workmanship is not reflected in the workshop appearance, it would be hard to say where it would be shown. So the view on the next page shows the present appearance of the Cleveland shop. This was not a spontaneous growth, but rather grew to its present imposing size little by little, each year seeing the necessity for another big addition, until it ultimately reached the present vast expanse. Even now, rumor has it that another addition would be welcome for the floor space it would afford.

There Are No Changes Over Last Year—As the adjacent view of the assembled chassis displays, the whole construction is the same as in previous years, no changes worthy of the name having been made. This, put in another way, means that in an extra year of hard service no additional fault developed. For the ensuing year three models will be staged, known to the trade as: Model 27, a four-cylinder car of 30 horsepower, equipped with any desired body, or even the bare chassis may be purchased: Model 28, a 50-horsepower, 6-cylinder, with a long list of body types, and the new town car, Model 29, a 20-horsepower "four," which is only turned out with limousine and landaulet bodies.

The engines of the two former are alike as to bore and stroke, this remaining unchanged at 4 7-8 inch by 5 1-2 inch, while the new little motor also inclines toward a long stroke, the dimensions being 4 by 4 5-8, which gives a ratio of 1 to 1.155 as against 1 to 1.3 for the older engines, revealing in this the modern tendency toward a longer stroke relative to the bore, said to give also much more power.



Complete Mechanism of Model 27

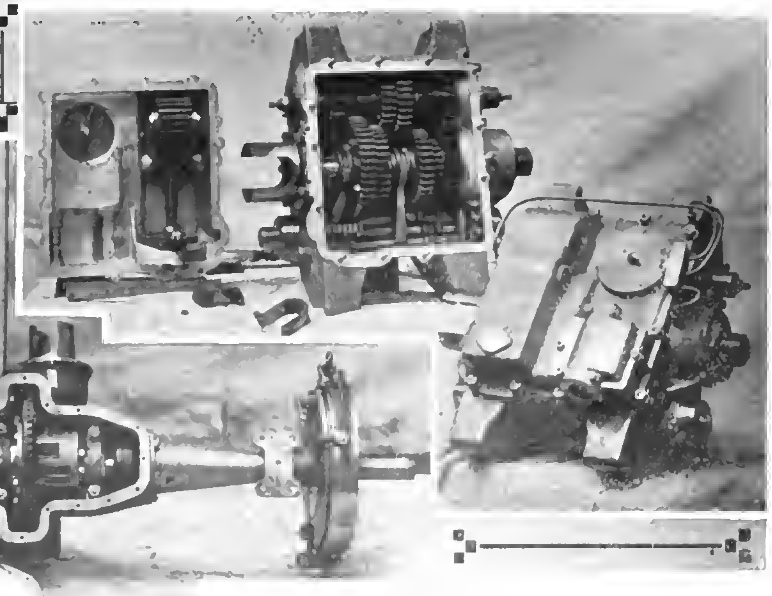
Conservative rating is in force on all models, as is evident from a brief mention of the A. L. A. M. rating for the three sizes, these being 38 for the motor actually rated at 30, 57 for the so-called 50-horsepower engine, and 25 for the little fellow, which is called a 20. All three cars are to be had with comparatively long wheelbases and rather large tires, the combination which always makes for ease and comfort of riding.

Interrelation of parts and their location, as shown on the chassis of Model 27, is the same for all models. The engine is placed in front, drives through an expanding band clutch and a readily detachable universal coupling of simple design back to a four-speed transmission located in the center of the car, right under the driver's seat and hung on a sub-frame, thence by exposed propeller shaft back to the differential mechanism and full floating rear axle, the latter retaining its distinctive feature of two universal joints incorporated in the construction to allow of sustaining the camber of the wheels and arched rear axle, which give the Peerless car such a different rear appearance.

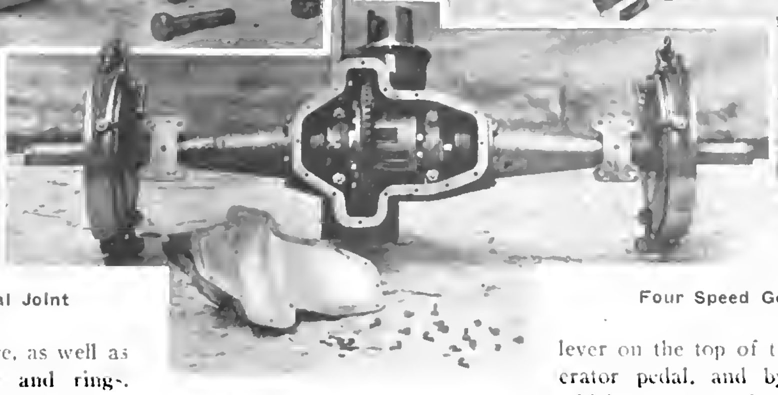
Details of the Power Plant—To chronicle the changes in the engine, or in fact, any part of the car, is to go into the infinitesimal, so that the statement made above that there are no changes, is practically true. Thus, to take up the motor parts, the crank case is as before, a one-piece casting of aluminum, but with an increased number of stiffening ribs. The rear portion of the case is made slightly larger, particularly the oil reservoir, which now has an increased capacity and the oil pump enclosed within it, making the lubrication system complete in itself.

The cylinders are cast in pairs with offset intake and exhaust valves, these being made with taper seats from a special imported alloy steel. The cylinders pass through the most careful machining process given to any part of the car, being bored, reamed, ground, and finally lapped with the pistons and rings in place, a special polishing preparation being used. This results in an almost perfect sur-

Clutch and Universal Joint



Four Speed Gear Box Shows Few Changes



Rear Axle with Cover Off

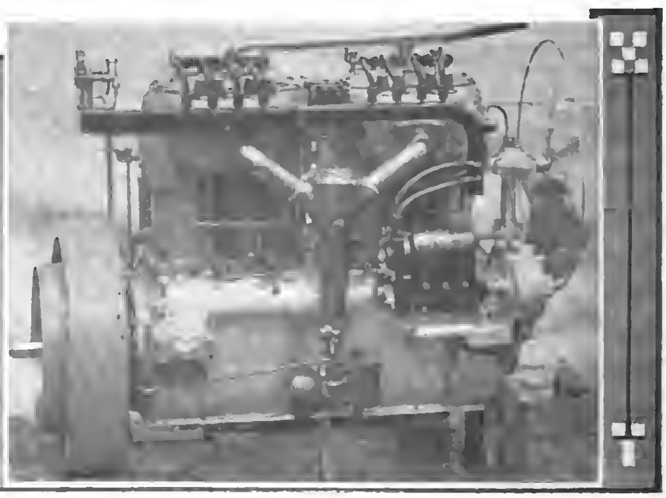
face for the cylinder bore, as well as perfectly fitting pistons and rings. Since this method insures compression tight cylinders, which means starting on the spark nearly every time, the extra work is well worth the time it takes and the money it costs. Strictly aside from the starting feature, this makes a smooth engine.

An additional precaution taken to have the engine parts right lies in the balancing operation; each part which enters into the rotating element is carefully balanced singly and then in combination with the others, in pairs, and last in groups. Finally, the whole is tested for running balance.

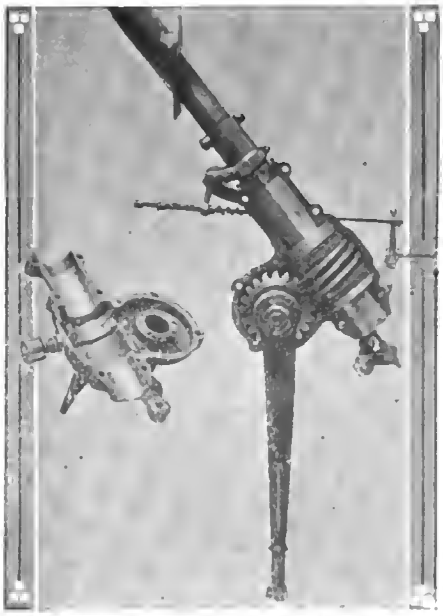
Carbureter Is Slightly Changed—On Models 27 and 28, a vaporizer of new design is used, which embodies several very important improvements. Ae the right-hand view below shows, the carbureter is really in one piece with the inlet pipe, the former being placed very low down on the right side of the motor. This low position is not accident but design, the float chamber in that position being so low that fuel is supplied to the engine under gravity feed on any grade likely to be encountered even with the gasoline tank nearly emptied. As will be seen, the form of the vaporizer is very simple, while the inlet pipe is made different from the usual run to co-act with it properly. The mixing chamber within the pipe is of larger capacity to provide a better mixture when the motor is throttled to slow speeds or working hard on hills. A single seated, vertically acting throttle is used, this being controlled by hand lever on the top of the steering wheel, by foot accelerator pedal, and by a sensitive governing device, which regulates the throttle opening to the motor speed regardless of load. The other side of the engine carries the pump drive and piping, as well as being the side upon which the oil reservoir is located. The pump is gear-driven and of the gear type, herringbone gears being used to insure absolute silence. These gears are placed in a vertical position, one above the other, the top one being driven.

Transmission Case Moved Forward—Still located in the middle of the car, the gear box has been moved slightly forward, making it possible to move the quadrant on which the change speed and brake levers operate forward to a vertical position within easy reach of the operator, and more comfortable withal. This forward position of the case allows of easy inspection, oiling or cleaning, since the case, and with it the cover, is directly below the driver's seat. Another and more weighty argument in favor of this location is that by moving the gear case farther away from the rear axle the propeller shaft is lengthened, and coincident with this, the angle which the shaft makes with the horizontal is materially reduced. The reduction in this means a nearer approach to a straight line drive.

On the ends of the propeller shaft are a pair of universal joints, one on each end. These remain unchanged, but the crosses have been fitted with roller bearings, which replace the ball bearings formerly used. The rear axle consists of but three pieces, the cast steel differential case, bolted at the ends to the



Two Sides of the Splendid Four-Cylinder Engine of Model 27 Contrasted two flanges, to which the one-piece heavy gage tubing is welded. These axle tubes are flared from the spring saddles toward the steel gear case, giving the axle as a whole much strength and an imposing appearance. The power is transmitted by means of bevel gears, both axle ends and differential ends acting through jaw clutches. On each side of the balance gear is placed a universal joint consisting of a 14-toothed gear meshing within a similar internal gear. The teeth are rounded so as to allow some lateral movement as well as vertical motion. This constitutes the mechanical device which allows of the cambered rear axle as well as the camber and dishing of the wheels. The housing containing the bevel gears is a steel casting split 2 1-4 inches above the center line, instead of exactly central as before. The castings being of greater depth, have greater strength than before and more rigidity, also. Since the case is filled with oil for lubricating purposes, this new form of construction makes the differential case more nearly oil tight.



Steering Gear Partly Dissembled

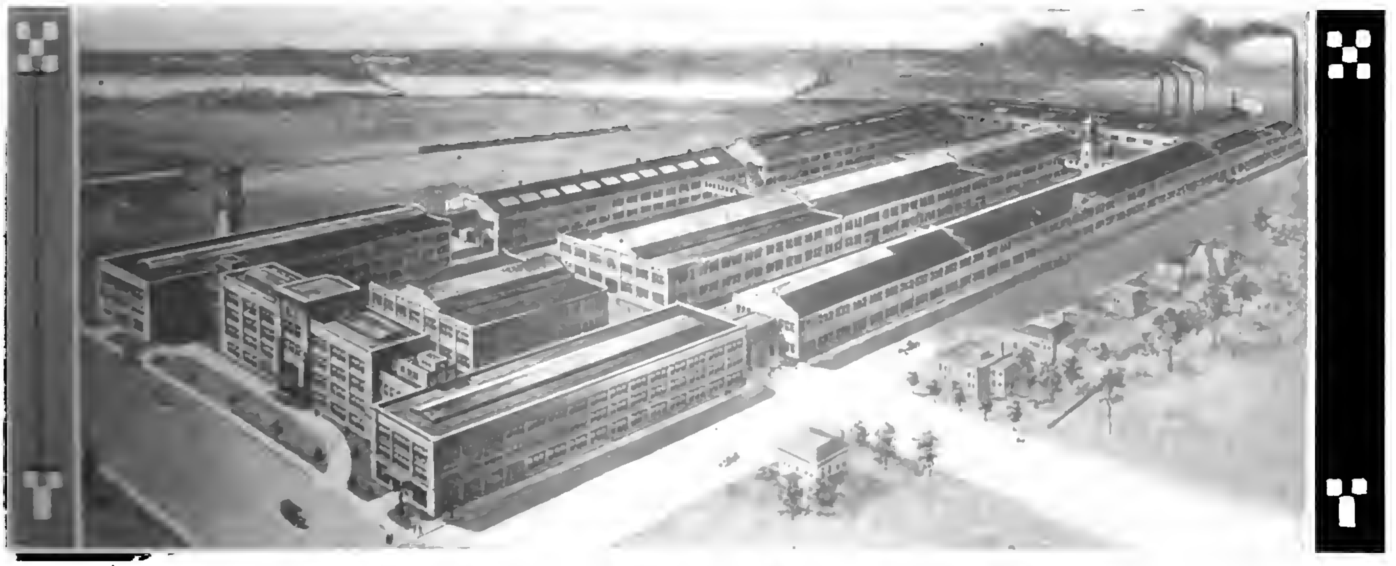
New Torque Rod an Improvement—Distance rods are attached to both frame and rear axle by means of joints of the ball and socket type, so that the car is propelled through these rods and not through the springs. A torque rod of new design takes all other possible strain off of the springs, which have nothing to do other than support the body and load. The rod is of channel section pressed steel instead of the former tube. This rod is attached to the frame at the forward end by cushion springs, which are completely enclosed in a neat tubular case.

In the front axle is seen a piece of work from the skilled mechanics on the other side of the water, this being an imported, solid, one-piece, drop forging, with the spring saddles forged integral. The section is the now generally adopted I-beam, and while the drop is not excessive, the bottom of the front axle is the lowest point on the car. Front wheels turn upon roller bearings, and the pivot point of the knuckles is supported on imported ball bearings of large size and special design. The cross rod is located behind the axle, where it is protected from road obstructions. Like the front axle, the springs which support the body and make life in it worth living, are imported from France, these bearing the trademark of Lemoine, Paris. In material they are of the very best that money will buy, this being an alloy steel, known as silico manganese, which possesses a number of physical and chemical properties, particularly fitting it for spring use. To improve the riding qualities of the car, if this be possible, the front springs have been increased in length by two inches and the rear side springs by four inches. The same flat shape is retained, as is the platform construction in the rear. In combination with this is the dropped frame, which gives a low center of gravity and large road clearance, too.

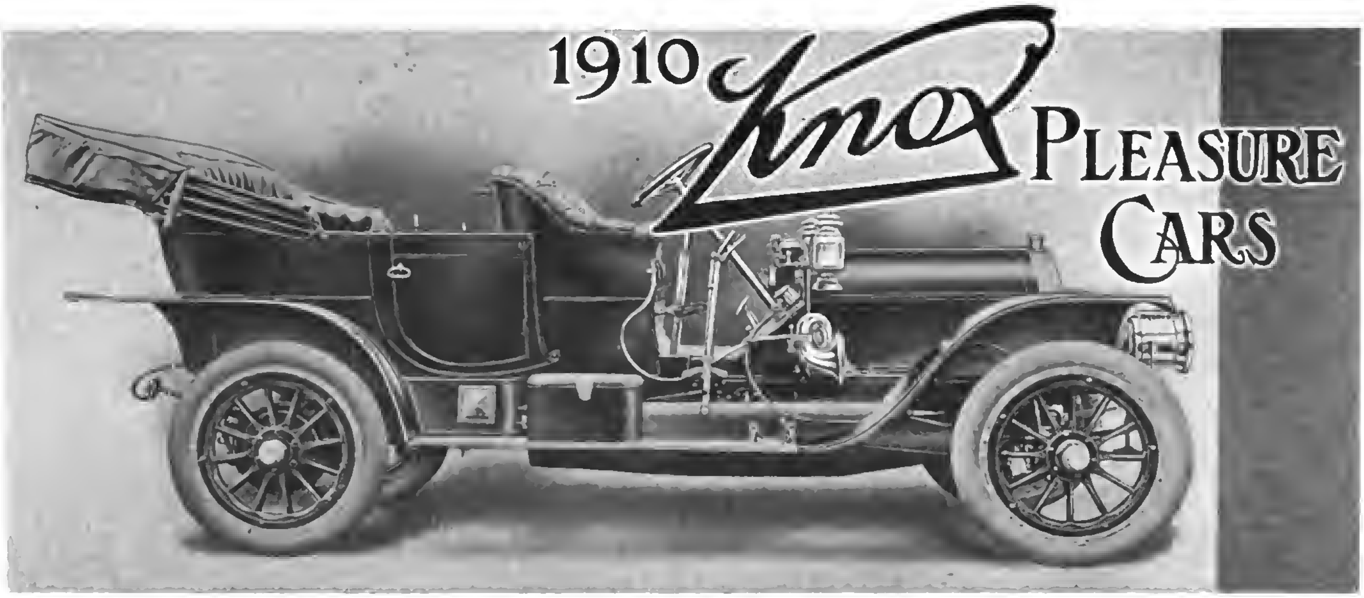
Unchanged is the term which applies to the frame also. This is still of cold rolled pressed steel, truss pattern, with the sub-frame for engine and transmission. The frame section is that of a channel, and the drop at the rear is 2 1-2 inches, while the overall length is 160 inches on Model 27, and 174 inches on Model 28. This corresponds to a wheelbase on the first of 122 inches and on the second of 136 inches.

Distinctive Peerless Body Types—Body types are unusually numerous, there being six to choose from in the case of both of the larger cars. These include the regular touring car, close-coupled body, roadster, pony tonneau, limousine and landaulet, all being built along the distinctive Peerless lines, namely, the combination of curves and straight lines, which never fails to please. The front fenders have been flattened a little and a wing added on the inside to prevent mud splashing up. This is carried back to the rear fenders, completely enclosing the under parts of the mechanism, and thus adding to the beauty of the car as a whole. Thirty-six inch wheels are continued, these being of the artillery type with dished spokes. The dished spoke is said to be the form which stands up best under side strains, while at the same time being stronger than the straight spoke form. Thirty-six by four inch tires will be used on the front wheels, which size is increased to five inch in the rear, where the work is more severe. Standard colors for the season will be: on touring cars and roadsters, maroon bodies and coach painter's red running gear; on all enclosed cars, maroon or blue. The closed cars will have upholstering of an imported cloth, known as Wulfing cloth, or, if desired, goatskin. All enclosed cars are fitted with an electric lighting outfit, consisting of a set of Fulmen, imported 60 ampere hour batteries, carried under one of the rear seats, the interior being wired for the tungsten lamps.

The prices vary with the body types, the touring body on Model 27 chassis being $4,300, and the same equipment on the six-cylinder chassis listing at $6,000. The little car has but one price, the same for both bodies, $4,500.



Bird's-Eye View of Peerless Factory As It Will Appear In a Few Months When Completed



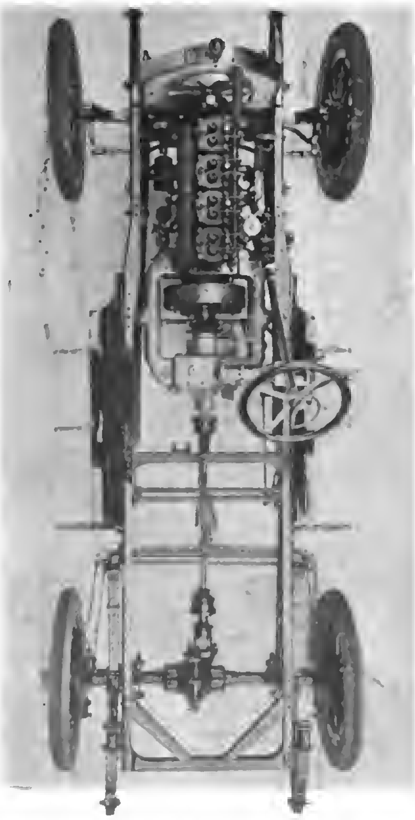
Model R, the Knox Leader for 1910, a Car Which Bristles with Good Features of a "Different" Nature

VERY recently—last week, in fact—there was described in these columns a car hailing from Massachusetts, the construction of which embodied the unit power plant, three point suspension, multiple disk clutch, and other advanced features. Strange to relate, another car which embodies these same features also comes from the Bay State, and still more strange is the fact that the two factories are within a very few miles of one another. The company whose output will be described here is the Knox Automobile Company, Springfield, Mass., a well-known concern, actively engaged in business ever since 1900.

For 1910 this concern will turn out three models, Model M, continued from 1909 and previous years on account of its continued successful career; and the different cars just added to the list, Model R, of 40 horsepower, which replaces Model O of last season, four cylinders, and a new "six," Model S, rated at 57 horsepower. All of the newcomers follow in a general way the construction of Model O, since the success of that model is taken as the best kind of proof that the form of construction is wholly right.

All Engines Are Water-Cooled—All Knox motors are now water-cooled, with valves located in the head, a location which has become very popular on the other side, being a noticeable feature of every winning car of this season. Model "R" cylinders are 5-inch bore, 4 3-4-inch stroke, rated at 38 horsepower, A. L. A. M. standard; Model "M" is 5 1-2-inch bore and 5 1-2-inch stroke, rated at 48 horsepower, A. L. A. M. Both have cylinders cast separately; each consists of two distinctive castings—the cylinder proper and the head. The water jacket of the cylinder is cast integral therewith, the water entrance being at the lowest point, and the outlet near the top on the right-hand side of the casting.

In the upper end of the cylinder casting a deep concentric groove is machined in which fits a copper asbestos gasket. Upon this is seated a corresponding concentric tongue formed on the bottom of the head which is firmly secured to the head by four bolts. It is impossible to bring these parts together except in a correct location and with a correct bearing. This joint, it should be noted, is not a water joint; in fact, there are no water joints in this construction which can occasion a leak into the cylinders.



How the Chassis Looks from Above

By this simple construction cylinders are secured symmetrical in form and perfectly uniform in cross section, which fact reduces to a minimum the liability of going out of round. Furthermore, they may be easily and accurately machined, the casting being entirely open at both top and bottom. The bottom of the head is also machined so that the entire surface of the combustion space is smooth and accurate in capacity, giving a perfect balance of the volumes of all cylinders, which contributes to sweet and even running. Machining the combustion space has other advantages, usually not taken up because of the cost.

In addition to this, the smooth surface of the combustion space is less likely to retain deposits of carbon than the rough casting, and the entire absence of sharp points, edges and roughness is supposed to be a preventive of premature ignition. The head is cast integral with its own independent water jacket, and the inlet and exhaust passages from the manifolds to the valves are cored in the head. The water spaces are large, the water circulating freely around all the parts mentioned as well as around both valve seats, the head being cast with a division through it horizontally, making two separate water spaces, the water circulation being directly over the valve seats, returning through the top water space to the return manifold, the water entering the lower one through a single U-shaped hollow casting. The "U" connection and the return water manifold are held in place by a double clamp and single bolt easy to connect and disconnect.

Flat Valves Given the Preference—After an unsatisfactory experience of two seasons with the conical seat for the valves, and after an exceedingly thorough trial of the flat seat, the latter has been adopted for use on all motors. The valves are mechanically operated by rockers and push rods on the right side of the motor. The upper ends of the push rods are in the form of hardened cup-shaped sockets and screw in the ends of the rods for adjustments of the valve openings; they are securely fastened by lock nuts and the outer ends of the rockers with which they engage are ball shaped. Oil is placed in the pockets, preventing wear at this point. This construction and the positive adjustment of the valve rods, together with the use of spiral springs for taking up lost motion in the valve mechanism, has resulted in an exceptionally quiet engine, as well as one of great flexibility.

In the three point suspension, which was worked out by Knox in 1900 and used ever since, the two points are on the yoke surrounding the transmission and clutch, while the single point is located at the front end, where the weight is carried on a flexible trunnion hung to a bronze cross member of inverted channel section bolted to the side members of the frame. There are two other cross members with flared ends forming the gusset plates, both of which are hot riveted to the frame. The complete power plant is composed of three separate units, the motor, clutch and transmission, any one of which can be easily removed without disturbing the other. The whole power plant can be taken from the chassis by the removal of four bolts, one on each side of the yoke at the rear, and the trunnion bolts in the center of the forward transverse frame member, the uncoupling of the forward universal joint, muffler pipe, ignition wires, throttle and brake connections which, under ordinary circumstances, would require about 45 minutes. A change over last year consists of casting the crankcase and yoke separately, and bolting them together, a tongue and groove making for accurate assembling.

Details of the Aluminum Crankcase—All the crankcases are similar to Model "M," cast from aluminum and composed of four pieces—the case proper, the bottom of base, and the timing gear case and cover.

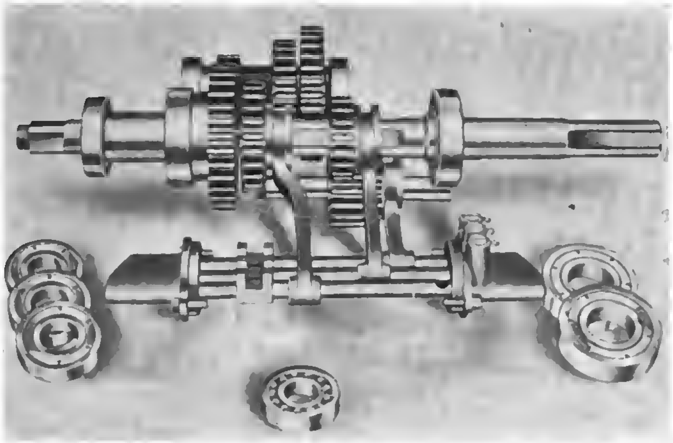
The shape is that of a rectangle, or perhaps more nearly a square, the crankcase proper forming the top and two sides, while the bottom is formed by the oil pan, which, however, is not very much on the pan order, being very flat and shallow. The bottom of the case is easily removed and acts chiefly as an oil reservoir. The aluminum in these castings is an alloy, obtained after months of testing and careful analysis, which, while sacrificing but little of the inherent lightness of aluminum, has ample strength for its purposes. The case proper has a massive extension cast on each side of the rear, which makes, when finished, one part of the forward joint for the side arms of the yoke. This casting forms the upper half of the crankcase or engine bed; the crankshaft and bearings being bolted to the lower side of it.

All crankshaft and connecting rod bearings are made of Parson's white brass, making it easy to replace worn bearings. With this metal it is impossible to injure the crankshaft in case of a hot bearing from lack of lubrication. The lower half of the crankcase can be taken off without disturbing the main bearings so that the engine could be run without it.

Connecting rods are made from drop forgings of nickel steel sufficiently heavy to stand the strains of a powerful motor. The heads are fastened with four bolts having contracting double lock nuts, a positive fastening, the four bolts making it practically impossible for the bearings to wear more on the ends than the center, which after long use would have a tendency to concave the wristpins.

A circulating pump of the centrifugal type is used on all motors, and is driven by spiral gears from the camshaft, located on the right side of the motor. A special spring connection is used, made to snap by should the pump become frozen or stopped by obstruction, thus avoiding any danger of damage to gears or shafts; the pump can also be entirely drained. The water is delivered from the pump through a tapered manifold to the lower end of each cylinder jacket, thence out of its upper end, through the outside connector, into the lower chamber of the head, then into the upper chamber and out of the right side, into the return manifold and to the top of the cellular radiator. The action of the radiator is assisted by a six-bladed fan, positively driven by a leather-covered chain belt.

Ignition on Models "M" and "R" is by Bosch high tension magneto and vibrating coil and timer—two complete systems with two sets of plugs. The magneto is located on the left side



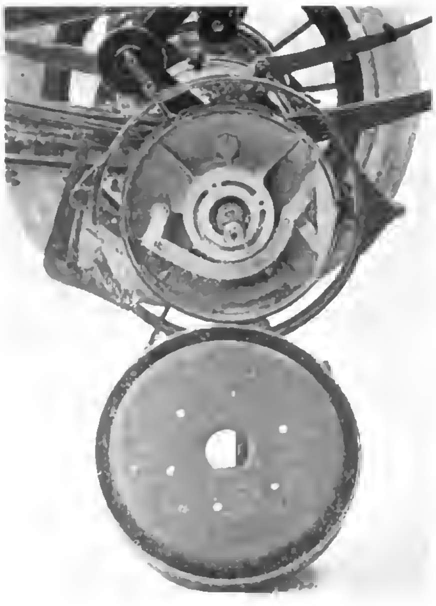
Heart of the Transmission Used in Models R and S

of the motor, and is driven from the timing-gear case. The ignition timer is driven by spiral gear from the oil pump shaft on the right side of the motor.

Great Stress Laid on Lubrication—The makers of this car say that one of the most important points necessary to the perfect working of machinery is proper and systematic lubrication at all times. The motor, being subjected to different variations in the speed and power required, makes it even more important that it be considered one of the most essential points in the perfect motor car. In all Knox motors what is known as the De Dion system is used, which has proved to be efficient, economical and satisfactory. With this system it is practically impossible to burn a bearing, the oil first being strained, and as all are lubricated from the inside, has a tendency to carry grit away from the bearings. The camshaft near the center drives a downwardly projecting shaft for the rotary gear pump, which is also fitted with a spring connection to snap should it become clogged.

The lower part of the crankcase forms an oil reservoir from which, through a strainer, lubricant is drawn by the gear-driven pump and conveyed through an oil pipe on the left side of the case, from which are pipes leading to the various bearings of the crank- and camshaft. In each connecting rod is drilled an oil passage, the opening of which registers once in every revolution with a similar opening in the crankpin, so that the wristpin is not only lubricated by the oil distributed centrifugally but by direct pressure through the connecting rod. A pressure gauge, located in the sloping footboard, registers the amount of pressure, which is varied at will by means of an adjustable by-pass located on the left side. The oil screen is easily detached by a socket wrench furnished with each car. The filler cap and petcock showing oil level are also on the left side. With this sys-

Knox Three-Plate Clutch Dissembled, Showing Cork Inserts



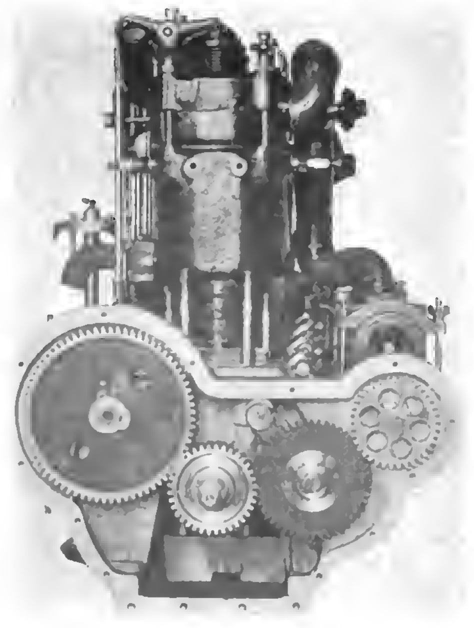
Rear Hub Brakes and Brake Drum

tem a gallon of oil will last for over 500 miles of ordinary running.

Transmission Three Speed Selective; Compactness a Feature—On Models R and S, the transmission used is of a new design, affording three speeds forward and reverse, operated along selective lines. A special feature is its compactness and the elimination of the use of a troublesome hollow shaft. The shafts and gears are made from nickel steel of large size, mounted on Hess-Bright and F. & S. imported ball bearings; the short shaft is only five inches between bearings, thus avoiding any liability of springing even under the most severe abuse. A transmission clutch brake is used to avoid clashing the gears in shifting from one speed to another.

Not the least of the good features with which this car fairly bristles is the straight line drive. This is obtained by setting the two rear supporting points of the power plant down low so that a straight line is described from the front end of the crankshaft to the rear axle, except the provision made back of the transmission for the drop at that end caused by the weight of the body and passengers. Throughout the car the very best of material is utilized, chrome nickel, nickel and other special steels, as well as high-class bearings, being used freely.

Changed is the steering gear, the one to be employed in the future being of the irreversible type as before, but operated by a double right and left hand thread with a rocker action at the base, which works the steering lever. The crossrod is placed at the rear of the front axle. The steering wheels are covered with hard rubber and are of large diameter, 18 and 19 inch being used.



End View of "R" Motor, Gear Cover Removed

Front axle is of high carbon steel, drop-forged to shape, which is the now popular I beam. The yokes are of the Elliott type with adjustable roller bearings. Massive steering knuckles formed by hand from nickel steel billets make for safety. The rear axle is of the semi-floating style with 1 1-2-inch shafts of nickel steel. On the axle double race ball bearings are used to give greater bearing contact and take up end thrust as well. Four of these are used on the axle and two in the pinion housing.

Alloy Steel Frame of Large Section—Frames are made of a cold-pressed alloy steel, admirably suited to the purpose and of large sectional area. Besides the front member which carries the forward trunnion of the power plant, there are but two cross members. Both of these are of steel and braced with heavy gusset plates where they join the main frame. Special efforts have been made to have the springing of the Knox cars as nearly perfect as human endeavor can make it. To this end semi-elliptic fronts and three-quarter elliptic rear springs are used. The front springs are shackled at the rear above the spring so that the shackles work in compression. The lower half of the rear spring is positively attached to brackets in front, while the upper half is bolted to a rigid gusset plate.

Realizing the importance of durable and reliable brakes, considerable experimenting has been done to have them first class in type as well as workmanship and material. One special feature is the construction of the drums, same being pressed from one piece of sheet steel, with an air space between the outer and inner drum, avoiding any possibility of either brake dragging, due to the expansion of the drum from heat when the other is applied. The service brake is a contracting band on the outside of the double drum, operated by foot pedal; the band is so fastened that it is pliable and free from rattle, and held free of the drums by springs. Adjustment is by turnbuckle, easy of access.

With a Runabout Body a Shorter Wheelbase, 102 Inches, Is Used

The emergency is a hand lever pull brake of the expanding type, operating on the inner drum, and easily and positively adjusted. Brake shoes and bands are lined with thermoid, and have perfect working equalizers; all rods and connections are free from rattle.

Model R, with standard equipment, including about $700 worth of parts ordinarily listed as extras, sells for $3,250. With different types of body, however, the price varies from $3,050 up to $4,000. The price of Model M remains the same at about $5,000. Specifications and prices for the new "six," Model S, have not yet been given out.

MEAN GAS SPEED IN MANIFOLDS AND PORTS

The loss due to friction of gas against walls is approximately as the square of the speed; since the loss of ability of a motor is materially affected by this friction, and since about ten per cent. of the power will be lost when the speed of the gas is about 4,000 feet per minute, the effect of a very high gas speed will be marked. While it is true that in motors of some repute the speed of the gas is maximum at 15,000 feet per minute, in steam practice the speed is kept down to 6,000 feet per minute, and in the better class of automobile motor designs, it is the aim to hold the gas speed down to about 9,000 feet per minute. Much depends upon the shape of the cams as well as upon the area of the ports, and as a rule it is better to so shape the cams that they will do the work properly, than it is to have large manifolds in conjunction with cams that are not well suited to the purpose.

P. & S. Town and Country Victoria, an Exclusive Model of Unique Design

IN all likelihood, there are few concerns which are forced into the manufacture of any one type or style of car, yet that is the peculiar position in which the Palmer & Singer Manufacturing Company, New York City, finds itself to-day. The Six-Sixty car built by this firm, has been so popular and such a good seller that owners of these cars, desiring a smaller and lower powered machine, have practically forced the company to build one for them. Not only did these enthusiastic adherents of P. & S. work, design, and material, force upon the concern a new type of car, but they contracted for a very large number of the new cars, before anything more had been done upon them than the decision to make a different car.

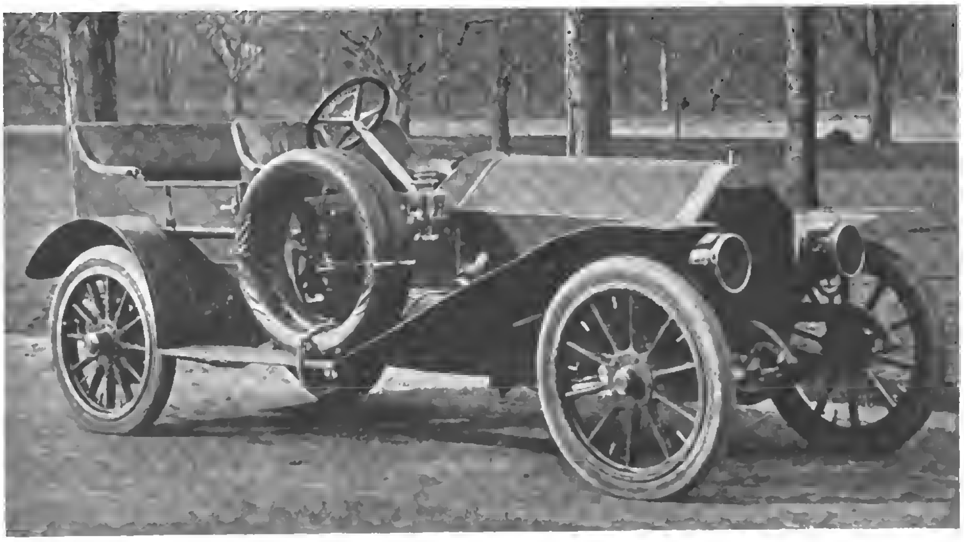
This condition necessitated a new and large factory, modern in every respect. So, land was purchased in Long Island City, at Webster, Second, and Third avenues, and the construction of the new shop started. This factory will be of fireproof construction, steel, brick, concrete, and glass only entering into its make-up. The edifice will be three stories in height, with sufficient floor space to accommodate 1,000 workmen, although, at first, many less than this will be transferred from the older buildings. In the selection and arrangement of the machinery which will form the greater part of the new equipment, much care has been exercised to have the result as nearly perfect as is possible. The labor-saving machinery is very complete and well-planned.

The present line of cars consists of but two, which are, however, fitted with numerous body style fitting them to the needs of every class of automobile enthusiast. These are the Four-Forty and the Six-Sixty. In the series for 1910 (the Palmer-Singer Company have no models, the various changes which mark the successive years being denoted by the series of cars going through the shop) two more cars are found. These are a Six-Forty and a Four-Fifty.

The former is the car which owners and friends have forced the company into the production of, while the latter is put out in response to a large demand for a four-cylinder machine of the very highest practicable power. Like their predecessors, these cars will have the tried and proven features which have made the name of Palmer-Singer famous in connection with automobiles of the highest type. Although it is not generally known, this company takes rank among the pioneer car builders, since it was among the very first to use a number of features which are now the standard. Some of these are: Four-speed transmission, which the majority of builders will use for the first time in 1910, but which this firm has always used; annular ball bearings throughout tbe car; universal joints on all steering connections; liberal use of nickel steel for axles and elsewhere; multiple disc clutch running in an oil bath; and many other features.

Model Four-Forty is powered with a four-cylinder engine, of 4 1-4-inch bore and 4 1-2-inch stroke. Ignition is by high-tension magneto, Bosch being the usual equipment. The transmission is four-speed selective, and with the engine is located on a subframe. To add to the strength of the main frame and at the same time preserve its light weight, the latter is made with longitudinal trusses. Between the engine and transmission is located the clutch, of the multiple disc variety, running in a bath of oil, which insures easy engagement. In addition to the usual full brake equipment, a hill pawl is fitted, which is dropped into engagement by the driver, using a small and inconspicuous hand lever. This prevents the car backing up, so that if the brakes should fail and the engine stop, when ascending a steep hill, there is no danger to the occupants of the car, since the hill pawl would hold it from backing down. As a two-passenger runabout, this chassis has a 107-inch wheelbase, and is fitted with 34 by 4-inch tires all around.

The Six-Sixty differs little from the smaller car, except for power plant and wheelbase length, as would be necessitated by longer bodies. The motor has a 4 7-8-inch bore and a 5 1-2-inch stroke, the length of the stroke relative to tbe bore making for slow speed and consequently quieter running. Wheel diameters are increased to 36 inches, while the front tire sizes remain at 4 inch. The rears, however, are increased to 4 1-4 inch to care for the slightly greater weight and carrying capacity. The wheelbase of 126 inches allows of any desired form of body, although the company fits a three-passenger runabout usually.



Baby Tonneau Body on Six-Sixty Chassis, 1910 Series

FRANKLIN AUTOMOBILES PERFECTED FOR 1910 SEASON

IMPROVEMENT being the order of the day, it is not strange to find the progressive H. H. Franklin Manufacturing Company of Syracuse, N. Y., on the spot with a few minor yet noteworthy additions to the well-known Franklin air-cooled cars. The improvements take the form of slight changes in the motor cooling system as mentioned briefly in the July 22 issue of THE AUTOMOBILE, in the ignition control, and a big improvement in the matter of wheel and tire sizes. This latter is along the line of modern changes which go toward making cars ride easier, and is made particularly noticeable in this case, since the cars already are very light in weight so that the old wheels are large, and tires ample for the weight carried. However, it has been fairly proven that larger wheels make a car ride easier, so the 1910 Franklins will have larger wheels. These larger wheels are also easier on tires, so that the increased wheel size coupled with larger tire diameters should eliminate all tire trouble.

A list of cars to be made and sold for 1910 would duplicate a similar list for 1909, since all models are continued, including: Model H, a six-cylinder 42-horsepower chassis, made with seven-passenger touring, close coupled, double rumble seat runabout, and limousine bodies; Model D, a four-cylinder smaller car of 28 horsepower, and fitted with five-passenger touring, close coupled, double rumble seated runabout, landaulet, and limousine bodies; and a high-grade runabout chassis, Model G, powered with a four-cylinder 18-horsepower engine, and equipped with the following body types: Four-passenger touring, six-passenger town, runabout with hamper, single rumble seat runabout, and double rumble seated runabout.

By far the most important of the changes has to do with the air-cooling arrangement. Formerly, the engine cylinders were cooled by the direct impingement of air upon thin sheet metal flanges radiating from the cylinder castings, the latter being machined on the outside to advance the cooling action and to allow of the flanges fitting closer. In this system, the air was forced against the flanges by means of the forwardly located fan, bevel gear driven from the front end of the crankshaft. The flywheel also assisted in moving the air past the cylinders at a high velocity, the clutch being very small, and the space between the exterior of the clutch case and the flywheel rim being made up of a series of spokes which have a fan blade shape. The newer way dispenses with the front fan, the flywheel spokes alone being used to move the air, but to do this most efficiently, a sheet metal casing has been placed around the cylinders and flanges, with very little clearance between its internal diameter and the outside size of the flanges. This casing is open at the bottom, and at the top the whole number of casings have been connected together with a diaphragm, which is carried back to the flywheel fan. The whole is made into an air-tight casing, except the openings left at the bottom for the admission of the air, and at the rear end, for the emission.

Another 1910 improvement is the elimination of the spark advance lever, which makes the ignition system much simpler than otherwise, as well as reducing the control to its simplest terms. In this manner, the judgment of the operator or driver as to the best spark position is done away with, and better results are obtained both as to maximum speed and power at all speeds. In the ignition group, the battery and coil are done away with. Dependence is placed wholly upon the reliable magneto, a Bosch high-tension, and the complication and added weight of the extra, in fact superfluous, system is saved.

Tire sizes have been much increased on all models. Last year, Model H carried 36 by 4 front tires and 36 by 4 1-2 rears, which have been changed to 36 by 4 1-2 tires in the front and the new odd size, 37 by 5, in the rear. Considering that the weight of this model complete does not exceed 2,700 pounds with touring body, the tires provided are unusually large.

Model D tires are increased from 36 by 3 1-2 front and 36 by 4 rear to 36 by 4 front and 36 by 4 1-2-inch rear. So, too, with the smaller car, all tire sizes have been increased by one-half inch.

Axles, springs, and frame remain the same, particularly the frame, which is of laminated wood. In this construction, selected second growth white ash is used, placed in three vertical laminations. In construction, these laminations are screwed and glued together, after which the whole is kiln dried, despite the previous kiln drying and seasoning process which the wood has gone through. The upper and lower edges are bound with a thinner strip which prevents the entrance of moisture into the grain of the wood and its consequent destruction. This frame is claimed to be lighter than the more usual steel frame and stronger as well. Certainly it yields to the rider, in the car so equipped, the desirable resiliency. As to springs, the full elliptic type, attached to the underside of the axles, which has long been a Franklin feature, will be retained without change.

All other features of Franklin cars in previous years have been retained, since they have survived the test of another year's daily service with complete satisfaction.

FRANKLIN SALESMEN CONFERENCE AND TOUR

When the branch managers, traveling salesmen, and factory representatives of the Franklin company held their recent conference at the big Syracuse factory, one day was spent in an outing which included a drive in the new 1910 models over some of the worst hills and roads to be found in Central New York. The drive, 75 miles in extent, ended at Chittenango Falls, where lunch was served on the ledge at the top of the falls, and just showing in the background of the picture. The long ride over bad roads served to try out the cars in an excellent manner, and the way in which they stood up was evidence that the new features incorporated in these models are right. The conference of the week was held under the direction of Sales Manager F. R. Bump, who, in the picture, stands at the left with cup in hand.

Group of Thirty-five Franklin Salesmen After Lunch at Chittenango Falls

NO MOTOR VEHICLE COMMISSIONER FOR CONNECTICUT

HARTFORD, CONN., July 26—The Senate of the Connecticut State Legislature, which is still in session, has without a doubt put away the commissioner of motor vehicles provision of the new State law. When the original bill was introduced, provision was made for the creation of the office of Commissioner of Motor Vehicles, entirely separate and with ample provision for absolute control of the situation, as far as the State was concerned. But this feature was a bone of contention, and a compromise was effected by providing for such an office but still leaving the control of matters with the Secretary of State. Like the bill proper it has dragged along until no one really cares a great deal anyway. But the machine has got to work, and is responsible for putting the commissioner bill to sleep for keeps. United States Senator Morgan G. Bulkeley, a former Governor of the State, was at the Capitol when the bill came up for action in the Senate. That was one side of the situation, and former Governor George P. McLean was on the other. The McLean faction favored the bill inasmuch as it was proposed to put in office George I. Allen, a former postmaster of Middletown. Now, then, it is generally assumed that Secretary of State Rogers is a Bulkeley faction man, which was obviously opposed to the bill. As might be expected, a lively time ensued. Senator Peck was in favor of having the work done in the Secretary of State's office rather than by a special commissioner, which latter, involving the installation of the commissioner and incidental office force would be a waste of good money. Without going into details, the measure was put to sleep by a big vote, so at all events it is very doubtful if there will be a commissioner of motor vehicles provided for at this session of the State Legislature. Both factions are headed by representative Republican leaders. It is intimated that an attempt will be made to prevent an appropriation being made for the Secretary's of State's office with which to control the motoring situation, as this would be such an easy way out of the difficulty and one that might be used.

OWNER NOT A CHAUFFEUR IN NEW YORK

ALBANY, N. Y., July 26—Automobile owners in general will be interested in knowing the text of the opinion of Attorney General Edward R. O'Malley on the subject of chauffeurs' licenses, and whether an owner or member of his family must take out a chauffeur's license to operate a car. The Attorney General's opinion was delivered in response to a request from Secretary of State Samuel S. Koenig, for information on the subject, and is as follows:

HON SAMUEL S. KOENIG,
Secretary of State, Albany, New York.

In answer to your inquiry of July 13., as to whether or not it is necessary for various members of a family who own an automobile to procure a chauffeur's license in the event that different members of the family operate the automobile, I am of the opinion that such license is not necessary.

There is no provision of law that I am aware of requiring the owner of a motor car or any member of his family to procure a chauffeur's license to run such machine.

Subdivision 5 of section 280, of Chapter 30 of the Consolidated Laws defines the word "chauffeur" as follows: "Shall mean any person operating a motor vehicle as mechanic, employee or for hire."

Section 282 requires the owner to file in the Secretary of State's office a statement of his name and address, with a brief description of the vehicle to be registered, etc.

Section 283 provides for the registration of such motor vehicle. Section 302 provides that every person desiring to operate a motor vehicle as a chauffeur shall file in the office of the Secretary of State a statement, which shall include his name and address and the trade name and motive power of the motor vehicle he is to operate. Upon filing such statement, the Secretary of State shall issue to the chauffeur a badge, as provided in section 304.

Section 306 provides that no person shall operate a motor vehicle as a chauffeur upon the public highways, unless such person shall have complied in all respects with the requirements of the four preceding sections.

There is no requirement that the owner of a motor vehicle shall procure a license to run the same, nor is there any requirement that any other person shall do so, unless he proposes to become a chauffeur or a person conducting an automobile as an employee for hire or wages.

EDWARD R. O'MALLEY, Attorney General.

[illegible]O SPEEDERS PUT "ON PROBATION"

[illegible], July 26—Imagine bankers, trust officials and others [illegible]ment in business and social circles making weekly [illegible] probation officer, like small boys caught swiping [illegible] a push cart. That is the latest idea of Police [illegible] of this city, before whom all speeders must ap[illegible] that fines had little effect, and tried the probation [illegible] Police Department has organized a motorcycle corps.

[illegible] **River Bridge Rebuilt**—The bridge across the [illegible] River at Conowingo, which was destroyed by fire in [illegible] will be opened for public traffic September 1. This [illegible] connecting link of the Maryland State road north and south of the Susquehanna River.

STATE AND LOCAL LAW IN PENNSYLVANIA

SWARTHMORE, PA., July 26—"Does a borough ordinance take precedence over the State law?" is a question which is now agitating the motorists of this country. President J. H. Weeks, of the Automobile Club of Delaware County, says that it doesn't. Squire Burnley, reinforced by the vast legal knowledge of the borough solicitor, avers that it does. The hullabaloo was raised by the arrest, at about eight o'clock on July 20, of W. R. Taylor, a member of the club, on the charge of driving his car without lights. The defendant does not deny the charge, but the club, through President Weeks, who has taken up the matter, asked for the dismissal of the proceedings on the ground that Section 12 of the new State law says vehicles must carry lights "from one hour after sunset until one hour before sunrise," and that as the sun did not set till 7.26 on the night in question, the defendant was still within the limit when arbitrarily arrested. The borough solicitor wanted to fine Mr. Taylor, and then remit the fine, charging the defendant with the costs alone, but the defense refused to accept this solution of the problem, preferring to pay fine and costs in order to have a groundwork for an appeal. The club and President Weeks are prepared to carry the case up to the Supreme Court on account of the principle involved. If every picayune borough and township ordinance is to be allowed to take precedence over the State law, which was carefully worded to prevent that very thing, President Weeks thinks the automobilists of Pennsylvania should know it as soon as possible.

OHIO PASSES 20,000 REGISTRATION MARK

COLUMBUS, O., July 26—State Registrar of Automobiles Fred. H. Caley on Friday, July 23, issued the twenty thousandth license to operate an automobile in Ohio. The number was granted to A. R. Davis, 2223 West Thirty-ninth street, Cleveland, an agent for the Studebaker line. Counting a population of 4,500,000 in the State, the use of 20,000 automobiles means there is one car to every 225 inhabitants.

According to a decision rendered by Attorney General Denman, all automobile tags must be plainly and conspicuously displayed. The ruling was given upon the request of the State Automobile Department, which has received numerous complaints of tags being hidden behind springs and swung parallel with the body of the car. Under the ruling these practices must be stopped. As the primary object of the law is identification nothing must be done to prevent an easy reading of the number of all tags. Such pernicious practices as oiling the number tags so that the rising dust will adhere to the oil, cover the surface, and thus prevent identification, will be stopped.

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BLERIOT'S PASSAGE OF THE CHANNEL

The French journals have one and all worked themselves into a fine Gallic frenzy over M. Bleriot's very successful flight, and even the once unemotional English betray considerable excitement. Of course, Bleriot is a Frenchman, and, equally of course, England's pose of insular superiority has been badly damaged of late. Still none can doubt that this first passage of the English Channel by aeroplane is an event long to be remembered.

All scientific men have seen for some time that M. Bleriot's feat was perfectly practicable. The distance was a trifle, but 23 miles; and, although it had never been done, there was every reason to suppose that flying over water would prove easier than flying over land, as there would be none of the sudden and irregular air currents always set up by trees and tall buildings. The French government had volunteered to send a body-guard of swift torpedo boats. The only real difficulties to be anticipated were at the start and finish, where the steep cliffs might cause aerial disturbances. Wilbur Wright said that he could have done it long ago, and he is not a man given to vain talk. When prizes were offered and half a dozen aviators gathered to attempt the feat, it was only a question of time when one or the other of them would get across.

Nor need M. Bleriot's fame suffer by more mature consideration. The flight was not one to be accomplished by a novice. To attempt it required admirable courage and daring, and to succeed the knowledge and experience only to be attained by years of study, mingled with the dash and the enthusiasm of the born adventurer. M. Bleriot possesses all these qualities, and he has honestly won his fame. Meanwhile M. Latham should not be forgotten. He, too, had the courage and the enthusiasm, and he at least demonstrated that the aviator need come to no harm if his machine should stop in mid-channel.

One phase of the matter which has caused a needless flurry is the political effect. According to some, the Channel is narrower than in Napoleon's day; others claim that it has been obliterated, and that England now is on the Continent. All this is as unsubstantial as the German war balloon scare. There is no immediate possibility that aeroplanes will be made to carry more than two or three persons, and any extensive cargo of guns or explosives is out of the question. Some of these jingoists might work off a little energy in figuring the cost of equipping a fair-sized army with aeroplanes, at a thousand dollars apiece; not to mention the detail of training the necessary number of operators. The results will make the present Dreadnought craze look mild and innocuous in comparison.

The greatest importance of M. Bleriot's flight is not on the scientific, nor yet on the political side, but rather in its effect on the public mind. Hitherto people at large have looked on the aeroplane as a toy; interesting, and unquestionably able to fly, but incapable of any directed or useful effort. It needed the shock of just such an exploit to wake them to the possibilities of mechanical flight.

TALK OF GEARLESS CAR ON THE DECLINE

Not so very far back into automobile history there was much talk of the elimination of the transmission, this coming coincident with the rise of the six-cylinder motor. Now that the latter may be fairly said to have come into its own there is little heard about the lack of a necessity for speed changing devices, as was the case then. Rather, the inclination is in the other direction, for it is a noticeable fact that the number and quality of the users of four-speed gear sets increase, slowly, it is true, but nevertheless surely enough to be noticeable. With the advent of the low powered and low priced car, this question of number of speed changes will doubtless be renewed, for, desirable as a four-speed transmission would be on a car of this type, the additional weight, cost and complication over the three or even two speed gear would make its use out of the question.

Some light will be shed on this vexing problem by the present tendency in motor design, if continued along similar lines. At present there is a very pronounced leaning toward the long stroke motor. This would seem to be a high power at slow speed prime mover, which would have its effect on the transmission question. If the engine speed is slow and the gear reduction the same as is general now, there would be little use for numerous gear changes. In that case the probable outcome would be the use of a two speed sliding gear transmission. To consider this for a moment, it would be small, compact, hence easy and cheap to assemble, easy to repair or replace, and equally easy to keep in order. Aside from a large saving in weight, due not alone to the transmission, but also to the control, there would be an equally large economy in manufacturing cost, this undoubtedly redounding to the prospective purchaser's benefit.

PREPARATIONS FOR THE FAIRMOUNT PARK "200"

PHILADELPHIA, July 26—The Quaker City Motor Club is out with its prospectus of the second annual renewal of the 200-mile Fairmount Park stock chassis race, which, by reason of there being no Vanderbilt contest this year, promises to be the biggest race of the fall in the East. The club has decided to hang up $5,000 in cash, to be divided possibly as follows: 50 per cent. to the winer, 25 per cent. to second, 15 per cent. to third, and 10 per cent to fourth. Should any winner prefer to have a cup or plaque of equal value, he will be accommodated.

The proceeds will go to charity, the club, out of the entrance fees, paying all expenses of promoting and advertising, besides providing the prize money, preparing, oiling, and guarding the course, repairing any damage to the roads, etc. A committee of patrons and patronesses, to be composed of the most brilliant social lights of the Quaker City, will have complete charge of the grand stands, parking places, and all points of vantage whence the race can be viewed. Already this end of the affair is shaping up as a huge benefit, to boost the anti-tuberculosis fund and to aid other charities, and tentative plans look to so widening the scope of the event as to give the half million or more of spectators an opportunity to help along the worthy object.

It is hardly likely now that there will be any room for foreign cars, and that the same conditions as obtained last year will prevail. An effort will be made to increase the number of starters from 16 to 20 that a representative American field may line up for the word next October. Last year's field included two Locomobiles, two Loziers, and one each of Acme, Peerless, Pullman, Thomas, Studebaker, Chadwick, Stoddard-Dayton, Apperson, American Locomotive, Palmer and Singer, Pennsylvania, and Maxwell. Several cars not in the line-up last year are already assured. It begins to look as if there would again be a "waiting list." Certainly, with the fairest and best-policed course in the country, and an unexcelled management, the Quakers deserve well of the American manufacturers.

PLANS FOR LONG ISLAND DERBY TAKING FORM

W. J. Morgan, now the president of the Motor Contest Association, is organizing a road race for Long Island this fall, and says he has been assured of sufficient entries to make the event a success. The proposed circuit is between Riverhead and Mattituck, about twenty-two miles in length. The roads in the main are excellent, and there are but two sharp turns, dividing two ten-mile straightaways. Mr. Morgan thinks it will prove the fastest course in the country. The Suffolk county supervisors have been consulted and their consent secured. The date is to be September 21, so that the race will be an added attraction for the second annual "tour around Long Island." The policing of the course will probably be in charge of the Federation of American Motorcyclists. Owing to the distance of the course from New York, it is not expected that the crowd will be as unruly as at the Vanderbilt races. The course, however, is easily accessible by motor boat, as well as by automobile and train, and is said to possess many vantage points of observation for the sport-loving spectator.

The contest will be limited to cars selling between $2,500 and $5,000, and these will be divided into four classes, to run at different distances. The present plan calls for 100 miles by the small cars, 150 by the third class, 200 by the second class, and 250 by the big ones. Most of the 1910 models will be out by the time set, and it is expected that the entries will be largely recruited among these. The event will be known as the Long Island Derby. A definite announcement of the exact distances, the prizes, etc., is expected soon.

ATLANTIC CITY WANTS AN AUTODROME

Atlantic City, N. J., July 26—Spurred on by the success which seems to be in store for the Indianapolis and Atlanta projects, a company has been formed here to build a two-mile automobile track at Chelsea Heights, which in general appointments will excel either of those motordromes. The new company, at the head of which is Commodore Louis Kuehnle, of the Atlantic City Yacht Club, proposes to spend $800,000 in acquiring and filling in the ground, and $150,000 in building the track.

One hundred and fifty feet wide on the stretches, and one hundred and twenty-five feet wide on the banked turns, the track will have a concrete foundation to give it stability and permanence. A grand stand seating 25,000 people will also be erected. A huge garage, a club house, hotel, and chauffeur's quarters are also included in the plans. The property includes 526 acres, and work will be begun in time for an opening meet at the beginning of summer season at this popular seaside resort.

PREPARATIONS FOR WASHINGTON-BOSTON RUN

Washington, D. C., July 26—The rules governing the running of the Frank A. Munsey reliability contest from this city to Boston and return have been issued and given wide circulation. They are patterned after those governing this year's Glidden Tour. Entries have been received as follows: Chalmers-Detroit Motor Company, Chalmers-Detroit; Hudson Motor Company, Hudson "20"; Olds Motor Works, through Philadelphia branch, six-cylinder Oldsmobile; Jackson Automobile Company, through the New York branch, Jackson "40"; the Motor Company, Philadelphia, Premier; F. Windsor Eveland, Philadelphia, Stevens-Duryea; Charles E. Miller & Bro., Ford.

The Chalmers-Detroit pathfinding car has arrived in Washington, and will be sent out to blaze the route within the next few days. This battle-scarred hero, has jus returned from its strenuous trip from Denver to Mexico City, and it is attracting much attention on the streets of Washington. Carl Schnorr will drive the car on the pathfinding trip.

A number of well-known drivers have already been engaged to pilot cars in the Munsey contest. Among them are Tom Berger, who will be at the wheel of the big six-cylinder Oldsmobile; Ray McNamara will drive the Premier, while Frank Kramer, the well-known bicycle champion, will handle the Jackson.

CHEVROLET AND STRANG BREAK RECORDS

Lansing, Mich., July 27—At the Grand Rapids and Lansing races last Friday and Saturday, Louis Chevrolet and Lewis Strang carried off the honors. At Grand Rapids, Chevrolet, driving a Buick, broke the world's record for from ten to eighty miles on a circular track, covering fifty miles in 51:22. Strang's performance at Springfield the Saturday before, of 52:48, was the best previous record. At Lansing, Strang won the fifty-mile race with a 30-horsepower Buick in 52:19.

RICHFIELD SPRINGS CLIMB POSTPONED

The Richfield Springs, N. Y., hill climb, under the auspices of The Earlington, has been postponed from July 31 to August 7, on account of the conflict of the former date with the 24-hour race at Brighton Beach. The change was made necessary by the desire of a number of manufacturers to enter their best cars and drivers for both events.

Milwaukee Will Adopt Chicago's Plans for dust laying on its streets, boulevards and park roads, and will probably build a plant for making its own oil mixtures.

A. A. A. SOUNDS WARNING AGAINST RECKLESS DRIVING

DO automobilists understand the rules of the road? This question has been brought prominently before many automobile clubs within the last few days in view of the increasing number of accidents, some resulting in fatalities both to motorists and other users of the highway.

In many cases these accidents have been due either to ignorance of the ordinary rules of the road or to the supreme carelessness of automobile drivers in ignoring the simple regulations that conduce to safety. So flagrant has this tendency to recklessness become, in spite of the efforts being made by the leading clubs throughout the country to cooperate with city and county officials in observing the legal regulations, that a word of warning has been sounded by President Lewis R. Speare of the American Automobile Association, and his endeavors to control the present wave of recklessness have been seconded by the other officers and chairmen of the various A. A. A. boards.

"Many of the recent deplorable accidents might have been avoided by the observance of the simple road rules and sane driving," said President Speare. "There is also too much recklessness in crossing railroad and surface car lines, as well as passing electric cars in city streets when passengers are alighting. Again, many autoists in descending hills, even if not very long or steep ones, persist in keeping practically the full power of their motor on. If more motorists would throttle down the engine, or totally disengage it while descending a hill, the number of accidents from this source would be materially decreased. When the motorist suddenly finds himself in a tight place while descending a hill under full power or even partially so, and he loses control of his car, it is the most natural thing in the world to attribute the difficulty to the failure of the steering gear to work properly, whereas there would probably have been no trouble at all were the machine allowed to coast down gradually under its own momentum."

Some of the ordinary rules of the road which every motorist ought to know by heart and invariably observe are:

1. Keep to the right when overtaken by a passing automobile or other vehicle going in the same direction.

2. Keep to the left when about to pass another vehicle going in the same direction; in other words, the automobilist should pass another vehicle going in the same direction on the left-hand side of the vehicle passed.

3. Pass to the right when meeting a vehicle moving in the opposite direction.

Among the clubs that have recently been aroused to renewed activity toward preventing this widespread tendency to recklessness are the automobile clubs of Cleveland, Rochester and Syracuse. A vigilance committee has just been appointed by the Rochester Club, whose object is to deal severely with members and chauffeurs who persistently exhibit recklessness and carelessness in driving, and a vigorous campaign is also to be waged against autoists carrying fictitious numbers.

President W. F. Bonnell, of the Cleveland Automobile Club, has issued a general letter to all of the members, calling their attention to the fact that the city ordinances are being violated every day. So flagrant has this become that the chief of police in Cleveland has ordered that bulletins shall be issued every forty-eight hours giving the numbers of cars which have been recklessly operated. President Bonnell requests the members to cooperate with the officials toward suppressing this evil. "Cooperation in this," he says, "will be helpful to the automobile manufacturers, the individual owner of a car, and to citizens in general."

MAXWELL EMPLOYEES' PICTURES TAKEN

NEWCASTLE, IND., July 26—The employees of the Maxwell factory here turned out en masse last week to have their pictures taken, and it was certainly a job on a wholesale scale. There are said to be 2,300 men working there, and though all did not get in, the photographer still earned his pay. The automobile in the center of the group is occupied by Benjamin Briscoe, president; J. D. Maxwell, superintendent, and F. D. Dorman, secretary of the Maxwell Company, and Colonel K. C. Pardee. Around them are grouped the district supervisors and branch house managers of the company.

Striking Exhibit of the Development of the Automobile Industry—Photograph of the Officials and Employees of th

A. L. A. M. EXPERIMENTS TO OBTAIN QUIET MOTORS

THE engineers of the Association of Licensed Automobile Manufacturers have done a great deal of study and experimentation in the line of designing quiet-running motors, and have met with considerable success. One of the subjects of their experiments was the two-to-one gear set which is necessary on every four-cycle motor, which they found was a prolific source of noise.

Although the two-to-one gears do not at first glance seem to offer any designing difficulties, there are nevertheless some very important factors to be considered. Chief of these is the uneven or intermittent load due to the lifting action of the cams, causing intermittent and even reverse pressures on the gear teeth. To ameliorate this condition there must be considered the weight of the valve mechanism, the proper tension of the valve springs, the shaping of the cams to give smooth action to the valve plungers, and the proper pitch and lubrication of the gears and the permissible amount of back lash.

Some of the structural difficulties encountered are inaccurate machine work on the crankcase, causing variation in the distance between gear centers; unsuitable crankshaft and camshaft bearings, allowing the shafts to "jump" when the motor is running, and improper cutting of the gears themselves, causing them to warp after the strain of cutting the teeth is removed.

The principal cause of noise in the valves themselves is the too sudden impact of the valve on its seat. The descent of the valve should be arrested just before it strikes the seat, either by a slight rise in the cam or by a very gradual taper. The valve spring should be of sufficient strength to keep the roller in contact with cam. One leading experimenter says that with proper design the sound produced by the seating of the valve should not be heard at all with the manifolds in place and connected. The weight of valve for the best results is also an important consideration, and much may be accomplished by the suitable use of non-resonant material.

As for the rest of the motor, noise from pistons, connecting rods and crankshafts has been practically eliminated by proper design and accurate machine work, and proper lubrication and clearance.

APPLICATIONS READY FOR ATLANTA SHOW

ATLANTA, GA., July 26—Application blanks for the automobile show to be held here November 6-13 will be ready for distribution in a week or ten days, and will be distributed among the trade. All the details for this show, the first of importance ever held in the South, have been completed, and a decorative scheme is being planned that will be decidedly novel and will furnish a proper background for the first exhibition of the 1910 models. The show will be coincident with the opening of the new automobile track now under construction here. The general management of the show, which is under the auspices of the National Association of Automobile Manufacturers, will be in the hands of General Manager S. A. Miles and Alfred Reeves, and the Southern end will be cared for by Asa G. Candler, Edward Inman, and others. Applications for space may be made to the N. A. A. M., 7 East Forty-second street, New York.

A. M. C. M. A. SHOW COMMITTEE MEETS

The show committee of the American Motor Car Manufacturers' Association held a meeting at the New York office last Monday, at which the plans for the association's annual show next Winter were discussed. The show will be held in the Grand Central Palace and will open New Year's eve. Among other things, the decorative scheme was planned. S. H. Mora, chairman of the show committee, presided at the meeting, and others present were Benjamin Briscoe, D. J. Post, Motor and Accessory Manufacturers, and Alfred Reeves, A. M. C. M. A.

Pittsburgh's Public Safety Department is making life miserable for automobilists nowadays. Warrants were issued last week for more than 100 owners and drivers charged with either violating the speed ordinances or with having no drip pans on their cars. One day 350 autos were held up for examination.

Motor Company, at the Newcastle, Ind., Plant During Recent Convention of Maxwell Sales Managers

AUTOS IN MASSACHUSETTS' SUMMER MILITARY MANEUVERS

BOSTON, July 26—Plans that have been made for the annual Summer maneuvers of the Massachusetts militia, which will consist of a war game in the southeastern part of the State, with troops from New York, Connecticut, New Jersey and the District of Columbia as the enemy, contemplate the extensive employment of motor vehicles. Though the original plans, when it was expected that the maneuvers would consist of an attack on the coast, and in which motor vehicles were expected to play a most important part, have been abandoned, Adjutant General Grigham has not given up his idea of employing cars.

Briefly the war game consists in the landing of the troops from other States at Fall River and New Bedford with, presumably, the intention of marching on Boston. This will be the "Red army." Meantime, to defend Boston, the Massachusetts militia, constituting the "Blue army," will proceed from Boston toward Fall River and Boston, and the scene of activity probably will be in Bristol and Plymouth counties. In this section good roads are plenty, making it an ideal field for motor vehicles to demonstrate their value in military work.

For headquarters work Adjutant General Grigham has engaged the services of three White touring cars and a White ambulance, the negotiations having just been concluded by Manager J. S. Hathaway of the Boston branch. Walter G. Schmunk will be in charge for the White company, but a special officer detailed for the purpose will have charge of the cars in the field. These cars will be used for taking the officers from headquarters to any part of the territory that is being defended, and as the line probably will stretch out many miles, the service will require some long and speedy trips. They will also be used by the signal corps, for reconnoitering and for carrying despatches. While the maneuvers are on, all telegraph and telephone lines will be considered destroyed, so the commanding officer will have to send his orders and secure information by other means, and it is in this work that the cars are expected to prove most valuable. Private cars owned by officers of the different organizations also are likely to be used for similar purposes.

The problem of feeding several thousand men in the field, perhaps at a considerable distance from a city or from a railroad station, is to be a hard one, and the militia officers are negotiating with owners of motor trucks and expect to secure several of these vehicles for use during the maneuvers of August 14-22. Food of all kinds has been contracted for and will be transported by train to some point as near as possible to the expected center of activity during the maneuvers. From that point, however, it will have to be distributed to the various commands by motor trucks and by army wagons. The officers in charge believe that in this work the motor trucks can demonstrate an immense superiority over horse-drawn vehicles. Some of the separate commands are also trying to secure motor trucks, but the supply of these vehicles available is limited.

The motor cycle and the bicycle will be important in the maneuvers, and will be used to supplement the automobiles in scouting and in carrying despatches. It is planned to have a corps of motor cyclists and bicyclists attached to the headquarters of the "Blue army" and also to regimental and other headquarters, and soldiers who have motor cycles will probably be relieved from most duty, other than that incident to the use of their machines under orders from superior officers.

THE LATEST NEWS FROM OHIO'S GREAT TIRE-TOWN

AKRON, O., July 26—Local manufacturers confirm the announcement of an increase of 15 per cent. in the price of tires, but no complete price lists have been made public yet. Dealers have received new quotations, going into effect after July 16. The manufacturers say that a year ago the price of crude rubber such as was used in tires was less than $1 a pound, whereas, now it is $1.50, so that a raise in the price of the finished product is fully justified. The increase in the price of rubber was sudden, because the general depression kept the demand low; but when the demand again became brisk the price went up with a bound.

The new plant of the Falls Rubber Company, at Cuyahoga Falls, supplanting the old Superior Rubber Company of that town, will be ready to operate in three weeks. The officers are S. H. Sturgeon, president; W. G. Short, vice-president; H. F. Sechrist, secretary and treasurer, and William Sherbondy, superintendent, all of Akron. One of the products of the company will be a patented inner tube containing a layer of felt, for which great things are claimed.

The International Harvester Company this week started a final test of its new runabout of standard size, the machine, after a local test, being shipped to the central factory at Chicago to undergo the inspection of the company officials, to be followed by an inspection by the cost department that a sales price may be fixed. The new machines will be placed on the market next year, and will probably be named the International Runabout. It will be driven by a 20-horsepower four-cylinder engine. The car is of attractive appearance, and the color will be red. The company is also completing a touring car, and ran the first one to Albany, N. Y., this week, F. V. Kennedy, one of the prominent members of the company, driving the car. The International Harvester Company has a large plant here at present.

T. L. Pharr, of Pittsburg, drove his automobile fire engine from that city here this week for the purpose of equipping the engine with Swinehart tires. A test of the engine was made here, it working all right except near the canal it sank in the mud and some trouble was experienced. Stops were made at Newcastle and Youngstown on the way here. The engine is 115 horsepower, and when manned with eight men and 1,000 feet of hose weighs 9,400 pounds. It carries a 35-gallon gasoline tank, which the inventor claims will run the engine six hours, feeding four lines of hose. It also carries two four-gallon chemical tanks.

The Goodyear Tire & Rubber Company, whose tire and air bottle trade has grown immensely, has begun work adding two more stories to its office building. The plant was recently enlarged. All of the rubber tire plants in the city are making additions again this year.

The annual picnic of the Diamond Rubber Company was held on Saturday. The company gave 6,200 tickets to its employes for themselves and families. Free transportation was given to Silver Lake, where sports of all kinds were had with the shop men contesting. The Rubber Products Company, of Barberton, also run a free excursion to Brady's Lake.

Frank R. Tate, formerly of this city, has resigned as manager of the St. Louis branch of the B. F. Goodrich company to enter the automobile business.

A new product of the Diamond Rubber Company is an improved demountable rim. The company has also placed on the market an innovation in the form of a double tube motor cycle tire. The company has heretofore been making only single tube tires for motor cycles. The new tire has deep corrugations on the side to prevent side slipping. The company is having a very large demand for motor cycle tires.

What the Clubs Are Doing These Days

'FRISCO CLUBS TO HAVE NEW QUARTERS

San Francisco, July 26—Members of the Western Automobile Club are rejoicing in the fact that they will soon have the Jefferson Square building on Golden Gate avenue transformed into a club house for their use. The club, which is composed of autoists from this and surrounding cities, has taken over the building containing 100,000 square feet of floor space. It will have swimming tanks, gymnasium, library, bowling and billiard rooms, and apartments for members on the two upper floors. The lower floor will be given over to club appointments. The officers of the club are Louis Mooser, president; and Dr. R. G. Hubbell, W. V. Lloyd, S. M. Samter and W. N. Wright constitute board of directors. The membership is limited to 500.

Interest is being taken in the forthcoming contest in Alameda county in September. Among the star entrants is to be Percy J. Walker, a well-known amateur, who will drive the Grand Prix Benz car in the race, providing the contest will be an open one. He will drive a 60-horsepower stock car of the same make, however, if only such cars are allowed to participate.

GOOD ROADS AND AUTO CLUB IN ONE

Jackson, Miss., July 26—Automobile owners of this city and nearby towns have formed the Hinds County Good Roads and Automobile Club. While the formation of the body was inspired by the automobilists, its membership is not limited to them, and, in fact, a determined effort will be made to enroll all users of the highways. The club will become actively engaged at once in the spreading campaign for better roads in the South. The following officers were elected: President, Eugene Simpson; vice-president, R. S. Withers; secretary, W. D. McRaven. A committee composed of George C. McLaurin, of Clinton; H. L. Hicks and Floyd Williams, of this place, was appointed to consider the feasibility of macadamized roads through this section. Another committee, composed of R. S. Withers, of Clinton; Mason Birdsong, of Bolton, and J. C. Landen, of Jackson, was selected to prepare plans for the government of the club, and for launching a membership campaign.

MILWAUKEE CONSIDERING A CLUB-HOUSE

Milwaukee, Wis., July 26—The Milwaukee Automobile Club will meet in special session Thursday evening, July 29, to make a final decision in the matter of building a clubhouse. There has been some difficulty in obtaining an expression of sentiment as to the advisability of mortgaging the club's present properties to cover the cost of a building, but proxies will be legal at this meeting, and the vote will be final. The club owns a five-acre tract at Blue Mound and Cottrill avenues, west of Milwaukee, which would be a perfect location for a building. The clubhouse that is being planned would cost $12,000.

Thirty of the cars that participated in the parade at the Racine, Wis., Homecoming early this month will be entered in the parade to be held here August 3-7. There will be three sections, floral, novelty, and comic, and several hundred dollars are offered in prizes.

BINGOS TO HAVE INFORMATION BUREAU

Binghamton, N. Y., July 26—The automobile club of this city proposes to establish in the office of the chairman of the touring committee an information bureau for the gratuitous use of tourists passing through here. The latest maps, route books, etc., will be kept for reference, and the bureau will keep informed as to speed traps, road closings for repair and other items of interest to tourists.

HAMILTON, ONT., ORPHANS GIVEN A RIDE

Hamilton, Ont., July 26—The orphans of this city had the time of their lives at the outing given them by the Hamilton Automobile Club last week. About 300 of the youngsters turned out. Owing to a laughable mistake, they got a longer ride than was bargained for. The president and secretary of the club had laid out the route to what they thought was Oaklands Park; but when the procession arrived they found that it was really Bay View, and that the caterer was miles away. The trip to the real Oaklands was made in record time. Indoor baseball, football and foot races were the features, and a magnificent supper topped off the day.

HARTFORD CLUB GIVES ORPHANS AN OUTING

Hartford, Conn., July 26—Last Tuesday afternoon the Automobile Club of Hartford held its long-deferred annual orphans' outing. Several previous attempts had been blocked by bad weather. About 150 children from the Hartford asylum were the guests, and even more cars than were needed turned out. After the parade through the city the procession headed for Goodwin Park, where the children were turned loose. There were abundant refreshments and everybody had a good time.

GENEVA, N. Y., HAS A WIDEAWAKE CLUB

Geneva, N. Y., July 26—Sixty cars turned out for the "joy ride" of the Geneva Automobile Club, which passed through Phelps, Newark and Palmyra and arrived in Canandaigua in time for supper. It was one of the most enjoyable events that the club has participated in. Later the automobilists of Newark, N. Y., who contemplate organizing a club, visited Geneva in grand style and were received by a brass band; after a parade through the city a joint banquet was held, at which the mayor spoke, and much good roads talk was indulged in.

COLUMBUS' CAREFULLY COMPILED BOOK

Columbus, O., July 26—The Columbus Automobile Club has issued the first number of *The Bulletin*, which was announced some time ago. The booklet is attractive with plenty of advertisements and all the live news of the club. Handsome cuts of the interior of the club are printed as well as the annual report of the secretary and treasurer. A full roster of the membership is one of the features.

AUTOISTS OF ALLEGANY, MD., ORGANIZE

Baltimore, July 26—The Automobile Club of Allegany County has been formed with fifty members. It will be a branch of the advisory council of the Automobile Club of Maryland. The president of the new organization is H. H. Amack, and W. C. Devecmon is secretary.

TRUMBULL, O., AUTO CLUB GIVES BANQUET

Trumbull, O., July 26—The Trumbull Automobile Club, one of the strongest organizations in the Western Reserve, held a big banquet last week at which more than a hundred guests were present. The club is doing good work in the vicinity.

AUTO CLUB ORGANIZED AT ALTOONA, PA.

Altoona, Pa., July 26—The Altoona Motor Club has been formed by automobilists of this city. The officers elected are: W. L. Hicks, president; E. J. Lomnitz, secretary, and W. W. Blake, treasurer.

Salesman Holden and His Business-Getting Stearns

A "STEARNS CHASE" THROUGH FOUR STATES

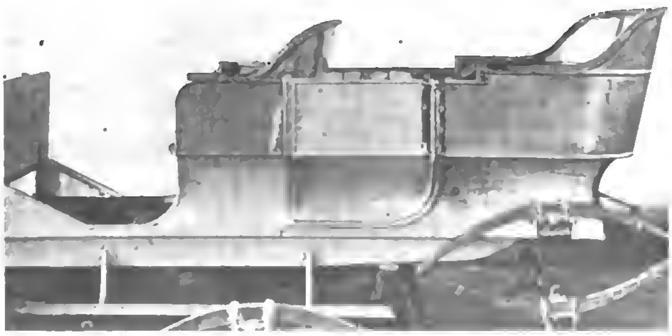
A. S. Holden, one of the district salesmen of the F. B. Stearns Company, kept his 30-60 shaft-driven Stearns on the road continuously from May 29 till July 17. Leaving Cleveland on the former date, he drove through Columbus to Cincinnati, through West Virginia, back again through Ohio and into the coal regions of Pennsylvania to Pittsburg. After spending considerable time in that vicinity he kept on through Ligonier and through New York State back to Cleveland, via Erie, Pa. In its fifty-one days on the road the car averaged 85 miles a day, and for three consecutive days it averaged 210 miles. It ran perfectly from the start, no attention having been given it beyond filling the tanks. He will start again shortly in the same car, and expects to make another trip of the same length.

DETROIT COMPANY FOR COMMERCIAL CARS.

Detroit, Mich., July 27—A new automobile company has just been organized here, in which the principal movers are the officers of the Chalmers-Detroit company. The new concern will be known as the Fairview Motor Car Company. The capital stock has all been subscribed, and work will be started at once on a $150,000 plant. The new company will manufacture commercial vehicles and taxicabs.

A TOURING BODY OF CAST ALUMINUM

The touring bodies to be fitted to the 1910 Marmon cars almost completely dispense with the use of wood. This material is only found in the mahogany dash, the floors and a thin strip between the body and the steel chassis frame. All the rest of the body is of metal, the lower panels and the doors being of cast aluminum, and the upper panels of sheet aluminum. This construction makes impossible any shrinking or warping, with consequent misfits of doors and seats, and is stronger.



Cast Aluminum Bodies Used on 1910 Marmon Cars

WITH THE REGAL ON WESTERN PRAIRIES

Denver, Col., July 24—When the Regal transcontinentalists planned their schedule they overlooked two factors that seriously interfere with adherence to the timetable. The first has been with them ever since leaving New York in the shape of friends and the general public, who, with their entertainments, consumed several hours each day. The second, the Iowa gumbo has just appeared in its malignant form after the heavy rains throughout that section. Still the car keeps on schedule and is covering the road in great shape.

The transcontinentalists left Chicago at noon on the twelfth, and, passing through Aurora and Rochelle in good time, finally stopped at Morrison. The next morning, after a short run, they came to the Mississippi, only to find a twenty-foot gap in the bridge, which the foreman of the repairing gang told them would take at least two hours to close. Of course it was nearer three hours before the last plank was down and they were able to continue their journey. The next day's run was to Cedar Rapids, and after that the schedule named Carroll, Ia., as the stopping place. Night found them, however, at Boone, fifty miles short, and for good reason, as the rains had converted the roads into bottomless quagmires of the purest gumbo. Several times the Remy magneto was submerged in muddy water, but it never refused to spark.

Transcontinental Regal Following Prairie Trail

The day after leaving Omaha was spent principally in crossing and recrossing the North Platte River, which winds over half the State. Here they overtook in mid-continent a car bound for Seattle and another from New Mexico headed for Detroit. The Seattle car joined forces and they continued together nearly to Ogallala. The roads became impassable, and the tourists were forced to take to the prairie alongside, leaving behind them a trail of cut fences and choking alkali dust. At Sterling they found the nicest and cleanest little hotel of the trip—a godsend to weary travelers.

Leaving Sterling a rain drenched them for the first time since leaving New York, relieving the heat and making the sand more passable. They went up a long hill late in the afternoon and at the top they found themselves facing the main chain of the Rockies. To the north Long's peak and to the south Pike's Peak loomed up majestically. The sun broke through the clouds as it was setting behind the range and clearly defined the magnitude of this great wall of mountains, which set across the path to the coast like a forbidding wall. Denver the tourists reached at 7 p. m., 2367 miles out from New York in 13 1-2 days' driving.

Dixon, Ill.—Alderman James Gaffney has started the erection of an up-to-date garage on East First street, between Ottawa and Crawford avenues.

Six-Story Addition to Stoddard-Dayton Plant, Now Building

When the new structures are completed the Dayton Motor Car Company, Dayton, Ohio, will have 100,000 square feet increase in floor space. This will accommodate 400 additional workmen, and $75,000 in new equipment is ready to take its place on the floors.

Extra Bodies Are Popular—An idea which seems to be growing in popularity is that of having two bodies, one open and one closed, to be used interchangeably on the same chassis. The Pierce-Arrow Motor Car Company of Buffalo reports that about 22 per cent. of its orders during the past season called for extra bodies. The Pierce chasses are the same for all touring, landaulet and limousine models, so that a man buying a car for delivery during the Summer months can have an open touring body for the warm weather and in the Fall can substitute for this a closed body. The advantages of this idea appealed to President Taft when ordering his car. He had a touring body built for his six-cylinder, 48-horsepower Pierce landaulet, and this has now replaced the enclosed body used in Washington during the inauguration.

Ford Victor Fire-Scarred—The Ford which won the New York-Seattle race had a narrow escape from ending its career once and for all at Prosser, Wash. Just after crossing a district known as "Horse Heaven"—decidedly not a heaven for automobilists—Scott and Smith, the drivers, stopped at this town to take on gasoline. The usual crowd gathered, and one bone-headed individual struck a match on the tank. Instantly the car was in flames, and nothing could be done until it had burned itself out. Luckily the machinery of the car was not injured. The tank's usefulness was ended, however, and for the rest of the journey the fuel had to be carried in a can on the footboard.

Firestone Makes Demountable Rims—The Firestone Tire and Rubber Company is sending out to the trade blue-prints and other matter descriptive of the Firestone demountable rim. The Firestone Company recommends the use of quick detachable tires in connection with this rim because they are so much easier to remove and replace. It is prepared, however, to supply the rim with regular clinchers on order, although it is difficult to fit these with the short-stem staybolts required. Another booklet contains in fac-simile form telegrams received from the Ford and Acme drivers in the recent New York-Seattle race, telling of the excellent service their tires are giving.

Wayne and Northern Parts—A. L. Austin, formerly connected with the Northern Automobile Company and with the E. M. F. Company, and A. O. Dunk have organized the Auto Parts Company, of Detroit, to be located at St. Antoine street and the Michigan Central Railroad. The company has purchased from the E. M. F. Company all parts, drawings, patterns, jigs and special tools for making replacement parts of Wayne and Northern cars and will devote its particular attention to repairing cars of these two makes.

Grabowsky Sells Treasury Stock—The business of the Grabowsky Power Wagon Company, of Detroit, has developed so rapidly that it was recently found necessary to offer for sale all the treasury stock in order to obtain sufficient working capital. The stock was quickly taken up by Detroit capitalists, and the directors are now thinking of increasing the stock from $300,000 to $1,000,000. The present increase of capital will be employed in building an addition to the factory so as to effect a considerable increase in next year's output.

New Tire on the Market—The Ohio Tire Company, with a capital stock of $10,000, has been incorporated under the Ohio laws by Thomas Midgley, B. G. Huntington, Louis Fink, J. A. Pfeifer and M. E. Murphy. Mr. Midgley is general manager of the Midgley Mfg. Co., of Columbus, which manufactures the Midgley automobile wheel. The new company will locate a factory in Columbus for the manufacture of a tire which is said to embody many improvements.

Milwaukee Buys Two Cars—The Milwaukee common council has authorized the purchase of a Pierce-Arrow touring car for the use of the bureau of detectives. The department also has an auto patrol wagon in service. The purchase of a Peerless touring car for the joint use of council committees and the board of public works, after being delayed several months by injunctions, has finally been authorized and paid for.

Large Order U. & H. Master Magnetos—As an indication of the prospects for 1909, the J. S. Bretz Company, New York City, reports an order from the Interstate Automobile Company of 3,000 U. & H. master magnetos. All through the West, among the makers of cars, the demand for magnetos is brisk, indicating that many cars are to be put out for next year and magnetos will be regular.

Interesting Registration Figures—The records of the secretary of state of Wisconsin show that up to June 1, 1909, 7383 cars had been registered in that State. In point of numbers the Rambler leads, having 733 to its credit, with the next three makes in order having 697, 598 and 487 respectively. Illinois has already passed the 10,000 mark, and in this State, too, the Rambler leads.

Fisk Tires in Racing—A number of entrants in the coming 24-hour race at Brighton Beach will use Fisk tires and rims. These have in the past been used more by tourists than by racing drivers, but the latter seem to be recognizing the value of the bolted-on type of tire, as these have been represented in more contests this year than ever before.

Kinsey Ready for Business—The new plant of the Kinsey Mfg. Co. at Toledo, O., will be ready for occupancy August 1, at which time 100 men will be started. The company has just been incorporated with a capital of $100,000 by Isaac Kinsey, H. V. Hawk, Willard Corbin, W. C. Smith and J. N. Van Deman.

Oily Hospitality—When the Glidden tourists passed through Jackson, Mich., the American Oil Company of that city gladdened the heart of each driver with a present of a gallon can of oil, a pound box of grease and a pound of waste.

A Carriage-Builder in Line—The L. Burg Carriage Company, of Dallas City, Ill., has taken up the manufacture of automobiles and will have both touring and roadster models. The Rutenber motor will be used.

IN AND ABOUT THE AGENCIES

Studebaker, Philadelphia—In anticipation of the expected large increase of business due to the advent of the Studebaker-Flanders "20," and the taking over of the E-M-F car from the Foss & Hughes Motor Company. Manager E. V. Stratton, of the Philadelphia Studebaker branch, is preparing for an extensive enlargement of the present quarters.

Packard, Hartford, Conn.—Milton J. Budlong, president of the Packard Company, of New York, is authority for the statement that the Packard Company will establish a branch in this city. The location has not been determined. It is understood that R. B. Sloan, of the New York branch, will be manager.

Rambler, New York City—The retail business of the Homan & Schulz Company has been taken over by the Rambler branch house in New York, located at 38 West 62d street. The branch will continue to handle as before the Rambler wholesale business throughout the East.

Empire Tires, Philadelphia—The Empire Tire Company, of Trenton, N. J., last week opened a branch house at Broad and Wood streets, Philadelphia, with E. B. Richardson as manager.

Continental Tires, Omaha, Neb.—The Continental Caoutchouc Company, New York City, announces that it has appointed the Baum Iron Company, of Omaha, Neb., distributing agents for Continental tires and rims in the State of Nebraska.

Hotchkiss, New York City—J. W. Delamater, manager of the Hotchkiss Import Company, has completed the alterations in the garage at 20 West Sixtieth street, which is to be the home of the Hotchkiss.

The Standard Automobile Company, of Pittsburgh, Pa., will establish a branch house in the Deveeny building, in Uniontown, Pa. It will have an agency for Peerless, Mitchell and Baker electric.

Hudson, New York City—The A. Elliott Ranney Company, metropolitan agent for the Hudson, has leased a suite in the Automobile Building, 1777 Broadway, and will take possession August 1.

Jackson and Babcock, Houston, Tex.—P. J. Lea, W. T. McKallip and Elmer Abbey have organized a company to take the agencies of the Jackson and the Babcock electric.

Jewel, Pittsburgh, Pa.—The Jewel will hereafter be shown in Pittsburgh in the Banker Automobile Palace block on Baum street, E. E., which will be ready about August 1.

American, New York City—The headquarters of the American Motor Sales Company have been removed to the northeast corner of Broadway and Fifty-seventh street.

PERSONAL TRADE MENTION

Ernest Coler has assumed charge of the Maxwell-Briscoe Motor Company's new publishing department. The growing interests of the company have made the creation of the new department desirable. Mr. Coler, who has looked after the Maxwell's publicity for the past two years, will continue to publish *The Co-Operator*, and will also be responsible for most Maxwell literature.

Berry Rockwell, late of the Railway Steel Spring Company, and well-known through his work as field secretary of the Sacramento Valley & Eastern Railway Company, and secretary of the Hotel Knickerbocker, New York, has accepted the position of advertising manager, Maxwell-Briscoe Motor Co.

A. L. Bolster, who has been connected with the Fisk factory at Chicopee Falls, Mass., ever since the organization of that company, has succeeded K. B. Harwood as manager of the Philadelphia branch. The latter will devote his energies to special outside factory representative business for the Fisk company.

Edwin E. Peake has been appointed manager of the Regal Sales Company of Detroit, which is to control the sales of the Regal car in Michigan. He was formerly connected with the sales department of the Buick Motor Company.

C. H. Hill, formerly with the Cadillac Company of New York, has left that company to take a position with the Haynes Automobile Company.

RECENT BUSINESS CHANGES

The Motor Car Company of New Jersey has dissolved partnership. In future the business will be managed by W. V. Snyder, Jr., who will retain the agency for the Matheson. The withdrawing members, M. Uppercu, C. Fisher and E. G. Ward, have formed a new concern, which is to handle the Cadillac.

Standard Thermometer Company, Boston—This company, at 65 Shirley street, Boston, has purchased the speedometer business of the Parker Mfg. Co., of the same city, and will continue to conduct the business on the same principles as heretofore.

Auto-Automatic Windshield Company Moves—The Auto-Automatic Windshield Company has moved its offices to 870 Woodward avenue, Detroit, in the new George building, which will be devoted exclusively to the automobile trade.

TAXICABS AND TRANSIT

Hartford, Conn.—Taxicabs are constantly increasing in numbers here, and the horse cabbies are complaining bitterly. Many of the garages operate taxicabs of the Maxwell, Mitchell and Elmore makes and have all the business they can handle.

Pittsburgh, Pa.—The incorporators of the Pittsburgh Taxicab Company intend to increase the capital of the concern from $100,000 to $200,000. The company has been very successful this summer.

RECENT MICHELIN VICTORIES

Continued success of Michelin tires in every form of road and track contest has been emphasized again by a large number of victories within the last thirty days. The list includes first and third places in the 290-mile Denver Motor Club stock car road race, July 5; the 100-mile track record at Columbus, O., July 3; the kilometer, the mile and the free-for-all at the annual meet at Wildwood, N. J., also on July 5, and the 25-mile Canadian championship at Montreal, July 9. At the Illinois State Fair Meet, July 10, Michelin tires won the 5-mile and the 50-mile contests.

In the Indiana Trophy road contest on June 18, over 232.74 miles of Lake County, Indiana, roads, Michelins secured first, second, third, fourth and fifth places, and first, third, fourth and fifth in the competition on the following day for the Cobe Trophy over the same course, but totaling 395.66 miles.

At Readville, the Harvard Trophy and a new 25-mile world's track record were secured by Michelins, as well as the Bailey Trophy for winning the Owner's 5-mile stock car contest. The Automobile Trade Trophy, too, was gathered into the Michelin camp. This was a free-for-all stock car event. Four other numbers of less importance were also captured.

The Point Breeze Meet saw a wide variety of contests, and De Palma established a new track record on Michelins. Other events won on these well-known tires at Point Breeze included a 100-mile contest, two for 10 miles, one each of 50 and 5 miles.

RECENT INCORPORATIONS

Imperial Motor Car Company, Hamilton, O.—Incorporated with a capital stock of $500,000 to manufacture automobiles, by C. U. Carpenter, Stanley Helvey, G. E. Helvey, G. A. Rentschler and F. B. Rentschler.

Chicago Taxicab Company, Chicago—The Chicago Taxicab Company has filed a statement announcing that its capital stock has been decreased from $3,000,000 to $500,000.

Grout Automobile Company, Orange, Mass.—Capital, $150,000. To take over the business of the Grout Brothers Automobile Company.

Sauer Motor Trucks, West Orange, N. J.—Capital, $200,000. Incorporators: W. D. Sargent, G. M. Judd and E. H. Fallows.

Crow Motor Car Company, Elkhart, Ind.—Capital, $50,000. Incorporators: E. C. Crow, F. A. Howe and M. E. Crow.

Animated Scene in Hudson Motor Car Company Testing Yard Adjacent to the Detroit Factory

This newly-formed company has already received deposits from actual purchasers of over one thousand cars, and so has found it necessary to push the factory organization to the limit. The above scene in the testing yard gives a very good idea of the prevailing activity, necessitated by plans and contracts to deliver four thousand cars during the balance of this year and next.

VOL. XXI NEW YORK—THURSDAY, AUGUST 5, 1909—CHICAGO No. 6

THE AUTOMOBILE

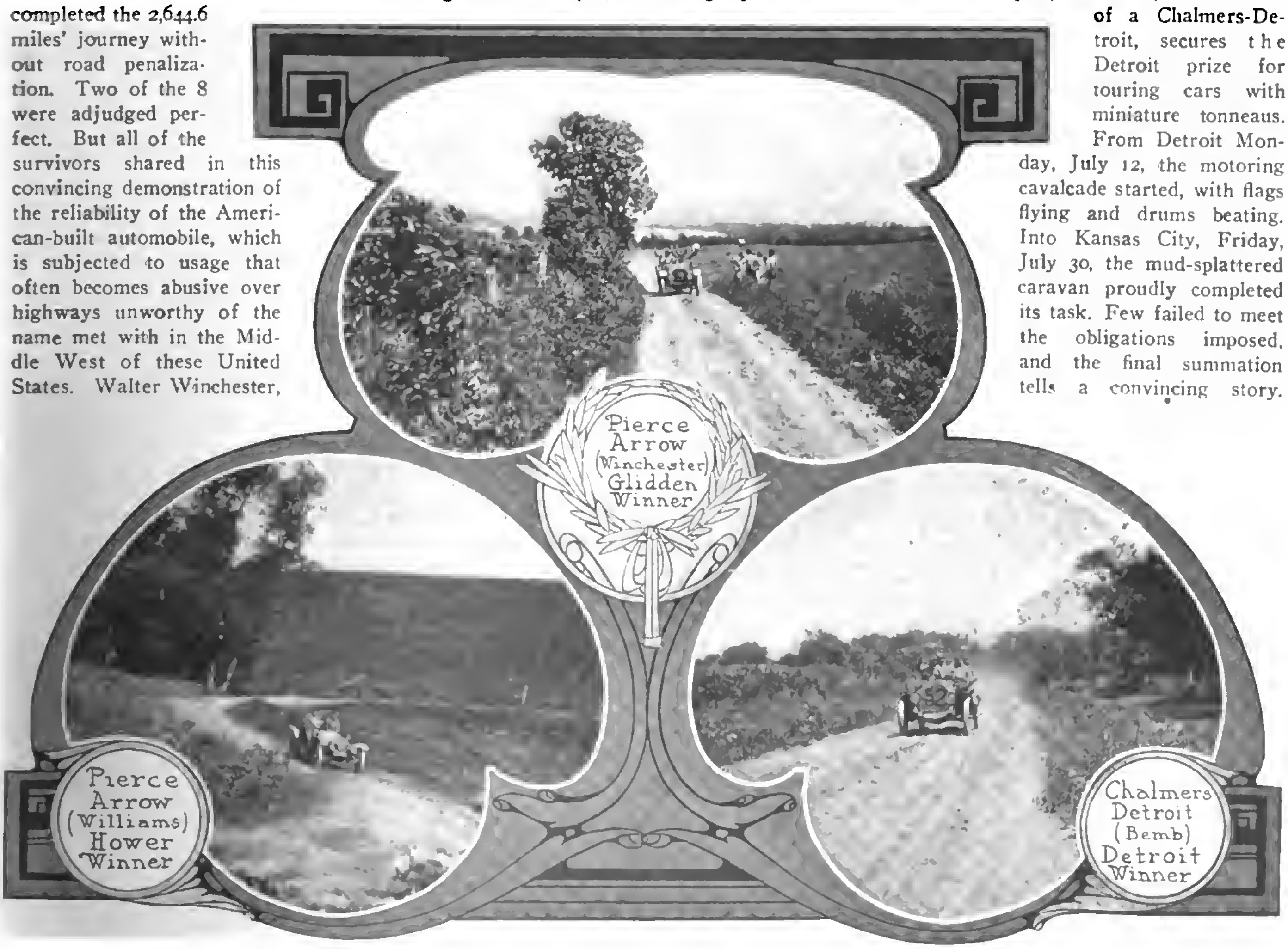
BIG TOUR ENDS WITH THREE WINNERS

Pierce Arrow (Winchester) Captures the Glidden Touring Car Trophy. Pierce Arrow (Williams) Takes the Hower Runabout Cup. Chalmers-Detroit (Bemb) Secures the Detroit Toy Tonneau Prize

EIGHT AWARDED PERFECT ROAD SCORES

No. 9 Pierce Arrow, No. 2 Premier, No. 8 Pierce Arrow, No. 5 Marmon, No. 1 Premier, No. 108 Pierce Arrow, No. 101 Moline, No. 109 Pierce Arrow

TWENTY-FOUR of the 30 contestants successfully accomplished the Sixth Annual Reliability Touring Contest of the American Automobile Association. Eight of the 24 cars completed the 2,644.6 miles' journey without road penalization. Two of the 8 were adjudged perfect. But all of the survivors shared in this convincing demonstration of the reliability of the American-built automobile, which is subjected to usage that often becomes abusive over highways unworthy of the name met with in the Middle West of these United States. Walter Winchester, driving a Pierce Arrow, obtains possession of the famous Glidden trophy. John S. Williams, piloting another Pierce Arrow, gains the glory of the Hower runabout cup. Jean Bemb, at the wheel of a Chalmers-Detroit, secures the Detroit prize for touring cars with miniature tonneaus. From Detroit Monday, July 12, the motoring cavalcade started, with flags flying and drums beating. Into Kansas City, Friday, July 30, the mud-splattered caravan proudly completed its task. Few failed to meet the obligations imposed, and the final summation tells a convincing story.



RELIABILITY was the marked characteristic of the Sixth Annual Touring Contest of the American Automobile Association, which started at Detroit, July 12, and ended at Kansas City, July 30, after a journey which totaled 2,644.6 miles.

Eight cars completed this diversified and strenuous passage without road penalizations of any sort. This is the list: No. 9 Pierce Arrow (Winchester); No. 2 Premier (Hammond); No. 8 Pierce Arrow (Dey); No. 5 Marmon (Marmon); No. 1 Premier (Jay); No. 108 Pierce Arrow (Williams); No. 101 Moline (Wicke); No. 109 Pierce Arrow (Schofield).

Of this octette, two mastered the minute technical examination without the loss of a single point: No. 9 Pierce Arrow, driven by Walter Winchester, and emerging as the winner of the Glidden trophy in the touring-car class; No. 108 Pierce Arrow, piloted by John Williams, and winner of the Hower cup for runabouts. The penalties imposed upon the remaining six detracted but slightly from the achievements of the cars.

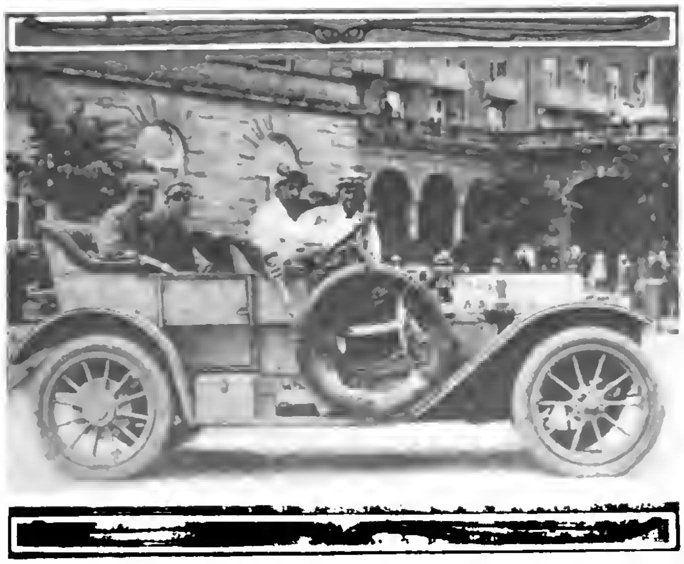
In the competition for the Detroit prize, for cars fitted with small tonneaus, none of the trio had a perfect score, and No. 52 Chalmers-Detroit, Jean Bemb at the wheel, came through with the smallest penalization, closely pursued by No. 53 Premier, handled by C. Waltman.

With four of eight perfect road scores, and with two flawless survivors, the Pierce Arrow secured the largest amount of glory and secured it through sturdy cars, capable drivers and general all around excellence.

Of the three Premiers competing, two finished with unsmirched road travelling, and the technical penalizations imposed upon two of the three were such as to cast no discredit upon their running qualities.

The two Marmons finished fourth and fifth in the grand total of the Glidden, with penalizations that were provoking rather than serious.

In the Hower competition, the two Molines and the Lexington were so close up to the winner as to call for condolences at the infinitesmal things which prevented a clean bill of health. But in deciding the possession of a single prize there could be only one winner, though in a competition of such a prolonged kind the entire field of finishers is entitled to credit in generous quantities. Surely no road competition ever held before in this country imposed such exacting and variable conditions as those which confronted the participants in the 1909 tour. Roads of every known variety, in conditions ranging from ideal down to the most wretched substitutes for highways, were included in the twenty-six hundred odd miles travelled.



Howard Marmon and the Perfect Road Score Marmon

Michigan had good cause to be ashamed of its alleged roads. Illinois contributed very bad and very good ones in the short mileage through that commonwealth. Wisconsin proved considerable of a surprise, with uniformly good going and attractive scenery. Minnesota was crossed at an opportune period and gave perhaps the greatest enjoyment of the entire tour. Iowa, too, was traversed with satisfaction, again principally because of excellent weather conditions. Nebraska contributed some good roads and a supply of nondescript prairie progress. Colorado had several good stretches, but for the most part it was a case of lonesome tracks across scrubby plains. And, finally, Kansas did fairly well, with a concluding day that was the toughest of the entire trip.

Such knocks and twists and strains as the cars withstood emphasized the recent advance in American automobile construction. The route for the most part passed through sections of country never before visited by a big endurance tour. The interest aroused was apparent on all sides. Entertainments, almost too profuse in number, punctuated the two-day stops at Minneapolis and Denver, to say nothing of the preliminary festivities at Detroit and the concluding functions at Kansas City. Intermingled were other events at Madison, Wis.; Mankato, Minn.; Council Bluffs, Ia.; Kearney, Neb., and Salina, Kan., not forgetting lunches and other mid-day contributions received en route at innumerable places.

Of course, Chairman Frank B. Hower had to be chairman in his own way, which means that he ran the tour more or less according to his own ideas. A good man with him, for the last half of the trip, was S. B. Stevens, a board member of considerable experience in automobile competition. Dai Lewis scattered the confetti as only he can do it, and his unfailing buoyancy of spirits did much to keep many in humor whose noses occasionally got slightly out of joint. E. L. Ferguson, who always does the starting, had to drop out of the procession at Kearney, Neb., because of an accident that placed him on the retired list. Thereafter, "Mort" Reeves, the chief observer, assumed most of "Fergy's" duties.

In the technical examination at Kansas City, Henry Souther and Joseph Tracy had a difficult task which was executed with as much satisfaction as could have been given by any other two men as capably qualified to do the work. They did not pretend to interpret the rules, and whenever in doubt they called upon the chairman to make a ruling.

As to whether there will be a 1910 tour, there exists a conflict of opinion, though the general concensus is that something of this nature is still needed by the automobile industry. Some are satisfied, some are disgusted, and some are indifferent.

Kansas City Entertained Tourists—The technical examination of the cars in Convention Hall somewhat interfered with the entertainment planned by the Automobile Club of Kansas City, but there were a substantial number at liberty to enjoy the warm hospitality. The reception began on the outskirts of the city, when each arriving car was decorated with American flags, and as the cars checked in the occupants were furnished with credentials. One particularly appreciated was a card stating: "We hate to offer you water, but our cool marble pool and shower baths are at your disposal. The Kansas City Athletic Club." Then there was a book giving the freedom of the city, with a printed key, from the Mayor; and a program of the entertainment. A smoker in the evening at the Coates House opened the festivities. Saturday was marked by a morning jaunt, as guests of the city, over its magnificent oiled boulevards, the ride being followed by a buffet luncheon. There was a race meet at Elm Ridge in the afternoon, and Electric Park, with a Dutch supper, was the evening attraction, with automobile rides Sunday for those who desired them.

Lexington Which by a Minor Incident Lost Its Perfect Score Near Kansas City

TWENTY-FOUR OF 30 CONTESTANTS FINISHED THE RUN

KANSAS CITY, MO., Aug. 2—Eight of the thirty cars which started from Detroit averaged one mile every three minutes until Kansas City was reached, with five of the daily runs exceeding 200 miles. In giving credit for this remarkable traveling over varied road surfaces, attention should be called to the fact that it was done without adjustment of any kind to the cars other than permitted by the rules, which confined the work to adjusting carbureters, cleaning the gasoline line if it became clogged, cleaning of spark plugs, and the adjusting of brakes.

Although only eight finished with perfect road scores, there were twenty-four of the original thirty cars running at the finish of the tour. All honors, however, does not belong to the eight which finished with perfect scores, as some of the others did nobly.

One in this class not to be overlooked was No. 114 Lexington, a car brought out in May of this year, but which throughout the tour ran with a perfect road score until within 20 miles of Kansas City when a cotter pin working out necessitated a stop to replace it, not a bit of new material having to be used. This car passed a particularly enviable technical examination, and all of the penalties were for tightening parts which undoubtedly had suffered somewhat from vibration during the long tour.

The same story might be repeated with reference to many of the other cars, as a host of the troubles which entailed penalties at the final examination were for tightening of parts that had worked loose. This vibration would not have occurred with ordinary road conditions, but on the plains of Colorado and western Kansas the cars had to travel over water courses across the road anywhere from 6 inches to 3 feet deep, at times 18 inches of water flowing through some of these. Besides, there were a score or more of dried-up sandy creek beds, into which the cars had to dip and which racked not a few of them severely.

A careful analysis of the road troubles and the final technical examination show conclusively that continual vibration caused most of the troubles and that these troubles were not in the actual breaking of parts, but just in the loosening of them. Had the rules permitted of the tightening of nuts and adjusting of parts, but prohibiting the use of any new material, there would have been sixteen perfect scores at Kansas City instead of two.

The work of the four Pierce cars was commendatory from start to finish. Winchester's No. 9 and Williams' No. 108 went through with perfect road scores and passed a perfect technical examination. Williams was in the van of the tour every day, catching the official car repeatedly before the night control was reached. Winchester was always well up in front, so that neither of these cars were nursed throughout the entire trip. Although the other two Pierces, namely, No. 8 driven by Dey and No. 109 driven by Schofield, had perfect road scores, they were penalized in the technical examination. Dey's troubles were slight, one being the starting crank which was bent when dropping into a dried-up creek bed and the other was a bonnet hinge. The No. 109 car suffered from vibration, replacing a tool box torn off when dropping into a deep dried-up creek bed, and also requiring a new spring clip.

Of the three Premier cars entered officially in the run two came through with perfect road scores, and the other, No. 53, had troubles consisting of a leaking gasoline line where it rubbed against the mud apron, a broken spring, and putting on a fan belt. Both of the perfect score cars, Nos. 1 and 2, driven by Webb Jay and Harry Hammond, respectively, made over half of the run without fan belts and did not experience any trouble with heating, taking on not more than a pint of water on any day's run. On next to the last day of the run Jay broke a rear spring and was compelled to make the whole of the last day's run with the car resting on the bumper, which, considering the rough nature of the roads, was a particularly gruelling test and undoubtedly resulted in added technical penalization. All of the parts penalized in the technical examination originated from vibration. No. 2 Premier had nothing wrong in the technical examination but to replace a broken spring clip and put on a fan belt. No. 53 Premier's troubles were entirely due to vibration. During the run these cars maintained a conservative pace, starting out midway of the tour and finishing anywhere from

The Premier Trio, of Which Nos. 1 and 2 Finished with Perfect Road Scores

No. 101 Moline, One of the Perfect Road Score Cars

one-half to one hour ahead of schedule. The spring trouble which developed was unexpected, though the springs used were of a new kind that were being tested out.

Both of the Marmon cars behaved with special credit from start to finish and took a particularly clean technical examination. No. 5, driven by H. C. Marmon, had a perfect road score, and No. 4, driven by F. E. Wing, experienced but one road trouble, the loosening of a flange on the gasoline feed pipe. This was the sole trouble for the two cars on the entire trip. In the final examination the only point found on Wing's car was a piece about 3 inches long broken off the end of the bottom leaf of a spring. On No. 5 Marmon the same spring leaf had a portion broken off, and in addition there was a slight penalty for straightening a spring hanger and tightening one end of the tie rod between the steering knuckles.

A car performance that created considerable attention throughout the West in that it is a Western product was the triple Moline entry in the Hower, bearing Nos. 100, 101, and 102. No. 101 made a perfect road score. No. 100 had a sole road trouble, a piece of metal getting between the timing gears, which, when removed, had not damaged the gears, so that they were not changed or even repaired. No. 102 had an equally slight trouble which occurred twice and consisted in a taper pin holding one of the timing gears in place dropping out. To reinsert it called for considerable work, but the timing gears were not injured, and no new parts other than a pin were needed. In the technical examination the troubles, as discovered, were equally slight. A noteworthy feature about these cars is that they made the entire run without carrying spare parts of any nature, not even an extra spark plug, an extra cotter pin, or an extra bolt.

The road work of the three Chalmers-Detroit cars was particularly favorable, excepting No. 3, the Glidden entry, which burned out a connecting rod bushing and had trouble thereafter until the car was withdrawn on the ninth day. No. 52, which won the Detroit trophy, had only one road trouble, and that when the locking ring holding the bearing race on the commutator released, so that the balls on the commutator were lost, and thereafter the car made the complete trip on the magneto. In the final examination this car showed no troubles other than some loosened parts due to vibration. No. 105 in the Hower ran with a perfect road score until the last day when, within 100 miles of the finish, tire troubles ditched it, a wheel was damaged, a new one borrowed, and the car disqualified for using a borrowed wheel. This borrowed wheel was taken from the Chalmers press car, which had the wheel repaired in a blacksmith shop and completed the tour to Kansas City.

The work of the two Maxwell cars, No. 6 in the Glidden and No. 107 in the Hower, was noted daily. No. 6 had but one trouble which robbed it of a perfect road score and that was the breaking of a spring. Shock absorbers were not used on these cars. The only trouble with No. 107 on the road was a spring clip, a broken spring, and tightening a water gasket. In the technical examination the troubles of these cars appeared to be solely due to vibration. Both of these cars maintained a conservative pace throughout the run and were generally well ahead of their running schedule.

The No. 14 White had as its chief mission in the tour the demonstration of kerosene as a feasible fuel, which fuel was used from start to finish and which the driver was able to obtain at every crossroad store, at a price ranging from 6 to 8 cents less than the figure asked for gasoline. The car had but two road troubles, one on the run out of Denver, when the oiler tube had to be cleaned, and another towards the last, when a fender had to be wired up. In the technical examination the car had to have several parts tightened. This car had an unusual amount of tire trouble on the road which was apparently not due so much to the tires nor the car as to nail-catching, with which other cars shared.

The only two-cycle in the run, and one which made a particularly creditable road performance, was No. 51, American Simplex, contending for the Detroit trophy. This car would have had a perfect road score had it not been for its dropping into a deep water trench on the day's trip out of Denver. This seriously damaged the base of the radiator and loosened the steering gear, but outside of this the car had not a single instance of road trouble. In the technical examination the car received a heavy penalty for the radiator repair, and the only other penalty imposed was for a couple of broken spring leaf clips.

No. 12 Midland, in the Glidden end of the contest, had a perfect score on thirteen of the fifteen days of the tour, and the only trouble was due to a broken fender iron and a dent in the mud apron, which occurred on the Madison-La Crosse run. This car was one of the leaders into the night control on many days of the tour, and undoubtedly would have been first into Kansas City had it not been for striking a stone out of Lawrence, which destroyed a tire and badly damaged a rear wheel. Notwithstanding this the car was third at the finish and completed the day with a perfect score. In the technical examination this car was penalized for tightening several running gear parts, and had to replace two fender irons, a rear wheel, and the starting crank.

A car which suffered particularly from road penalties, but which completed the tour, and had no troubles whatever with the motor, transmission, or power plant, was the No. 10 Glide. Its troubles were all with the front springs and the spring seatings on the axle, which caused penalties from Denver on. In spite of having made several days' runs with broken springs, the final examination brought out very few defects in this car. It was indeed creditable that a car with front spring trouble should have shown so few troubles due to vibration at the completion of the run.

The only two-cylinder car to officially complete the tour as a contestant was No. 112 Mason, which made thirteen perfect score runs out of fifteen and had but two road troubles. One was a minor affair consisting of the breaking of a petcock; the other on the thirteenth day was the burning out of a bushing on a connecting rod. In other respects this car made a splendid road showing and invariably ran away ahead of its schedule. The car was never nursed along the road. In the final examination the penalties were very meager, requiring a new lamp bracket, tightening two front spring clips, replacing some cotter pins in the driving chain, and repairing a leak in the radiator.

The two Jewel entries, Nos. 7 and 111, had thirteen and eight perfect score running days, respectively. No. 7's road troubles were minor, consisting of work on a fender, and a couple of flange bolts on a wheel. No. 111 had trouble with its tire carriers, changed a spark plug, tightened some hub flange bolts, and did some work on its gas pump. The majority of the penalizations in the technical examination were occasioned by vibration as in the other cars. No. 7 was penalized for a new frame sidepice.

THE SUMMING UP OF THE TOUR

GLIDDEN TROPHY

No.	Car	Driver	Road	Technical	Total
9	Pierce-Arrow	Winchester	0	0	0
2	Premier	Hammond	0	1.5	1.5
8	Pierce-Arrow	Dey	0	1.6	1.6
5	Marmon	Marmon	0	7.3	7.3
4	Marmon	Wing	8	2.5	10.5
6	Maxwell	Gager	8.5	4.6	13.1
1	Premier	Jay	0	16.9	16.9
12	Midland	Hayes	4.3	31.3	35.6
14	White	Searles	19.3	26.2	45.5
7	Jewel	Bernhart	11.2	394.8	406.0
10	Glide	Bartholomew	682.9	6.2	689.1
11	Thomas	Buse	1,001.0	*	1,001.0
3	Chalmers-Detroit	Bolger	1,225.5	*	1,225.5

DETROIT PRIZE

No.	Car	Driver	Road	Technical	Total
52	Chalmers-Detroit	Bemb	6.0	17.8	23.8
53	Premier	Waltman	26.1	8.2	34.3
51	American Simplex	Wood	1.4	50.8	52.2

HOWER CUP

No.	Car	Driver	Road	Technical	Total
108	Pierce-Arrow	Williams	0	0	0
101	Moline	Wicke	0	1.1	1.1
114	Lexington	Moore	2	1.8	3.8
100	Moline	VanDervoort	3.1	5.2	8.3
109	Pierce-Arrow	Schofield	0	10.2	10.2
107	Maxwell	Goldthwaite	35.4	8.2	43.6
102	Moline	Gregory	46.6	2.8	49.4
111	Jewel	Uhl	38.2	69.6	107.8
112	Mason	Snyder	334.5	10.3	344.8
103	Brush	Trinkle	1,005.6	*	1,005.6
106	Hupmobile	Nelson	1,358.0	*	1,358.0
110	McIntyre	Goodwin	1,452.7	*	1,452.7
104	Brush	Huss	2,251.6	*	2,251.6
105	Chalmers-Detroit	Machesky	Disqualified		

* Withdrawn, no technical examination.

EQUIPMENT OF THE CARS WHICH FINISHED

GLIDDEN TROPHY

No.	Car	Tires	Magneto	Carbureter	Speedometer
9	Pierce	Goodrich	Bosch	Pierce	Warner
2	Premier	Goodrich	Bosch	Schebler	Stewart and Warner
8	Pierce	Goodrich	Bosch	Pierce	Warner
5	Marmon	Diamond	Bosch	Schebler	Warner
4	Marmon	Diamond	Bosch	Schebler	Warner
6	Maxwell	Ajax	Splitdorf	Maxwell	Jones
1	Premier	Diamond	Bosch	Schebler	Stewart and Warner
12	Midland	Diamond	Remy	Kingston	Jones
14	White	Diamond	——	Kerosene	Jones
7	Jewel	Diamond	Bosch	Schebler	Stewart
10	Glide	Goodyear	Eisemann	Schebler	Stewart

DETROIT TROPHY

No.	Car	Tires	Magneto	Carbureter	Speedometer
52	Chalmers-Detroit	Diamond	Bosch	Mayer	Jones
53	Premier	Diamond	Bosch	Schebler	Stewart and Warner
51	American Simplex	Goodrich	Bosch	Am. Simplex	Warner

HOWER TROPHY

No.	Car	Tires	Magneto	Carbureter	Speedometer
108	Pierce	Goodrich	Bosch	Pierce	Warner
101	Moline	Goodrich	Bosch	Schebler	Warner
114	Lexington	Goodrich	Bosch	Schebler	Warner
100	Moline	Goodrich	Bosch	Schebler	Warner
109	Pierce	Goodrich	Bosch	Pierce	Warner
107	Maxwell	Ajax	Splitdorf	Maxwell	Jones
102	Moline	Goodrich	Bosch	Schebler	Warner
111	Jewel	Goodrich	Bosch	Stromberg	Warner
112	Mason	Diamond	Splitdorf	Schebler	Stewart
105	Chalmers-Detroit	Goodrich	Bosch	Mayer	Warner

a left rear wheel, spring clips, and tightening some other parts. Of the cars that withdrew from the contest only one checked into Kansas City with the regular party, this being a Brush runabout, although the other checked in shortly after. No. 11 Thomas, driven by Amateur Buse, had a perfect score until the eleventh day, when a repair was made on the gasoline line, and it had no more trouble until the 13th day, when it withdrew, due to breaking sub-frame members when it struck a water trench. The Hupmobile withdrew, due to transmission troubles, on the run to Minneapolis; and the McIntyre motor buggy withdrew on the run into Madison owing to trouble with the steering gear when the car was ditched. The Rapid truck kept along with the party until Denver, when it went ahead to take the ascent to Pike's Peak, after which it did not touch the tour until Kansas City was reached. The arrival Sunday night in that city excited much attention and favorable comment.

PREMIER AND MOLINE PROTEST AWARDS

BUFFALO, Aug. 2—Alleging that Pierce cars Nos. 9 and 108 did not carry full manufacturers' specifications, protests have been filed by H. O. Smith, president of the Premier Motor Car Company, and W. H. VanDervoort of the Moline Automobile Company. The point in question is regarding tail lamps, which, it is claimed, were not carried for several days after dropping or breaking off, and that the two Pierce Arrows were not required to put them on, thus to incur a penalty for work.

The Premier protests from a Glidden class view, in that one of its cars took second place; and the Moline protests the Hower award, as a Moline finished second. Should it be decreed that the tail lamps must be placed, it is reasonable to suppose that the work would take less than a minute, so that no change would be made in the relative position of the contestants except that it would eliminate all perfect scores.

SIXTH ANNUAL A. A. A. RELIABILITY CONTEST, DETROIT, MICH., TO KANSAS CITY, MO., JULY 12 TO 30, 1909.

GLIDDEN TROPHY

No.	Car	Driver	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	Road	Technical	Total
9	Pierce Arrow	W. F. Winchester	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Premier	H. Hammond	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	1.5
8	Pierce Arrow	F. S. Dey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6	1.6
5	Marmon	H. C. Marmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.3	7.3
4	Marmon	F. E. Wing	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	8	2.5	10.5
6	Maxwell	E. G. Gager	0	0	0	0	0	0	0	0	0	0	0	0	8.5	0	0	8.5	4.6	13.1
1	Premier	Webb Jay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16.9	16.9
12	Midland	E. O. Hakes	0	0	0	3.7	0	0	0.6	0	0	0	0	0	0	0	0	4.3	31.3	35.6
14	White	H. N. Searles	0	0	0	0	0	0	0	0	0	0	0	18.2	0	0.4	0.7	19.3	26.2	45.5
7	Jewel	O. P. Bernhart	0	0	0	0	0	0	0	8.8	0	0.1	2.3	0	0	0	0	11.2	394.8	406
10	Glide	A. Y. Bartholomew	0	0	0	0	0	0	0	2.6	0	9.2	119.3	28.8	247	276	0	682.9	6.2	689.1
11	Thomas	G. G. Buse, Jr.	0	0	0	0	0	0	0	0	0	0	1	0	1000	*	..	1001	xxx	1001
3	Chalmers-Detroit	Wm. Bolger	1	0.4	0	0	0	1	204	19.1	1000	*	..	..	..	..	..	1225.5	xxx	1225.5

DETROIT PRIZE

No.	Car	Driver	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	Road	Technical	Total
52	Chalmers-Detroit	Jean Bemb	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6	17.8	23.8
53	Premier	Cliff Waltman	0	0	0	0	0	0	0	0.8	0	0	0	0	0	5	20.3	26.1	8.2	34.3
51	Am. Simplex	W. A. Wood	0	0	0	0	0	0	0	0	0	0	0	1.4	0	0	0	1.4	50.8	52.2

HOWER CUP

No.	Car	Driver	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	Road	Technical	Total
108	Pierce Arrow	J. S. Williams	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101	Moline	J. A. Wicke	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	1.1
114	Lexington	John C. Moore	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1.8	3.8
100	Moline	C. H. Van Dervoort	0	0	0	0	0	0	0	3.1	0	0	0	0	0	0	0	3.1	5.2	8.3
109	Pierce Arrow	C. A. Schofield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.2	10.2
107	Maxwell	Chas. Goldthwaite	0	0	.0	2.6	0	0	1.6	0	0	0	0	0	7.7	0	23.5	35.4	6.2	43.6
102	Moline	W. S. Gregory	0	0	0	0	0	0	0	16.1	0	1	0	0	0	0	29.5	46.6	2.8	49.4
111	Jewel	A. B. Uhl	0	0	0	9	6	5.8	0	8.4	1.4	0	0	0	0	2.6	5	38.2	69.6	107.8
112	Mason	R. Snyder	0	0	0	4.3	0	0	..	0	0	0	0	0	330.2	0	0	334.5	10.3	344.8
103	Brush	F. A. Trinkle	0	0.4	0	3	2.2	1000	†	..	..	..	..	..	..	..	..	1005.6	xxx	1005.6
106	Hupmobile	Frank Steinman	0	0	0	358	1000	†	..	..	..	..	..	..	..	..	..	1358	xxx	1358
110	McIntyre	Frank Goodwin	29	423.7	1000	*	..	..	..	..	..	..	..	..	..	..	..	1452.7	xxx	1452.7
104	Brush	D. B. Huss	40.6	149.3	423.6	343.9	294	1000	†	..	..	..	..	..	..	..	..	2251.6	xxx	2251.6
105	Chalmers-Detr't.	John Machesky	0	0	0	0	0	0	0	0	0	0	0	0	0	0	x	......	xxx	......

* Withdrawn. † Withdrawn; continued as non-contestant. x Disqualified. xxx No technical examination.

A Typical Early Morning Start—Leaving Hugo, Colorado, en Route to Oakley, Kansas

ROAD AND EXAMINATION PENALTIES OF THE TOUR

According to the rules of the competition the penalties, as announced at the finish, are divided into those given on the road and those resulting from the technical examination. The former include marks for lateness at any night stop, on a basis of one point per minute; marks for work done upon the cars at a rate of one-tenth of a point per man per minute, except upon material not carried at the start when the penalty for work was doubled; and penalty for material used, at a rate of one-tenth of a point per ten cents worth, or fraction, except that outside material was charged at double price.

In the technical inspection the plan was to put the contestants in safe and first-class running order, as they were at the beginning, with penalties for work and material. In the hurry at the finish of the tour there was some confusion in scoring and the result anounced in Kansas City has been somewhat changed. In the examination-penalties the material has been made to read at double the regular price, as required by the rules, but the clause requiring double work-penalties upon these materials was neglected. It may be that the Contest Board will decree an alteration, although it is not likely that the relative standing of the contestants would be greatly changed.

As the committee went over the cars they gave the entrants the choice of taking the penalty which they imposed, in regard to the amount of work necessary to replace or repair any part, or of trying to beat this by actual work. E. O. Hayes made a record when instead of 30 minutes to change a wheel on his Midland he took four and a half, thereby saving 2.5 points from his total score. Another example of quick work was that in which Roy Snyder, in one minute instead of five, tightened two spring clips on his Mason. In many cases the drivers were satisfied that they could not take successful issue with the technical men on these points. Herewith is the detailed story:

GLIDDEN TROPHY

No.	Car / Penalties		Total
9	PIERCE-ARROW		
	ROAD	0	0
	TECHNICAL EXAMINATION	0	0
2	PREMIER		
	ROAD	0	0
	TECHNICAL EXAMINATION		
	Tightening one broken spring clip, 7 min.	.7	
	Material, 30 cents	.3	
	Replacing fan belt, 2 1-4 min	.3	
	Replacing fan belt, 3-4 min	.1	
	One link for fan belt, 5 cents	.1	1.5
			1.5
8	PIERCE-ARROW		
	ROAD	0	0
	TECHNICAL EXAMINATION		
	Straightening starting crank, 3 min	.3	
	Material, starting crank handle, 60 cents	1.2	
	Repairing hinge on bonnet, 2 sec	.1	1.6
			1.6
5	MARMON		
	ROAD	0	0
	TECHNICAL EXAMINATION		
	Tightening right end, cross steering rod, 15 min.	1.5	
	Material, new bolt, 10 cents	.2	
	Replacing bottom leaf, front spring, 30 min.	3.0	
	Material, spring leaf, 30 cents	.6	
	Straightening left rear spring hanger, 20 min.	2.0	7.3
			7.3
4	MARMON		
	ROAD		
	Labor, repairing gasoline feed pipe	6.8	
	Use of outside tool	1.0	
	Material, tape	.2	8.0
	TECHNICAL EXAMINATION		
	Replacing bottom leaf, front spring, 10 min.	1.0	
	Material, spring leaf, 30 cents	.6	
	Replacing broken step hanger, 5 min	.5	
	Material, new step hanger, 20 cents	.4	2.5
			10.5
6	MAXWELL		
	ROAD		
	Replacing front spring, 40 min	.4	
	Material, new spring, $4.50	4.5	8.5
	TECHNICAL EXAMINATION		
	Tightening steering column anchor bolts, 4 min.	.4	
	Tightening right front wheel bearing, 4 min.	.4	
	Tightening truss rod, 10 min	1.0	
	Material, bolt, 10 cents	.2	
	Replacing 2 rear univ'l-joint bushings, 20 min.	2.0	
	Material, universal-joint bushings, 40 cents	.4	
	Tightening magneto advance rod, 2 min	.2	4.6
			13.1

No.	Car / Penalties		Total
1	PREMIER		
	ROAD	0	0
	TECHNICAL EXAMINATION		
	Tightening left rear wheel, 2 min	.2	
	Tightening front spring clip, 2 min	.2	
	Replacing broken spring clip, 7 min	.7	
	Material, spring clip, 30 cents	.3	
	Tightening right front and left rear engine bolts, 1 1-2 min	.2	
	Replacing and tightening fan belt, 1 min	.1	
	Tightening left front transmission foundation bolt, 3 min	.4	
	Replacing vent pipe cover, 1 min	.1	
	Material, vent pipe cover, 10 cents	.2	
	Replacing upper quarter rear spring, 60 min.	6.0	
	Material, new spring quarter, $4.25	8.5	16.9
			16.9
12	MIDLAND		
	ROAD		
	Labor in tightening front fender, 16 min	1.6	
	Material, wire and strap, 30 cents	.6	
	Labor in straightening bent mud pan, 15 min.	1.5	
	Labor in tightening front fender, 6 min	.6	4.4
	TECHNICAL EXAMINATION		
	Replacing right rear wheel, 4 1-2 min	.5	
	Material, new wheel, $7.50	15.0	
	Replacing broken starting crank, 9 min	.9	
	Material, $1	2.0	
	Replacing both front fender irons, 90 min.	9.0	
	Material, fender irons, 70 cents	1.4	
	Tightening left rear spring clip, 5 sec	.1	
	Tightening brake anchors, 20 min	2.0	
	Tightening right front and left rear engine bolts, 2 min	.2	
	Tightening gasoline pipe bracket, 1 min	.1	
	Material, one bolt, 5 cents	.1	31.3
			35.6
14	WHITE		
	ROAD		
	Labor, cleaning lubricator pipe line, 22 min.	2.2	
	Time, late, 16 min	16.0	
	Tightening fender, 3 min	.3	
	Material, wire	.1	
	Tightening fender, 6 min	.6	
	Material, wire	.1	19.3
	TECHNICAL EXAMINATION		
	Tightening steering gear, 13 min	1.3	
	Tightening tire iron brackets, 4 min	.4	
	Tightening left rear fender, 40 sec	.1	
	Removing and replacing drain pipe to heater, 7 min.	.7	
	Outside labor, cutting thread on drain pipe, 5 cents	.2	
	Adjusting right front wheel bearing, 7 min.	.7	
	Tightening left front fender, 1 min	.1	
	Replacing gear shifting pin and cotter, 1 min.	.1	
	Material, pin and cotter, 20 cents	.4	
	Replacing 1 screw and tightening 1 screw on overflow pipe, 1 min	.1	
	Material, screw, 10 cents	.2	

No.	Car / Penalties		Total
14	WHITE—Technical examination—Continued		
	Replacing 2 mud-guard screws, 1 min.	.1	
	Material, screws, 20 cents	.2	
	Replacing right fender bracket, 5 min	.5	
	Material, fender bracket, 20 cents	.2	
	Replacing right front spring, 45 min	4.5	
	Material, spring, $5.40	10.8	
	Replacing lamp bracket, 5 min	.5	
	Material, lamp bracket, $2	4.0	
	Replacing crankcase oiler tube, 5 min	.5	
	Material, oiler tube, 80 cents	.6	26.2
			45.5
7	JEWEL		
	ROAD		
	Tightening hub flange bolts, 80 min	8.0	
	Material, bolts	.8	
	Tightening fender, 1 min	.1	
	Replacing fan belt and cotter pin, 17 min	1.7	
	Material, fan belt	.5	
	" cotter pin	.1	11.2
	TECHNICAL EXAMINATION		
	Replacing repaired front spring clips, 46 min.	4.6	
	Material, spring clips, 80 cents	.6	
	Work on left rear wheel, 5 min	.5	
	Material, spokes, etc., $3	6.0	
	Tightening torsion rod, 5 min	.5	
	Tightening differential shaft housing, 3 min	.3	
	Tightening 1 rear spring clip, 8 min	.3	
	Replacing cracked frame side member, 48 hrs.	288.0	
	Material, side member of frame, $30	60.0	
	Replacing 2 radiator brackets, 5 hours	30.0	
	Material, radiator brackets, $2	4.0	394.8
			406.0
10	GLIDE		
	ROAD		
	Repairing steering arm, 16 min	1.6	
	Material, steering arm	1.0	
	Replacing front spring, 50 min	5.0	
	Material, front spring	4.2	
	Lateness, time, 113 min	113.0	
	Labor on fan belt and front spring, 62 min	6.2	
	Material, wire	.1	
	Replacing front spring, 164 min	16.4	
	Material, front spring	12.4	
	Time, lateness, 215 min	215.0	
	Labor on front spring seats, 257 min	25.7	
	Material, spring seats	6.3	
	Labor and material, front spring seats	276.0	682.9
	TECHNICAL EXAMINATION		
	Replacing bonnet catch, material 10 cents	.2	
	Tightening radiator set screw, 1 min	.1	
	Tightening step bracket, 15 min	1.5	
	Material, step bracket, 10 cents	.2	
	Replacing spring clips, 15 min	1.5	
	Material, spring clips, 2 at 20 cents each	.8	
	Riveting spring clips in place, 15 min	1.5	
	Material, 20 cents	.4	6.2
			689.1
11	THOMAS		
	ROAD		
	Repairing gasoline feed pipe, 10 min	1.0	
	Withdrawn	1,000.0	1,001.0
3	CHALMERS-DETROIT		
	ROAD		
	Tightening fender, 4 min., 4 min., 10 min	1.8	
	Material, wire and strap, 60 cents	.6	
	Labor, examining crank shaft bearings, 29 min.	2.9	
	Use of outside tool	.6	
	Labor on connecting rod bearing, 140 min	14.0	
	Material, connecting rod bearings	1.6	
	Removing and replacing mud pan, crank case and tightening connecting rod, 170 min	17.0	
	Time, lateness, 187 min	187.0	
	Withdrawn	1,000.0	1,225.5

DETROIT PRIZE

No.	Car / Penalties		Total
52	CHALMERS-DETROIT		
	ROAD		
	Labor on commutator shaft connections	5.8	
	Tightening motor bolts	.2	6.0
	TECHNICAL EXAMINATION		
	Tightening left rear fender iron, 1 1-4 min	.2	
	Tightening bevel gear pinion housing, 9 min	.9	
	Tightening rear truss rod, 1 min	.1	
	Replacing screw on bonnet ledge, 1 min	.1	
	Material, screw, 10 cents	.2	
	Tightening motor foundation bolts, 7 min	.7	
	Replacing commutator and bearing balls, 45 min.	4.5	
	Material, $4.30	8.6	
	Replacing right steering arm split washer, 5 min.	.5	
	Material, 10 cents	.2	
	Tightening foot-brake drums, 17 1-2 min	1.8	17.8
			23.8
53	PREMIER		
	ROAD		
	Repairing gasoline feed pipe, tightening lamp, 8 min.	.8	
	Labor on rubber spring bumper, wiring pan, 29 min.	2.9	
	Material, bumper and wire	2.1	
	Labor and material, new spring	20.3	26.1
	TECHNICAL EXAMINATION		
	Replacing front spring clip, 7 min	.7	
	Material, 80 cents	.3	
	Repairing leak in radiator, 60 min	6.0	
	Tightening motor foundation bolts, 1 1-2 min.	.2	
	Tightening water pump stuffing box, 10 min	1.0	8.2
			34.3
51	AMERICAN SIMPLEX		
	ROAD		
	Labor on leaking radiator, 4 min	.4	
	Labor on bent steering gear, 8 min	.8	
	Outside material, grease for radiator, 10 cents.	.2	1.4
	TECHNICAL EXAMINATION		
	Repairing radiator, 8 hours	48.0	
	Replacing 2 broken spring clips, 20 min	2.0	
	Material, 40 cents	.8	50.8
			52.2

HOWER CUP

No.	Car / Penalties		Total
108	PIERCE-ARROW		
	ROAD	0	0
	TECHNICAL EXAMINATION	0	0
			0
101	MOLINE		
	ROAD	0	0
	TECHNICAL EXAMINATION		
	Replacing bolt in step hanger, 1 min	.1	
	Material, 10 cents	.2	
	Tightening three spring clips, 1 1-4 min	.2	
	Repairing cap screw on oiler base, 6 min	.6	1.1
			1.1
114	LEXINGTON		
	ROAD		
	Labor in replacing cotter pin in rear axle housing	2.0	2.0
	TECHNICAL EXAMINATION		
	Tightening distance rod, 2 min	.2	
	Tightening pinion shaft bearing housing, 7 min.	.7	
	Tightening right spring clip, 1 min	.1	
	Tightening 3 rear spring clips, 6 min	.6	
	Tightening carbureter-hot-water-jacket pipe, 1 min.	.1	
	Repairing commutator rod connection, 1 min	.1	1.8
			3.8
100	MOLINE		
	ROAD		
	Removing piece of steel from crankcase, 31 min.	3.1	3.1
	TECHNICAL EXAMINATION		
	Labor on oiler driving mechanism, 50 min	5.0	
	Material, taper pin, 10 cents	.2	5.2
			8.3
109	PIERCE-ARROW		
	ROAD	0	0
	TECHNICAL EXAMINATION		
	Tightening steering drop arm, 7 min	.7	
	Tightening left front wheel bearing, 5 min	.5	
	Replacing spring clip, 7 min	.7	
	Material, spring clip, 30 cents	.3	
	Replacing truss rod pin, 1 min	.1	
	Material, truss rod pin, 10 cents	.1	
	Replacing tool box bracket and tail light, 30 min.	3.0	
	Material, bracket, 60 cents	1.2	
	" tail light, $3.50	3.5	10.2
			10.2
107	MAXWELL		
	ROAD		
	Replacing spring clip, 11 min	2.2	
	Material, new spring clip, 20 cents	.4	
	Tightening cylinder water gasket	1.6	
	Replacing front spring, 32 min	3.2	
	Material, front spring	4.5	
	Replacing 2 spring clips, 20 min	2.0	
	Material, spring clips	.5	
	Time, lateness, 21 min	21.0	35.4
	TECHNICAL EXAMINATION		
	Tightening right front wheel, 2 min	.2	
	Tightening right front dust cap, 1 min	.1	
	Tightening bevel pinion housing, 2 min	.2	
	Replacing collar bolt, 1 min	.1	
	Material, collar bolt, 10 cents	.2	
	Replacing right front spring saddle, 10 min	1.0	
	Material, $1.60	3.2	
	Replacing water pipe gasket, 80 min	3.0	
	Material, gasket, 10 cents	.2	8.2
			43.6
102	MOLINE		
	ROAD		
	Replacing water flange inlet cap screw, 1 min.	.1	
	Replacing pin in camshaft gear hub, 16 min	16.0	
	Tightening fender, 8 min	.8	
	Material, bolt for fender, 10 cents	.2	
	Labor on camshaft gear hub pin	13.3	
	Material, taper pin	.2	
	Time late, 16 min	16.0	46.6
	TECHNICAL EXAMINATION		
	Replacing 2 outside brake-band guides, 20 min.	2.0	
	Material, 20 cents	.4	
	Tightening transmission bearing set screw, 3 min.	.3	
	Tightening jackshaft bearing lock nut, 30 sec.	.1	2.8
			49.4
111	JEWEL		
	ROAD		
	Lateness, 9 min	9.0	
	Removing and replacing gasoline pump cock, 10 min.	1.0	
	Outside labor, rethreading gasoline pump cock	3.8	
	Labor on tool box hinges	1.0	
	Material, hinges, 10 cents	.2	
	Tightening hub flange bolts	5.6	
	Material, washer, 10 cents	.2	

111 JEWEL—Road—Continued

Replacing spring clip and work on wheel	4.4	
Material, spring clip	.2	
Tightening tire holders, 7 min	.7	
Material, wire	.2	
Use of outside tool	1.0	
Change of spark plug, 4 min	.4	
Material, new spark plug, $1	1.0	
Repairing leak in gasoline feed pipe	7.2	
Material, tape and soap	.4	88.2
TECHNICAL EXAMINATION		
Remaking two rear wheels, 10 min	1.0	
Material, $6	12.0	
Replacing rear cross spring, 60 min	6.0	
Material, $2.80	5.6	
Replacing front spring, 60 min	6.0	
Material, $2.80	5.6	
Tightening right rear spring clip, 4 min	.4	
Tightening left rear spring clips, 4 min	.4	
Tightening differential pinion housing, 4 min.	.4	
Replacing brake brace bolt, 1 min	.1	
Material, bolt, 10 cents	.2	
Tightening rear transmission bearing, 3 min.	.8	
Adjusting transmission bearings, 6 min	.6	
Replacing left radiator bracket, 150 min	15.0	
Material, bracket, $1	2.0	
Repairing leak in gasoline line, 60 min	6.0	
Straightening front spring horns, 60 min	6.0	
Material, $1	2.0	69.6
		107.8

112 MASON
ROAD

Labor in changing pet cock, radiator to cylinder	2.2	
Labor in making wooden plug for radiator, 19 min.	1.9	
Material, wooden plug, 10 cents	.2	
Time, late, 296 min	296.0	
Labor on piston pin bushing	33.0	
Material, new bushing	.2	
Use of outside tool	1.0	334.5
TECHNICAL EXAMINATION		
Replacing 59 cotter pins in driving chain, 21 min.	2.1	
Material, cotter pins, 20 cents	.2	
Tightening two front spring clips, 1 min	.1	
Repairing leak in radiator, 60 min	6.0	
Material, 10 cents	.1	
Replacing one new lamp bracket, 10 min	1.0	
Material, lamp bracket, 40 cents	.8	10.3
		344.8

103 BRUSH
ROAD

Tightening connecting rod bearing, 4 min	.4	
Replacing radius rod, 24 min	2.4	
Material, new radius rod, 60 cents	.6	
Replacing radius rod, 16 min	1.6	
Material, new radius rod, 60 cents	.6	
Withdrawn, 1,000 points	1,000.0	1,005.6

106 HUPMOBILE
ROAD

Time, lateness, 358 min	358.0	
Withdrawn, 1,000 points	1,000.0	1,358.0

110 McINTYRE
ROAD

Time, lateness, 434 min	434.0	
Welding part on rear spring bar, 187 min	18.7	
Withdrawn, 1,000 points	1,000.0	1,452.7

104 BRUSH
ROAD

Time, lateness, five days, 1,176 min	1,176.0	
Labor on connecting rod bearings, 804 min	80.4	
Material, connecting rod bearings, 90 cents.	.9	
Labor on connecting rod	34.4	
Material, new connecting rod	9.2	
Repairing gasoline feed pipe, 5 min	.5	
Material, one nut	.1	
Tightening rear wheel cone, 1 min	.1	
Withdrawn, 1,000 points	1,000.0	2,251.6

105 CHALMERS-DETROIT
ROAD
Disqualified, last day, for use of outside wheel.

WHAT PARTS THE CONTESTANTS CARRIED

IN order to keep close watch upon the amount of repairs necessary for the contestants, each car had its spare parts sealed in canvas bags. Before leaving Detroit the entrant was required to give an itemized list of the extras and show them to the chief inspector as they were placed in the receptacle. If at any time it was incumbent upon the driver to use something from the spare parts bag, the observer made note of the opening and of the materials requisitioned. At the completion of the tour the bags were turned over for inspection to the same man who had sealed them. Some of the cars carried few extras and in some cases none.

The list is as follows:

GLIDDEN TROPHY

NO. 1 PREMIER—2 low tension igniter plugs, 2 jump spark plugs, 1 valve cap yoke, 1 valve spring, 1 valve.

NO. 2 PREMIER—Same as car No. 1.

NO. 3 CHALMERS-DETROIT—2 rolls of copper wire, 1 box cotter pins, 1 roll tire tape, 1 coil solder wire.

NO. 4 MARMON—1 carbureter air valve, 1 air valve spring, 1 carbureter guide, 1 carbureter nut, 1 valve, 1 valve spring, 1 valve washer, 2 split valve washers, 1 fan belt, 2 spark plugs, 1 ball bearing, 1 piece water pump packing, 4 spark plug gaskets, 2 valve cover gaskets, 2 shoulder pins, 13 nuts, 5 cap screws, 9 taper pins, 10 washers, 12 cotter pins, 4 pieces rubber hose, 3 hose couplings, 1 piece annealed wire, 1 can "Smooth-on."

NO. 5 MARMON—Same as Car No. 4.

NO. 6 MAXWELL—Right and left steering knuckles, right and left steering knuckle arms, 2 large and 2 small steering knuckle cones, 1 drive shaft yoke, 1 pinion shaft yoke, 2 sets universal yoke pins, pin locks, pin lock screws, 1 driving pinion support complete, 1 inside and 1 outside ball races complete, Splitdorf carbon brushes and copper brushes, 1 front and 1 rear spring, 1 universal cross, 2 steering knuckle cone lock nuts, 3 steering arm nuts, 4 spark plugs, 2 spring straps, 97 cotter pins, 1 magneto breaker arm and screws, 1 roll tape.

NO. 7 JEWEL—1 D. W. F. bearing, 1 valve, 1 valve spring, 1 fan belt, 1 coil copper wire, 1 box cotter pins, 1 roll tape.

NO. 8 PIERCE ARROW—6 spark plugs, 1 inlet valve complete with spring, spool and cotter, 1 exhaust valve complete with spring, spool, and cotter, 1 fan belt, 1 package cotter and taper pins, 1 master vibrator spring.

NO. 9 PIERCE ARROW—Same as car No. 8.

NO. 10 GLIDE—1 double steering arm, 1 single steering arm, 4 roller bearing cones, 8 valves, 1 package emery, 3 fan belts, 1 package assorted washers and screws, 1 front spring, 3 front spring clips, 9 spark plugs, 1 box assorted washers and cotters, 1 package soft wire, 5 feet rubber hose, 1 roll tire tape.

NO. 11 THOMAS—4 spark plugs with gaskets, 4 countershaft keys, 1 chain, 2 F. S. ball bearings, 1 aluminum water pump connection, 6 hose clips, 18 inches rubber hose, 1 foot copper pipe, 3 pieces rubber hose, 6 sheets emery cloth, 1 bag assorted nuts, bolts, and pins.

NO. 13 MIDLAND—2 upper and 2 lower rear spring clips and nuts, 2 front spring clips, 2 front spring shackles, 2 front spring bolts and nuts, 1 right and 1 left steering spindles, 10 spark plugs, 1 set magneto parts, 1 box cotter pins, nuts, washers, soldering set.

NO. 14 WHITE—1 vaporizer, 2 pilot lights, 1 small spring, 1 box packing, 1 coil wire.

DETROIT TROPHY

NO. 51 AMERICAN SIMPLEX—26 nuts and pins, magneto carbon holder, 1 spool copper wire, 3 adapters, 6 spark plugs, 12 spark plug gaskets, 1 piece 1-4 inch brass pipe, assorted cotter pins, 1 muffler cut-out spring.

NO. 52 CHALMERS-DETROIT—4 spark plugs, roll tape, box cotter pins, roll copper wire.

NO. 53 PREMIER—Same as car No. 1.

HOWER CUP

NOS. 100, 101, 102 MOLINE—One roll copper wire each.

NOS. 103, 104 BRUSH—1 cam gear and shaft complete, 1 transmission coupling, 1 spring post, 1 chain, 2 pair connecting rod bushings, 5 Winkley oilers, 2 large and 2 small bearing cones, 4 meter links, 4 set screws, 1 sprig and bracket, 5 valve springs, 1 right front spindle, 1 grease cup, 1 starting ratchet, 8 step bolts, 11 carriage bolts, 2 commutator springs, 2 starting crank pins, 5 check nuts, 15 lock washers, 88 steel balls, 2 spindle adjusting nuts complete and 2 screws, 1 roll tape, 1 box assorted keys, 1 carbureter complete, 3 spark plugs, 20 feet copper wire, 1 valve.

NO. 105 CHALMERS-DETROIT—8 spark plugs, 1 roll tape.

NO. 106 HUPMOBILE—1 carbureter, 1 magneto, 2 shackle bolts, nuts, and washers, 4 spark plugs, roll tire tape, roll copper wire, 1 piece emery cloth, 2 complete sets front roller bearings, 1 complete set rear roller bearings, 1 front spring clip complete, 1 radius rod complete, 1 transmission sliding member, 1 cross steering connection complete, 4 hand-brake-to-shaft pins, 1 rear wheel axle pin, 1 clevis pin, 2 right and 2 left adjusting cones with 1 nut each, 1 stationary cone and washer.

NO. 107 MAXWELL—Same as car No. 6.

NO. 108, 109 PIERCE ARROW—Same as cars Nos. 8 and 9.

NO. 110 McINTYRE—10 axle clips and bolts, 1 set transmission fibers, 4 rocker arms complete, 4 crank base bearings, 4 valves and cotters, 2 piston pins and bushings, 4 valve springs, 2 connecting rods with bushings, 6 piston rings, 4 cylinder head gaskets, 1 transmission gear complete, 1 high speed clutch, 4 roller bearings, 2 gasoline pipes, 1 grease cup, 4 differential bushings, 2 radius rods, 10 feet ignition wire, 4 grease cups, 1 push rod with rollers, 3 valve spring discs, 1 steering rod bolt, 1 knuckle bolt, 12 cap screws, 4 check valves for oiler, 4 taper pins, 15 feet driving chain, 24 chain repair links, 1 carbureter, 2 wire belts, 2 spark plugs.

NO. 111 JEWELL—8 spark plugs, 1 fan bolt, 2 rolls tire tape, 1 box cotter pins.

NO. 112 MASON—1 pair rear axle bearings, 6 valve springs, 2 valves, 1 set valve parts, 4 spark plugs, 15 chain links, 5 feet magneto cable, 16 bolts nad nuts, box cotter pins, 1 connecting rod and main bearing bushings, 1 valve lifter roller and push rod complete, 1 front and 1 rear spring clip, 1 pot cock, 1 roll tire tape, 1 piece solder, 1 coil wire, 1 magneto timer, 2 battery connectors, 1 roll tire tape, 2 brake pins, 1 valve pin, 1 sheet emery cloth.

NO. 114 LEXINGTON—1 fan belt, 2 rawhide strings, 10 spark plugs, 4 sheets emery cloth, 1 box valve grinding composition, 1 roll tape, 10 spring bolts with nuts, 2 spring shackles, 4 yoke ends, 1 turnbuckle, 4 valve springs, washers, and keys, 2 gasoline shut-off cocks, 4 gasoline connections, 72 bolts, nuts, and screws, 11 rivets, 132 cotter pins, 41 lock washers, 3 carbureter throttle screws, 4 carbureter needle valves, 3 air valve springs, 1 air valve adjusting screw and nut, 1 Woodruff key, 1 tubing connector.

Midland Passing Through Topeka, the Capital of Kansas, on the Final Day of the Run

THE THREE FINAL DAYS THAT CONCLUDED THE TOUR

OAKLEY, KAN., July 28—Across the prairies the lessening cavalcade came to-day from Hugo, Col., after one of the toughest runs since the big tour started July 12 in Detroit. The open country traveling between Colorado Springs and Hugo had been comparatively easy, and this gave rise to the hope that to-day's run would be equally uneventful. The first 30 of the 165 miles to this night stop supplied the most treacherous kind of roads. Vegetation hid deep holes, and of ruts there were innumerable ones that scraped the bellies of the cars, and shook machines and occupants until they ached in concert.

Near Aroya deep ravines nearly put several cars out of the reckoning, and other fordings interspersed the hard journey. About half way Colorado was bidden adieu with mingled regrets and thanks, and for a time it looked as though Kansas prairie might be an improvement. Perhaps it was, but nevertheless there was some difficult going en route here, and all felt relief when they caught sight of the line of Pullman sleepers alongside the typical Union Pacific station. Kansas presented more rolling prairie than did Colorado, but as a whole this automobiling on flat country becomes monotonous, especially with a torrid sun shooting its rays earthward at over a hundred degrees. Rain threatened during the afternoon, which caused the sky to become partially overcast and somewhat curbed the stifling atmosphere. The few towns passed through found the people from the country round gathered to catch a sight of the "Gliddenites," who accepted with blasé indifference the homage of the "common people," who unfortunately knew not that this was the result of hand wavings and other greetings for some two thousand miles through seven States.

A Day of Penalties—Superstition may not hold much sway among Glidden tourists, but nevertheless this was the thirteenth running day of the contest, and there were more serious derangements upon the road than ever before. The roughness of the highway, the presence of the semi-concealed washouts, and one or two difficult fords wrought havoc with the condition of contesting and non-contesting cars. In addition to the points which were brought out in the penalties, those at the finish were able to detect derangements which will be unearthed later.

One of the deep gulleys near the finish of the run was responsible for an accident to the big six-cylinder Thomas, driven by Gus Buse, Jr. The car was crossing the plains at nearly a 50-mile an hour clip when the ditch confronted the river. He set his brakes, but the car dropped into the gulch, and it was so racked that its motor sub-frame and a water connection were broken. It was seen that the engine was out of line, and so no attempt was made to bring it in under its own power. Buse decided to withdraw, thus incurring a penalty of 1,000 points in addition to the single point previously charged.

The two Maxwell cars, one in the touring car class with a previous perfect score, and the other, a roadster, were penalized for using new springs. The cars are two of the few in the tour without shock absorbers, and the great strain of the miserable roads proved too great. The touring car broke its left front spring yesterday, and replaced it this morning just after checking out. This penalty of 8.5 points, four of which were for labor, reduced the number of clean Gliddenites to five. The same number of points were given Goldthwaite, the Hower trophy Maxwell pilot.

Springs have been giving trouble in several quarters, and as a result of a long run on one spring before reaching Denver, the Glide this afternoon experienced further inconvenience. The spring seat on one side gave way, allowing the axle to shift, and necessitating a new one. Temporary repairs were made, and the car arrived late to-night.

The Mason two-cylinder car broke the tie rod in its steering gear and came in late to-night.

Jean Bemb, in his Chalmers-Detroit car, in the Detroit trophy class, also had a "thirteenth" happening. While filling with gasoline at the station before checking in this evening, a five-gallon can similar to those with which gasoline was being dealt out, was picked up and emptied into the tank. A few minutes later, after the car had been officially checked, the motor stopped, and it was discovered that the can was full of water, and belonged to another contestant. Chairman Hower allowed Bemb to drain his tank and fill with the real liquid without penalization. This ruling could hardly have been otherwise.

FOURTEENTH DAY—OAKLEY TO SALINA

(199.7 Miles)

SALINA, KAN., July 29—This was the hottest day of the tour, and at times it seemed as though Hades had something to do with the stifling atmosphere. The roads were fairly good, and even those which were ordinary proved exceptionally easy for even the lowest-powered cars. As one neared the day's destination the country improved, with the soil more fertile and occasional breaks from the monotonous plains. Corn grew higher and prosperity seemed more universal. When the day was done "Globe-Girdler" Glidden said that the weather reminded him of India and the scenery of the lowlands of Scotland.

Salina, with a population of about 13,000, has some 160 cars. It has an automobile club in process of vigorous growth, with W. W. Watson as president and George D. Adams as secretary. The four local garages had the greeting of the visitors in charge, and the one most appreciated thing was the inviting natatorium, where the dusty travelers hied with unanimous accord, there to splatter and soak for a couple of hours. These are the four concerns which engineered the welcoming: J. F. Ollinger and H. L. Center, selling Olds and Regal; the Natural Body Brace Company, Howard Rash, manager, handling the Maxwell; Central Kansas Auto Company, George Weisgerber, manager, selling the Great Smith, Ford, Overland, White and Brush; and the Salina Auto Company, F. B. Shellaberger, manager, selling Franklin and Buick.

Apparently the weather was too much for both Chairman Hower and Committeeman Stevens, for they gave up their places in the pace-making car to J. C. Kerrison and Howard Reynolds, two Bostonese newspaper men, who stuck it out in company with Mr. Glidden.

Five Penalizations Were Levied—Five cars felt the pencil of the official scorekeeper, though only one had a very large amount. The Glide touring car, driven by A. Y. Bartholomew, suffered most severely, and 276 points were added to those of previous days. The spring seat trouble on the front axle was remedied, and Mr. Bartholomew showed good sportsmanship by taking it, denying reports that he would withdraw. By the expenditure of a few cents he secured iron to replace the broken seats, and 25.7 points represented the labor. The work took so much time, however, that he was 215 minutes late, giving him his total of 276, and a grand total of 406.9.

The White steamer had to fix a fender, losing .4 of a point, .1 of which was for the wire and the remainder for the work. The only car in the Detroit class penalized was the Premier, which had 5 points given, 2.1 for material, in this case a rubber bumper and some wire. The bumper was used under a spring and the wire for fastening the mudpan, the total for material and labor of 5 points increasing the Premier's score to 5.8. The Jewel roadster lost 2.6 points, being the only Howerite penalized, for repairing a leaky gasoline feed pipe.

Two changes in penalties of previous days were announced this evening, that of the Maxwell roadster being 7.7 yesterday for its new spring, and the record of the Mason, which broke a piston pin bushing, being 330.2 points.

FIFTEENTH DAY—SALINA TO KANSAS CITY

(212.8 Miles)

Kansas City, Mo., July 30—The final day of the tour was a back-breaker, and the casual remark of Pathfinder Lewis at Minneapolis, that the wind-up would prove interesting to all, was brought to mind soon after the tough ride had begun. It had rained during the night and the precipitation had been sufficient to put the gumbo roads into fairly slippery condition, meaning the use of chains and a sliding crawl for some fifty miles. The clouds threatened more water, and until noon there were spasmodic showers which aided in making the roads more difficult.

Some four miles beyond Junction City was passed the hilltop monument which designates the geographical center of the United States. A half mile more and the largest cavalry fort in the country, Fort Riley, interested the tourists. Then a couple of miles further on and the first capitol of Kansas presented a relic of past glory, roofless and windowless, the abiding place of owls and rats. Scarcely three miles more and Ogden, the oldest town in the State, presented a picture of utter indifference to progress, for apparently the village belongs to the Rip Van Winkle class, and doesn't care much about it, either.

Manhattan, 71 miles from Salina, put on some metropolitan airs, including a betterment of the roads, which continued more or less to the conclusion.

Going through Topeka, the factory of the Great Smith car was passed, and of course there were enthusiastic greetings to the mud-splattered caravan. Near Kansas City the hills increased in length and height, with road surfaces rugged and stony. From Shawnee there was a macadam road into the city, though it supplied more dust and dirt than all the rest of the day combined.

The checking-in was in front of the Coates House, and there were sighs of great satisfaction as one after another the cars reported for the last time. "Jack" Williams, with his No. 109 Pierce, was first, though his No. 12 Midland, with E. O. Hayes driving, made what might have been a successful run for the honor had he not met with a most bothersome puncture in a ditch across the road, some thirty miles from the finish.

A single mark was listed in the Detroit trophy class. This was one of 20.3 to the Premier, driven by Waltman, for work upon springs and the replacement of one.

The Molines came in with a unique record in several ways, one of which was that there had not been a spark plug removed from any one of the trio during the entire trip.

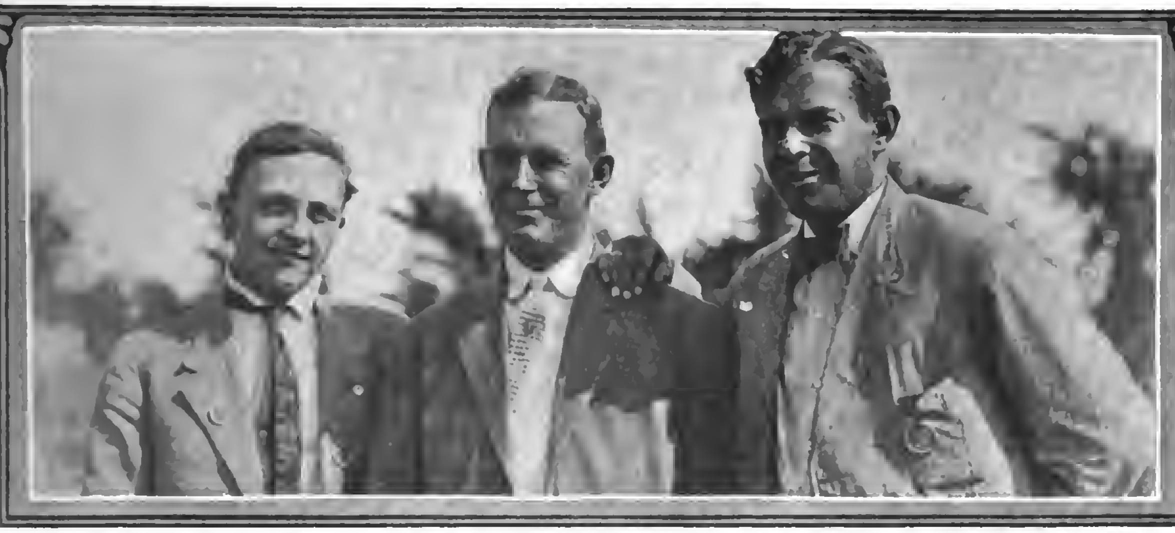
The two-cylinder Mason had the desirable goose egg for its final run.

Heavy Penalization Resulted—Nearly one-third of the competing cars were penalized as a result of this strenuous grind through the oozy mud of Kansas. Seven machines had to have time expended upon them in adjusting or repairing, and two of these in the Hower trophy ranks had had perfect records up to this time. The newcomer from the "Blue Grass" region, and the "Bluebird," from Detroit, were the unfortunates, the latter probably the more so because it was disqualified. The former is the Lexington, driven by John C. Moore, which was held ten minutes while its driver and mechanic each worked to replace a cotter pin that had dropped in the rear axle housing. The labor cost 2 points in scoring. The Chalmers received its very hard penalty for using a wheel secured from another Chalmers-Detroit to replace one broken. The rules explicitly covered the point.

In the same section there were three other penalties accorded to the Moline, driven by Gregory; the Maxwell, handled by Goldthwaite, and the Jewel, by Uhl. The Moline lost 29.5 points through the necessity of working upon a taper pin in the camshaft gear hub, the actual labor costing 13.3 points, material .2, and lateness at the finish 16 points. The Maxwell was held up to replace two spring clips, the penalty being 23.5 points, of which 21 was for lateness, 2 for labor and .5 for the material. The Jewel had a leak in its gasoline feed pipe from the auxiliary tank to the carbureter, and 5 points accrued through repairing it. Tape and soap were listed at .4, and the remainder as labor.

A single penalty was given in the Glidden class, that to the White steamer, of .7 of a point, .6 being for work in fastening a fender iron, and .1 for the wire.

On the Colorado Plains Numerous Morasses Were Partially Hidden by the Grass—Goldthwaite's Maxwell Found One of Them



Three Prize Winners of the Tour—Bemb (Detroit Prize); Winchester (Glidden Trophy); and Williams (Hower Cup)

OPINIONS VARIED AND INTERESTING ABOUT THE TOUR

F. B. Hower, Chairman of the Contest Board—"Of course, there will be another tour next year. Don't you believe that there won't be one. It always follows at this time that there must be a lot of talk about the event being the concluding one. The public may well invest in any car which came through this tour successfully with or without an absolutely perfect road score. This tour has been strenuous. The makers entered this tour primarily for publicity, but the experiences gained will prove of inestimable value in improving their product. The improvements in the cars of this tour will wipe out any little defects which may have shown, and when these improvements have been made the cars that are now competing will be ready for the proposed transcontinental contest of next year. I believe such a contest possible now, and in line with the desires of the makers. The question of season will have to be considered for the next tour, owing to the added time which will be required for its successful conduct."

Samuel B. Stevens, Member of the A. A. A. Contest Board—"The sixth annual tour has been a grand success, and I sincerely hope that there may be a transcontinental tour for 1910. The contestants in this tour did not fancy the idea at the beginning, but having won out with honors for all concerned in this event they now feel that the transcontinental is a possibility. Of course, the question of time enters into consideration. The proposed seventh annual could be carried through within a month I am quite sure. There would have to be two days lay-over each week to give time necessary for additions to the schedule in the event of bad weather. The real reason for the two-day stops at Minneapolis and Denver during this tour was possibly not generally understood. The extra days would have been utilized had the weather turned out bad. Regarding the rules for another year, I do not believe that they should be made easier at all, but I do believe that they should be made harder, if anything. The perfect car is not yet made, and may never be made, but we are fast reaching a point where confidence may be placed in any car. The troubles of the present trip have not been serious, and the makers who have had troubles, for the most part of the minor sort, will correct the defects for another year."

Charles J. Glidden, Donor of the Glidden Trophy—"Severe? Very severe hardly expresses it. The tour has been a hard test and a thorough test and a good one in every way. The showing for American cars has been immense, and I believe cars are now ready for the cross-country run. Early in the present tour many expressed the opinion that the longer tour would not be feasible, but after this 2,700-mile trip I believe that all think the time ripe for the greatest tour ever known, from the Pacific to the Atlantic. The transcontinental tour should precede any tour of Europe and will bring about a delay of the proposed tour of Scotland, Ireland and Wales, from Land's End to John O'Groat's. It may be possible that this will be in 1911, and again it may be better to tour the entire South before making the European trips proposed for several years."

Dai H. Lewis, Pathfinder of the Tour—"In my opinion, tours will go on year after year as long as there is a sale for automobiles. The great test of automobile construction is found on these tours, and the public and the makers want the tour. The present tour has been a grand test of construction and a great test of driving skill. The very fact that eight cars came through perfect in the road score and that so many came through with but slight losses due to minor defects is a great sign of the times. Cars are improving, as all will admit who took part or saw tours of days gone by. This tour was designed to bring cars through without a perfect score, and yet there are eight. It is wonderful, and it is evident that rules must be made ever more strict than has been the case in this tour. The idea of a transcontinental contest for next year is a good one, and if everything goes right I hope to be in this contest."

H. O. Smith, Chairman of the A. M. C. M. A.—"The 1909 Glidden has at least proven that the modern motor car can travel 2,700 miles at the rate of not less than one mile for every three minutes on the roads from Detroit to Kansas City, irrespective of weather conditions and without a repair or replacement or adjustment and without even tightening nut, bolt, or screw. The tour has furnished proof which should be worth to the manufacturer all the expense incurred and also supply information of inestimable value to dealer and to the individual purchaser."

W. H. VanDervoort, President of Moline Company—"I'm feeling pretty good, thank you, for we finished one car tie with the two Pierce cars for the Hower trophy, and had it not have been for a foreign substance that somehow crept into our gearbox we might have finished two cars. During our trip the Moline won honors by team work, for the cars always ran together unless in event of a puncture, and we had few of those, our Goodrich tires giving splendid service all through. The showing of the Moline this time has brought its reward, and I have already made three entries for the tour of next year, wherever it may go. I hope sincerely that next year's tour will be across the continent."

H. A. Croxton, President Jewel Motor Car Company—"We feel very well satisfied with the tour, and our showing is really a surprise to us, as our cars were both new when they started and had received almost no test. We hurried to get ready. We shall be in future tours. The idea of a transcontinental tour for next year is a good one and our entries are ready now when asked for."

Webb Jay, Driver of No. 1 Premier—"The public will not appreciate what the cars have gone through on this year's Glidden. The going was certainly hard and the rules strict. If the dealers and buyers only appreciated what information they could get by the showing of the cars they would be surer of getting their money's worth and a satisfactory car. The Glidden was certainly strict enough this year to cause the makers to stop and think whether they had any real doubts about their car. It is, of course, worth a lot to win, but I think if I were a manufacturer I would go in to find out weak points so that they could be corrected. The stayathome kind of manufacturers don't always know how much trouble their cars are giving and why every car they sell hurts them instead of selling more cars. Every fellow who buys a half baked, unproven car hurts the auto business, for he does not fail to tell his friends that he bought a cheap car and one which looked the most for the money. He is the one who shouts about the unreliability of automobiles and how expensive they are. He tells of the upkeep expenses. I believe in touring contests under rigid rules impartially enforced."

J. Machesky, No. 105 Chalmers-Detroit—"It was rough to strike that last day just when things were coming along so nicely, and tougher yet to lose out almost at the finish. I had to change wheels with Harry Bill and was disqualified, yet the wheel of Mr. Bill had come just as far as mine, and he merely took a little time, put mine into order, and then came on. I went into the last day settled firmly in my own mind that I had a perfect score, but changing wheels cost me a position."

H. N. Searles, No. 14 White—"This has been a severe test, a contest in which the cars have been forced through difficulties never before experienced. The A. A. A. planned a tour to bring forth no perfect scores, yet eight cars had perfect road scores and many more lost but a very few points. The present tour has been to me a very agreeable experience with the exception of the special train in which the men were so herded together as to make things disagreeable."

John C. Moore, No. 114 Lexington—"This was all new to me and I am unable to make comparisons, but the trip was tough and hard. The day's runs were long and the strain on a new car was enormous, yet the loss of points to us was but 3.8. I am satisfied to have finished successfully, and feel that I could not have done better, as many well known and well tested cars were in the competition. The trip has been a lesson to me."

E. O. Hayes, No. 12 Midland—"You can bet it was a hard trip, and I am satisfied to have finished, let alone get prize honors. The Midland is ready now to enter for a trip across America, and with comparatively few changes. The long hard days, the rough roads, the stiff schedule and the going into unknown dangers over the treacherous roads was an experience I shall never forget."

C. E. Goldthwaite, No. 107 Maxwell—"As a test for cars the tour proved all that was promised and a little more. All honors go to cars that pulled through with a perfect road score. I believe now, as I did not believe before, that it will be possible to shape up a tour under even stricter rules for San Francisco to New York. That will be the supreme test and I hope to be able to take part."

F. A. Trinkle, Driver No. 103 Brush—"Any car that came through to Kansas City along the route of the sixth tour is a car that anyone may safely purchase. This has been a hard run for the little Brush, but I am satisfied with this tour, for in spite of the terrible going, more so for the little than the big car in this instance, I was not last."

Walter A. Winchester, No. 9 Pierce—"The tour was an interesting run, and I am satisfied that the roads, the stiff schedules, and the long runs each day brought out the best cars in America. I am ready now to tackle anything in the driving line. Variety was the point of this tour, for every class of road was encountered."

Frank E. Wing, No. 4 Marmon—"The trip was hard to a man accustomed to New England roads and to tours of the past. Taken as a whole, the roads were the worst ever known for a long tour, yet the schedules were stiffer than ever known and the runs of each day longer. The strain upon the driver and the car was terrible."

John S. Williams, No. 108 Pierce—"I found nothing so very hard about the tour, and was satisfied to drive steadily and only as fast as possible to obtain a commanding position and be ready for trouble. Going out ahead is breaking road and hard on the car, yet my Pierce gave no trouble and my tires gave none."

"Teddy" Dey, No. 8 Pierce—"I've been on them all, and for wear and tear on car and man, this was the limit. It was tough, and that is true. Steady work, hour in and hour out, won. I am ready to take a Pierce-Arrow anywhere that may be desired, and across America is satisfactory to me."

A. Y. Bartholomew, No. 10 Glide—"I had a streak of bad luck in certain particulars that took a great deal of the pleasure out of the contest for me. Next year we will be prepared for a transcontinental or any other kind of a hard tour. My car ran splendidly."

Walter A. Woods, No. 51 American Simplex—"Care was necessary, but constant vigilance earned its rewards. I lost out through the plunge into that hole which held fifteen men and in which the Brush stood on its head."

HOW RAPID TRUCK CLIMBED PIKE'S PEAK

Kansas City, Mo., Aug. 1—Although the novelty of climbing Pike's Peak in an automobile has worn off since accomplished safely by a number of machines, no motor truck has ever attempted it before, and the Rapid truck in the tour justly earned great credit when the hard trip was successfully terminated. The start was made from the Antlers at daylight Monday morning, with T. P. Meyers in charge, Frank Grogan at the wheel, and Jim Curry as mechanic. Leaving promptly at 6:15, the eighteen-mile journey was nearly completed when darkness overtook the adventurous crew of the big machine, and they were obliged to stop and sleep on their arms, so to speak. Next morning, the top was plainly seen but three-quarters of a mile distant, this distance being completed easily by eight o'clock. The truck came down on its own power, finding this trip far easier than the upward one, which tested the nerve and skill of the driver to the limit. The Goodyear tires were badly cut up by the rocks but stood the journey and were used to the finish of the tour. It was certainly a strenuous test for a commercial car.

Rapid Truck Making Its Way Up Pike's Peak

HOW THE TOUR IMPRESSED ONE PASSENGER

BY W. W. BROWN, PRESIDENT AUTOMOBILE CLUB OF VERMONT.

I'm now arrived, thanks to the gods—
Through pathways rough and muddy,
Which surely shows that making roads
Is no' this people's study;
But though I'm no' wi' Scripture versed,
I'm sure the Bible says
That wicked sinners shall be damned
Who do not mend their ways.

THUS wrote "Bobbie" Burns after a drive over Scottish roads. I don't know whether the "sinners" who made these Western roads will be damned or not, but the roads themselves have been with all the fervency to be expected from men pounding nearly two hundred miles a day over them since July 12.

I have been asked for my impressions of the tour, from the vantage point of a passenger, and here they are, without fear or favor. I am in no way connected with the automobile business, nor the tour management. I paid all my own expenses and rode as a simple passenger, more or less accurately representing 125 pounds of sand. This was my first Glidden tour, and as a passenger I have had little to do except to keep my ears and eyes open to get all I could out of it, and I have thoroughly enjoyed every moment. I have met a lot of good fellows and been royally entertained.

W. W. Brown

The West is a great country, its people are cordial and open-hearted; everyone knows the reception we have had—it has been one grand ovation all along the line. But the country is all new and a bit raw, and with few exceptions the roads (outside of the large cities) beggar the name.

Any manufacturer who does not put a car in this yearly contest is missing something. I can see that the advertising for the cars in the run has been very valuable. The interest taken by thousands of future motorists during a three weeks' tour, covering seven great Western States, and passing through 336 cities and town, cannot fail to bear rich fruit. And they are buying cars. Little towns of three hundred people, with fifteen cars, is only one illustration of many I could give. Aside from the value of the advertising, it is the very best possible test that the manufacturer can get of the durability and efficiency of his car. Several builders of well-known makes and some factory superintendents and designers were driving their own cars in this tour.

One manufacturer and designer—and one of the brightest—told the writer personally that he had never been on one of these contests before, and that he would never miss another, as the experience was invaluable.

The drivers and their mechanicians, with few exceptions, were a conscientious, hard working lot of men—out to win; and the success or failure of any car depends largely on these men. I saw drivers who would smash up any car, no matter how well built, and others who would take most any car through safely. What knocks out many a car is the result of "speed mania" on the part of the driver. The time allowance is sufficient for reasonable driving. I know it creates a good impression on the public to come into controls among the first cars, but it militates against perfect scores. The observers—the most unobserving lot of men I ever saw—were all good fellows, but as observers there were many of them whom I should not want representing me and watching my competitors. It was the weakest point in the tour, and no one but the entrants themselves can be blamed.

I rode in the same car all but two days; the observers were changed every day. One said to me as we started: "Think I'll look over the rules; I haven't had a chance to read them yet." In questioning another as to how he came to be appointed, I found he was a friend of the entrant he represented and wanted to go on the trip for the fun of it. Another slept. I would give big money if I could sleep as that man did. I believe we could have put on a new spring and he still would have slumbered on.

Another said to me: "I use my own judgment; I don't follow the rules." Still another left the car with the driver and mechanic oiling up. They could have tightened up or made other little adjustments, though fortunately, or unfortunately, there was nothing to do on the machine.

Now don't imagine there were no competent observers. I know there were, but they should all be competent.

The tour was exceedingly well managed from start to finish; everything ran without friction, and when one considers the immense amount of detail involved, this is really remarkable. All moved like clockwork; there were no hitches, no delays. The route was well and carefully laid out and marked.

The contest committee hear observers' reports and pass judgment without knowing which car is in question. The chairman of this committee, the one dominant figure in the management, is a man with great executive ability, absolutely honest and fearless, doing at all times what, in his judgment, is best and right. A little more tact and consideration for others would, however, smooth his path a whole lot.

The gentlemen in charge of the hotel accommodations gave us the best which the several towns and cities afforded. They could not make bathrooms where baths there were none, nor change the hotel management; but we were as well taken care of everywhere as was possible.

The Pullman train of sleepers and dining cars were a decided success and reflected credit on the mind which conceived the idea. There were one or two disagreeable features incident to such an arangement during the hottest season in a hot country, but those who had been accustomed to travel and its consequent discomforts united in saying that the scheme was admirable.

There was a very general opinion among the men that favoritism was being shown a certain make of car. I know this to be false. It is true that in the early contests there may have been grounds for such a feeling, but there is no one connected with the present management who had anything to do with these earlier tours. But the car and the committee still get knocked. The car is a high-priced, well-designed, well-built car, with a well-organized crew, and is a logical winner under rules which compel low-powered, low-priced cars to compete on nearly even terms with cars of greater power and more expensive construction.

The rules under which this contest was run were formulated by a committee from the National Association of Automobile Manufacturers, working in joint session with the contest committee of the A. A. A.

The crews on the cars did a lot of talking about these rules, forgetting that they were formulated by representatives of the entrants themselves. Undoubtedly these rules are capable of betterment, but each car was entered with a full knowledge of the rules and "kicking" was a great waste of breath. However, it seems to be the opinion of the most experienced and thoughtful men that there was still too much laxity in the rules, and that penalties should be imposed for all adjustments, whether of

Teddy Day in No. 8 Pierce Following the Monotonous Prairie Road Through Eastern Colorado

carbureters or ignition system, or accessories, and that there should be a record kept of gasoline, oil and water consumption.

There is only one possible exception, and that is the adjustment of brakes, as a matter of safety, as drivers would run with brakes all gone rather than incur the penalties imposed for their adjustment.

The weaknesses developed in the contesting cars by this trip will be shown by the reports of the contest and technical committees. To an onlooker there appeared to be very little motor

A Reminder of Early Fighting Days in "Bloody" Kansas

trouble, penalizations being mostly for broken springs and retightening and replacing loose or broken accessories, fenders, feed pipes, etc.

The Press:

Drink to the press.
But do not press to drink
The gentlemen whose task is slinging ink—
They're usually men of sober views,
And never should be full—of aught but news.

We had about twenty-five along, and some were "slinging ink" and some mud, and some were sometimes full of news, and

Some of the Contestants "Talking It Over"

some were sometimes full of —— If you can think of any suitable rhyme fill it in. The gentlemen of the press were like any other group of mortals, all kinds, but mostly good fellows.

The representatives of the strictly automobile publications have done some "classy" work, and should be proud of it. But oh, you press men—who write stuff to fill space in the dailies, why cannot you give us something near the facts? Of course, we dont expect too much, but just get *near*, and couldn't you cut out the slush? This isn't my game, and I may not know what I am talking about, and, perhaps, the great benighted public wants that kind of "dope"; at any rate there was a lot of appallingly inaccurate news dealt out every day about this tour.

And now before I go back to the hardware store with my hammer, just one word about the "grumblers." Fault-finding, as a rule, is a pretty good proof of lack of knowledge or experience. The man who lives in luxury at home, or who is widely traveled, learns to accept conditions as he finds them on such a trip as this and make the best of everything. The strain of the long, gruelling ride began to tell on the nerves of the men, and toward the end of the run there was a good deal of "kicking" about things that would not have ruffled them at the start. You can't drive two hundred miles a day, over rough roads, and then be out with a "Floozy" all night, or attempt to fill a contract to make a dry town out of a wet one and then get up at 5 a. m. and find the steak tender and the service prompt.

The cup donor, Mr. Glidden, who has been on every tour, was with us every day, a most genial gentleman, meeting old acquaintances and making new ones everywhere, always thoughtful and courteous, making his speeches short and his hand-clasp long—a prince of good fellows!

And now it is all over and up to the technical committee (whom may Heaven protect), and the drivers, mechanics and observers are up in the convention hall, where the battered, "throbbing monsters"—see daily papers—have ceased to throb and are receiving bi-manual examinations by the two gentlemen constituting the committee, preparatory to being operated upon for the complete restoration of their mechanical health, while I am sitting, this scorching Kansas afternoon, in my hotel bedroom with my Apollo-like figure decorated with a fountain pen and a briar pipe, pushing the one and pulling the other and computing the fabulous price I would willingly pay for a long draught of cold, clear Vermont spring water.

Kansas City, Mo.

Hotel Accommodations Handled by an Expert—One of the hardest jobs in connection with the big tour is the apportioning of sleeping accommodations. The man who handled the task this time was Glenn A. Fargo, of the Hotel Lafayette, Buffalo, and while it is true that he, like all others who preceded him on the job, had some kickers, it is a fact that his work gave greater satisfaction than has ever been experienced before on the tour. He preceded the tourists as long as they were booked for regular hotels, and from Fort Dodge to Kansas City he was major domo of the moving Pullman hostelry.

NOTED AT THE TOUR'S CONCLUSION

Why Hower Used the Train—It seems that Chairman Hower is one of those who suffer much from hay-fever, and the dust of the road aggravated the complaint excessively. Hence the chairman had a very good excuse for his frequent utilization of the train, and thus had the opportunity of enjoying his private car a la Harriman.

Detroit Trophy Winner Used Diamonds—Diamond tires are represented in the winner's list by the Chalmers-Detroit car which captured the Detroit trophy for toy tonneau cars. There were twelve cars to start with Diamond equipment, one of them with solids, but for reasons which had nothing to do with tires, three dropped from the ranks en route. Nine cars finished with the Diamonds, two of them with perfect scores.

Tour's Physician Was an Observer—This was the first national tour in recent years in which there has not been a regularly appointed surgeon riding behind the contestants. The medical honors of the 1909 tour belong to Dr. T. F. Seymour of Mishawaka, Ind., who rode as the observer from the American Simplex interests. His compact medical case was called upon many times by the tourists en route with successful results.

Goodrich Tires on Glidden and Hower Winners—From the point of tire equipment the Goodrich Company was again successful in the winning of the Glidden end, for the third time, the Hower trophy. In this year's contest twelve cars started with Goodrich tires and every one of them finished, six having perfect scores. On the dozen cars there were but 17 punctures among 48 tires, and the long hard days of driving over rough roads made the trip a thorough test upon them.

Samples of Kansas Wheat—Soon after crossing into Kansas, one enterprising wheat-grower, J. E. Fitzgerald, of Weskan, saw to it that some excellent samples of Red Norway spring wheat were tossed into the passing cars. It is not positively known, but it is among the possibilities that some of the 1909 Gliddenites may later be found located on Kansas farms, for Mr. Fitzgerald stated that the samples donated were from seed sown in the last week of April, which meant a great yield for three months' growing.

"The Transcontinental Tour is possible now," said George Schuster, winner of the Around-the-World race, "for cars have passed through hardly more in this tour than they will be called upon to go through in a trip from coast to coast. It is evident that the rules will have to be made even more strict, and I believe that cars should never finish with a perfect road score after breaking parts on the road that are not repaired. For instance, one car broke a spring, and drove through without repairs, securing a perfect road score. Road breakages when not repaired should bring a penalty immediately and put that car out of the perfect list at once."

The Steamer Which Used Kerosene—A feature watched with special interest was that the White Steamer used kerosene, or "coal oil," instead of gasoline. The new fuel worked splendidly throughout the long journey, and claims made in its behalf were well proven. First of all, as regards cheapness, the White driver secured kerosene all along the route from 6 cents to 10 cents cheaper per gallon than was paid for gasoline. Secondly, the new fuel was handled without any precautions, and it was not unusual to see kerosene being poured into the fuel tank while the crew of the car and an interested crowd stood by with lighted cigars and cigarettes. At the finish of the tour the White was the only car permitted to enter Convention Hall, where the technical examination took place, without draining its fuel tank. Thirdly, the new fuel proved to be absolutely without smoke or smell. Fourthly, kerosene could be purchased at whatever part of the route was most convenient, and not once during the trip through the ten States of the Middle West was there found a grocery store where kerosene was not readily and cheaply obtainable. Finally, the amount of fuel used on the trip showed that kerosene is at least fifteen per cent. more efficient, gallon for gallon, than gasoline. The car in other respects made a most creditable showing. The only adjustments or repairs charged against the car were tightening a lubricator pipe and wiring a damaged mudguard. These penalties were not inflicted until more than 2,000 miles had been completed with an absolutely perfect score.

Brush Runabouts with a Self-Explanatory Sign


Bernhart's Jewel, Which Survived Rough Roads Creditably


A Patriotic Plainsman and His Growing Family

The White Sends Out a Warning to Those Behind

THE AUTOMOBILE

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1909'S TOUR AND 1910'S TOUR

Never before, here or abroad, were automobiles subjected to such a severe, prolonged, and diversified test as that necessitated in the A. A. A. endurance tour which came to its conclusion Friday last at Kansas City after fifteen days' running. Any car surviving this arduous reliability examination, with or without excessive penalization, need have no fear of meeting the requirements of owners who demand vehicles of no uncertain manufacture, capable of withstanding unusual and unexpected strains, and at the same time possessing speed in quantity sufficient to satisfy any reasonable man who does not use the public highway as a race course.

The concerns which openly proved the worth of their products in the tour just ended will profit commensurably by what their cars accomplished, to say nothing of the great cumulative value which follows as a sequence of the multiplied repetition of the names in print. Unconsciously, the public associates almost in a class by themselves, those cars which participate in national events.

But the 1909 tour had a disappointing entry, and reasons therefor are not all agreed. Through experience one learns—and this sixth tour of the governing organization will enable a better reliability to be conducted another year—if one is wanted. If a big endurance tour is still an asset to the industry—and we are inclined so to believe—it deserves a more unanimous support from the trade than was accorded this year. To secure this endorsement it would appear that the thing must be gone at in an entirely different manner.

Let us start out on the supposition that twenty makers believe in a national tour of some kind; exactly what, would have to be settled at a conference called for the purpose. It is decided that the industry can well afford to support such an event, and that all engaged will have a chance to benefit in a more or less degree, it being taken for granted that winners will profit the most from a publicity consideration.

It being the unanimous sentiment of the twenty that a tour is wanted, the twenty then and there guarantee one or more enteries, and furthermore deposit one-half of the entry fee. This would insure a representative field and add substantially to the benefits accruing.

Then would come the drafting of the rules, and such a drafting as would leave nothing to the discretion of the contest committee except the enforcement of the plainly worded regulations;—no handing to contestants penalties decided upon at the eleventh hour.

And right here it is urged that the tour be divided into two distinct departments, one having to do with the business direction of the event, and the other to be concerned solely with the competitive feature. One man should not dictate the entire situation, no matter how well he might be qualified for the position, for in this American republic there is an inbred dislike to monarchial control. It does not always follow that a good business man is equally successful in looking after details of a technical nature, which in their entirety should be left to a competent committee, without any possibility of interference from any other source. This is a vital point in connection with another tour.

It is a foregone conclusion that microscopic examination at the end of a tour can be utilized in bringing about the selection of so-called final winners. But some method should be evolved whereby first-class certificates should be issued to all contestants finishing within a maximum loss of points, say not more than one hundred, for the entire tour. In other words, this would mean a physical catechising of the cars such as would require a degree of reliability sufficient to satisfy even the most exacting buyer of an automobile.

In any sort of an examination very few ever pass at 100 per cent, and consequently it is logical that machinery, in its performance, should have the same kind of a chance as man, and all the glory of the tour should not go to the car which perhaps may have been a little more fortunate than the others in escaping ruts and stones that bestrew the path.

Coincident with reliability, the general public is beginning to associate economy. Next year's run should include exact information as to consumption of gasoline and oil, and, in order to make the figures more understandable, it would be well to have the contest an exact distance, say 5,000 miles. Thus the cost per mile per passenger, and all sorts of newsy statistics, could be extracted from the results of the tour.

But, first of all, let the manufacturers themselves decide as to whether they want a tour, and until then the A. A. A. should decline to go forward until it is evident that its services are desired. At the same time, no one questions but that the enforcement of the rules, after made, should rest entirely with the contest committee of a disinterested organization.

Characteristics of Piston Rings

Chapter IX

LEAKAGE by the pistons in cylinders of motors is one of the difficulties which is prone to manifest itself as the product of wear in regular service after a time, and even in new motors unless the work is most carefully done. Compression, which makes for power next to a balanced fuel mixture more than any other one point, will be lost if the piston rings are not tight, owing to the clearance which must be given to pistons, in view of the great heat raise and temperature variations as well.

To a vast extent the life of motors in actual service is coupled to profuse lubrication, using suitable grades of lubricant for the purpose, but the piston rings must be properly made, of proper materials, and nicely fitted as well, in order to make care and lubrication worth while. Trouble from inferior piston rings will be the most conspicuous when the compression is high and when the speed is low. This follows, since if the compression is high the explosion pressure will be much accentuated, and the higher the pressure the greater will be the pressure leak, heat change, difficulty in lubricating, and wear on the rings. If the speed is low, the time for the compressed charge to leak by will be prolonged, and, incidentally, if the stroke to bore is relatively long, the time will be prolonged on this account.

From what has been said, then, it is plain that the piston ring question becomes of the greatest importance in connection with long stroke, high compression, relatively slow speed motors, and granting that this type of motor will afford an increased energy output under refined conditions; even so, if the work is indifferently done the results will be disappointing.

Success Depends Upon Quality of Material—While rings are made of cast gray iron, even so, the quality must be of the finest. The castings from which the rings are turned may be in the form of a tube long enough to allow of turning out enough rings for a motor, and in a "six," if the rings are 5-16 inch face, using four to the piston, considering the material wasted in cutting off, the cast tube will have to be at least eight inches long, to which must be added the "accommodation" pieces, by means of which the tube is held in the jaws of the "chuck" of the lathe. Other length will be in proportion.

If the rings are to be 1-4-inch radial thickness when finished, the radial thickness of the tube must be more by an amount sufficient to assure that the rings will finish up. It is desirable to limit finish, since the superior metal will be found close to the surface of the casting. If 1-16 inch is allowed for finish on the exterior as well as interior of the cast cylinder, and if the walls are of uniform thickness all over, there should be little trouble in turning out good rings, provided the castings are poured from a good cupola charge, at the right time, at the instance of a "gaffer" of skill.

Rings Are Turned to a Greater Diameter—Since the finished rings must be of greater diameter than the bore of the cylinder by an amount equal to the difference in diameter of the bore and the piston, plus the amount of spring required in the rings to cause them to press against the cylinder walls firmly, they must be finished to a greater diameter, after parting, when the slip joint is made. This is done in a clamping chuck, and the same chuck serves for grinding the surfaces of the rings in the finishing process.

Extract from Vol. 1., Part II., Chapter IX., of a set of books, in preparation, by Thos. J. Fay, covering all phases of automobiling, from the point of view of designers, constructors and in actual service.

Grinding Is Necessary if Results Are to Be Good—Rings are usually ground on their faces by means of a special tool in which a magnetic chuck is the conspicuous feature. It would be very difficult to hold the lighter types of piston rings in any other form of chucking device, and even in the hands of machinists of great skill the rings would probably deform as a result of jaw chucking. The magnetic chuck alters this, and all that remains is to grind the surface of the rings after they are "parted" from the cylinder from which they are being made, and at the slip joint. Considering this plan, the rings are first reduced to near diameter in and outside (allowing about 0.010 inch for grinding) in the wroughing process.

Grinding is of the greatest advantage, especially in connection with cast iron, which is not of uniform texture, owing to the presence of a certain amount of white iron, which is very hard,

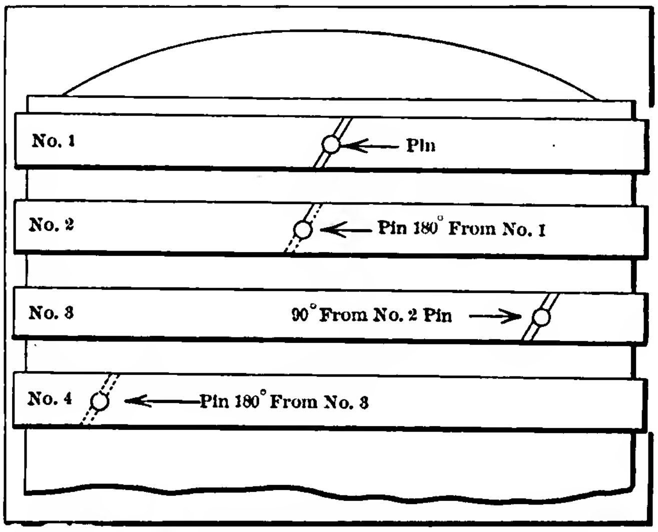


Fig. 1—Rings are placed to break joints and prevent direct leakage

and the effect of these hard zones, since the tool is prone to back off as it enters them. This is not, under ordinary conditions, a matter of great moment, but in piston ring work, since the rings have to be accurately made if they are to be of the greatest utility, grinding is the best practice.

Rings Are Pinned to Break Joints—Referring to Fig. 1, it will be observed that the four rings are so placed on the piston, in the ring groove, that none of the ring joints is in the same vertical plane, nor is the distance between any two joints less than 90 degrees. The joints of the second and fourth rings are shown in dotted lines, and in the first and third rings the pins show at the joint sufficiently plain to indicate the manner of profiling the rings in order to accommodate the pins.

There is some chance of the pins drifting out if they are not a drive fit, and that this work should be done by a fitter of more than ordinary skill is indicated by the amount of damage that a pin, if it drifts out, will do to the bore of the cylinder. If the dowel pins are made with two diameters, as shown at F, Fig. 5, they will be locked in place, since the shoulder on the pin, if the pin starts, will intercept the ring and be prevented from drifting further. Dowel pins are usually about 1-8 inch in diameter, made of Bessemer rod, and carefully hand fitted, in

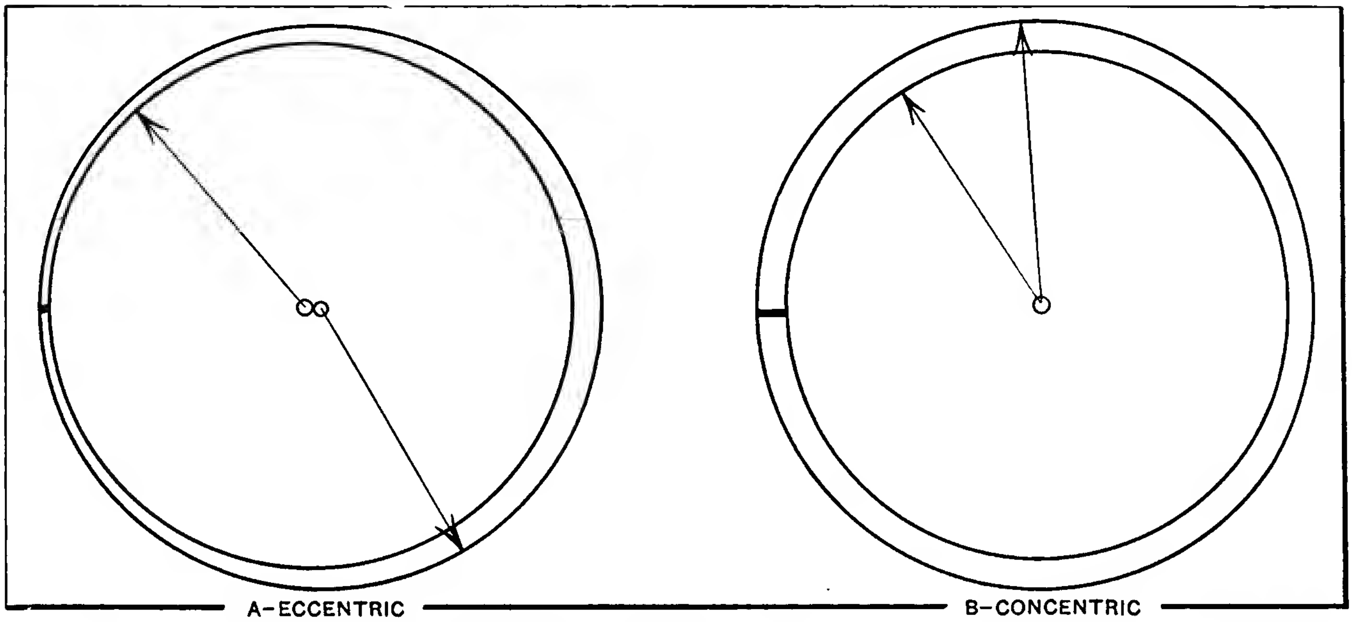


Fig. 2—Eccentric rings are designed to afford an even pressure, and concentric rings are peened to afford the same results

order to render them so tight that they will not start, even though they are fitted with a shoulder for locking purposes.

The mere fact that dowel pins are used at the joints constitutes no good reason for carelessness in fitting the rings at the joints; they will leak a little, perhaps, when the work is very well done, and any such leak will detract from the compression, hence from the power of the motor.

Spring Tension Must Be Equal All Around—The difference between rings, as used for packing, in motors for automobile work and motors in general lies in the use of rings of a small sectional area, carefully fitted. Since the piston speed of motors of the automobile type is even above 1,000 feet per minute, under full power conditions, it follows that the amount of power which would be wasted were the rings to press heavily far exceeds the allowable.

A very fair allowance for the power consumed by rings is on a basis of one horsepower per inch of ring depth, on the piston, at 1,000 feet per minute, considering a six-inch bore, which allows for a ring pressure of ten pounds per square inch against the cylinder walls. The several investigators who have given the matter attention report losses even as high as one and one-quarter horsepower per ring, which must show excessive pressure and inferior fitting when the loss is so great.

Some rings are made eccentric, as shown in A, Fig. 2, and the amount of eccentricity differs as between the several examples over broad ranges. The idea is to afford equality of pressure without having to do much fitting, and that the plan has considerable merit is generally believed. As a general proposition the difference in ring thickness due to eccentricity is in the ratio of 1:2, and since many motors are fitted as depicted in B, Fig 2, with no difference in thickness of the rings, it follows that the only danger lies in having the rings thin out too much.

When the rings are concentric, as shown in B, Fig. 2, it is the practice to "peen" them in order to lay the fiber, relieve the internal strains, or so distribute the ability of the metal as to render it capable of pressing out equally at all points in the diameter. For this purpose a peen hammer, in the hands of a man of skill, is used to peen the rings by striking against the inner surfaces at equi-distant points. The blow must be carefully regulated and the backing must be rigid, in order not to fracture the rings. The process is one of compression, and by bruising the metal at equi-distant points it may be shaped in or out to suit the occasion, and the amount of pressure the ring is to exert may be regulated by this process.

Joints Are Made in Divers Ways—Referring to Fig. 3, A represents a joint which finds a place in many makes of motors, and when the surfaces are parallel and closed, as shown at B, when the piston is in place and "hot," it works very well. The overlap joint, shown open at C and closed at D, is probably better, since the parallel surfaces of the joint will help to main-

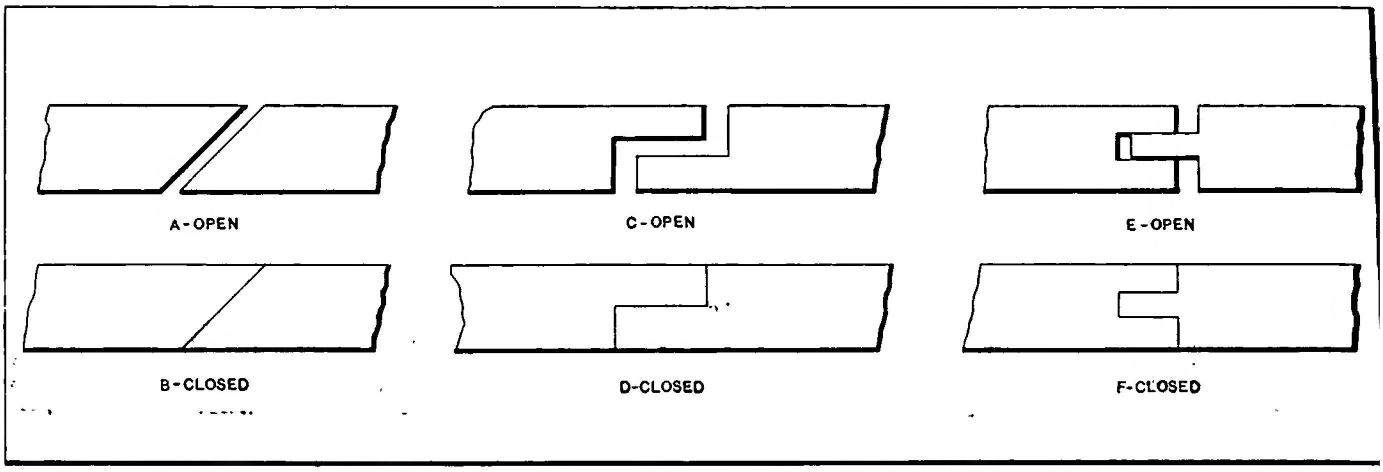


Fig. 3—Slip-joints of rings are made in divers forms, all with the idea of defeating leakage at joints as well as around the bore

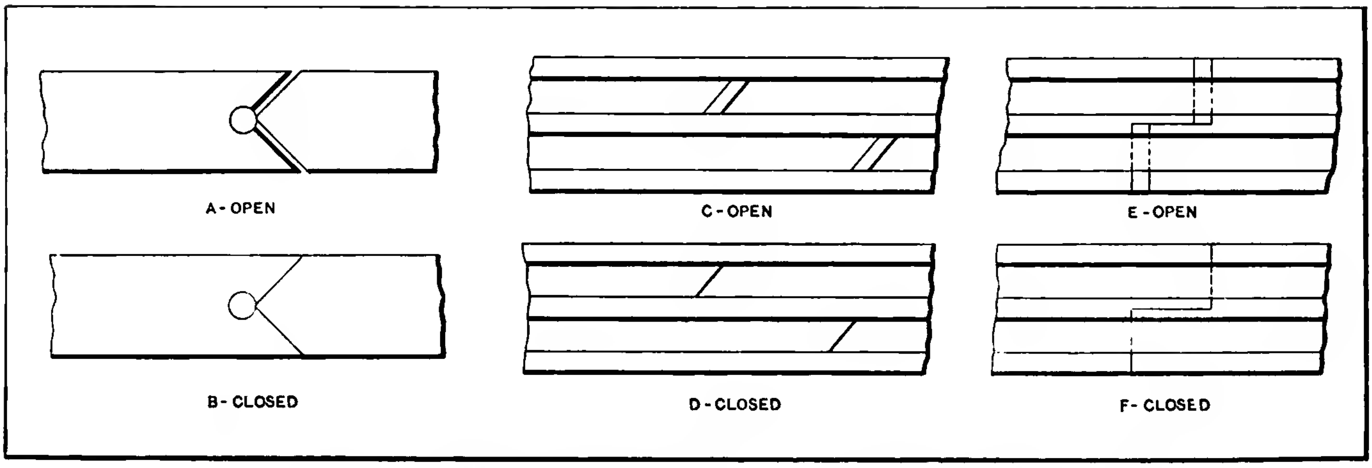


Fig. 4—Other forms of ring-joints, some of which are much in vogue, and others but little used

tain tightness, without having to figure upon the difference between cold and hot conditions, which is a difficult matter. This joint requires good fitting, or the surfaces at the joint will fail to be tight, but the joint, E, in the form of a tongue, is even more difficult to make, and it offers no advantage over the one previously mentioned, for the reason that there is but one set of surfaces in contact when the piston is traveling in one direction; this joint is shown closed at F.

Fig. 4 represents another series of joints, and A represents a modification of A, Fig. 3, which modification is without special merit, although it is probable that this joint will work very well when the fitting is well executed. A joint which is used in compressed air work more than in motors is shown at C, D, E and F, Fig. 4, and it is really a nest of rings, with one large ring supporting two smaller ones. The two smaller rings are shown open at A and closed at B; it will be observed that they do not have their joints in the same vertical plane, and the joints should be spaced at least 90 degrees from each other around the piston. At E the joint of the master ring is shown in the open position and closed at F. This joint is designed to come at a point remote from the joints of the nest of enclosed rings. In this way any leakage at any one joint will be headed off, since it will have to pass around the piston at least 90 degrees before it will intercept another joint. Time is a great factor in this class of work, since, if the leakage is impeded, the piston will perform its functions ere the leakage will diminish the power to a material extent.

Bearing Surfaces Must Be Parallel and Close—The rings, to be tight, must press against the walls of the ring grooves on the top and bottom sides alternately, depending upon the direction of travel of the piston. For tightness all depends upon the quality of surfaces and parallelism. The rings must not press against the radial bottom of the groove, and in order to prevent this the groove is made deeper than the thickness of the rings in the radial plane. The difference may be even 1-64 inch, and it is also true that the rings will not press against the top and bottom faces of the grooves simultaneously, since they must be free to move, in order that they will accommodate themselves to the differences in diameter of the cylinder and to the lateral play of the piston, which may not be without clearance.

Fig. 5 depicts the relations, and clearance is shown back of the rings. When the piston is in place in the cylinder the rings protrude a few thousandths of an inch, depending upon diameter and temperature, but when the piston is out of the cylinder the rings protrude considerably, which is an indication of the spring tension of the rings against the walls of the cylinder. If the rings do not protrude when the piston is out of the cylinder it is a sure sign that they will fail to perform their allotted functions when they are in place. In the process of peening it is the aim to make this difference such that the rings will press evenly all around against the walls of the cylinder when the piston is in place, but it is not desired to have the pressure above, say, 10 pounds per square inch. If, in peening, the rings are damaged even to a slight extent, it is necessary to scrape them to a true bearing, and in some shops they are scraped (even if the grinding process is well done), besides grinding. That a skilled workman will be able to make a good fit by scraping is proven by the good performance of many motors in which hand fitting is resorted to, and despite the use of special machinery in the process, it is proper to consider a certain amount of hand work. Damage, more than advantage, will follow, if the workman who is awarded the task of scraping is lacking in skill in the process. Even if the artificer is skilled, the facilities must be in keeping with the exacting nature of the work to be done, in order that the results will be up to a fitting standard.

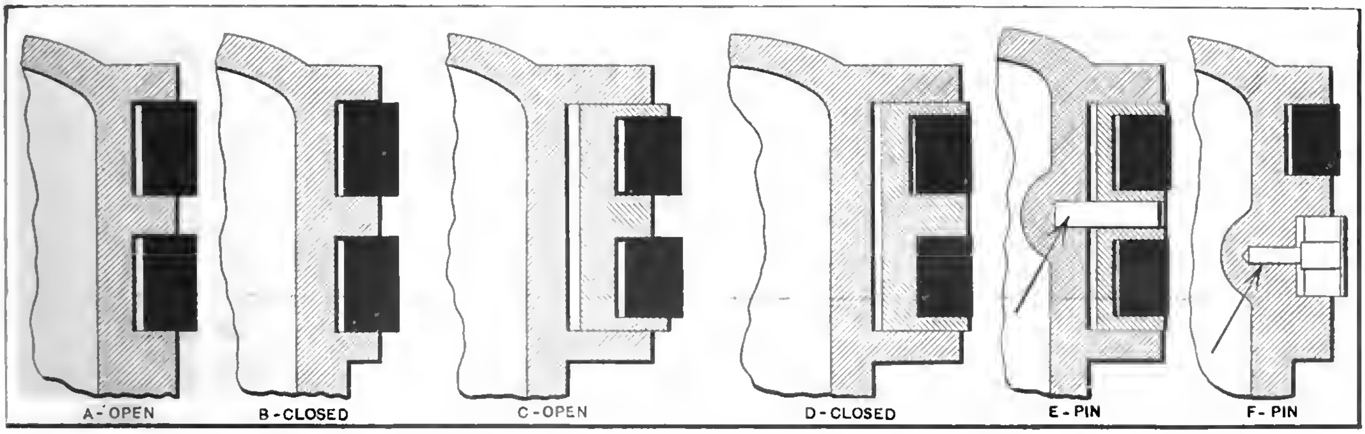


Fig. 5—Sections of pistons showing clearance back of rings and means for fastening dowel pins in place

In Fig. 5, A and B depict individual rings, of which at least three are used on each piston, and at E a dowel pin is indicated, which has the facility of preventing the ring from floating around so that joints will ultimately come in the same vertical plane. C, D and E show the nesting system of rings, indicating clearance behind the master, as well as behind the nested rings. E depicts a dowel pin for the master ring, and it will be understood that dowel pins are used for the nested rings at proper points; they fasten into the metal of the master ring.

Piston Rings Must Be Carefully Handled—In the process of fitting, if the artisan is not dexterous, they will be "sprung" out of shape, and when in place will fail to conform to the curve of the bore of the cylinder; if the rings are gently pressed over a set of thin, wide, flat blades, and thus sprung to a sufficient diameter, uniformly all around the circle, they will slip over the piston and into the slot without being damaged.

If they are fitted by a man of great skill and a certain amount of scraping is done to render them fit, they will have to be removed and replaced a number of times, and the chances of doing damage are very great; the process, as above indicated, will abort such tendencies to a marked degree.

A close scrutiny of the finished rings is essential to good success, and the inspection department, in the shops which turn out quality cars, are fitted out with facilities such as will enable the inspector to arrive at exact conclusions. A microscopic examination of the materials is also of value, and conclusions may be reached as the result of comparison, using a specimen, of known quality to go by.

CONNECTING RODS MUST BE LIGHT AND STRONG

BETWEEN the crankshaft and the piston for each cylinder of a motor, it is necessary to employ a connecting rod, and in view of the inertia effect on the mass, following rotation, and reversal of direction of motion, it is necessary to design the parts in such a way as to limit weight, or else the stresses in the section of the crankshaft will be such as to limit the speed, hence power, of the motor.

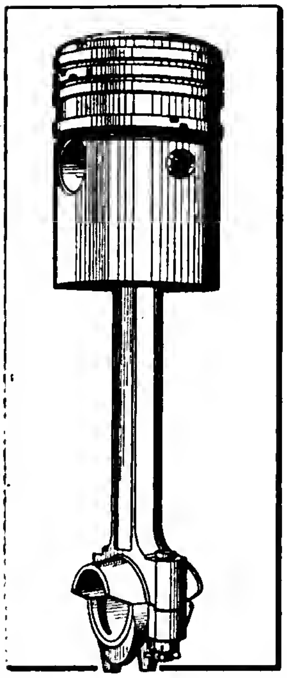


Fig. 1—Conventional design of connecting rod and relating parts in place

Fig. 1, depicts a design of connecting rod, of the I section, with every evidence of lightness, and strength at all points conforming to the requirements. The crankpin end, which is most likely to influence the results, is made light by using two bolts, and cutting away the cap, on which pressure is relatively light. At a point, 6-10 up from the center of the crankshaft bearing, the section with relating proportions, as shown in Fig. 2, and the taper of the connecting rod is on a basis of 3:2 from the crankshaft end.

In many examples of good connecting rods the cap is bolted on by means of four bolts, rather than two, as shown, and the cap is extended out in replica of the half of the bearing on the connecting rod.

Connecting Rods are Subjected to Various Influences—Compression, tension and flexure will be present in these members, in magnitude, depending upon the following:

(A) Compression due to the pressure of the gas, in compression, and on the power stroke.

(B) Tension, due to inertia.

(C) Flexure, primarily in view of the angularity of the connecting rod, and again, in a kinetic sense.

Compression, due to gas pressure, will decrease as the speed of the motor is increased, due to the restricted flow of gas at the higher speed, which is proven by falling torque with increasing speed as shown by a torque test.

Tension will decrease as the angularity is increased, which is a matter of the use of shorter connecting rods, considering a given stroke; it will also decrease as the weight of the members is reduced. It will increase with increasing speed. Tension will decrease with the shortening of the connecting rod, for a given stroke, due to the influence of side pressure, as well as on account of the reduction of the weight which naturally follows if the length is very much reduced.

Flexure will increase as the connecting rod is shortened, for two reasons: *a*, in view of increased angularity, and *b*, following augmented side pressure. Ability of the connecting rod to withstand flexure increases as the rod is shortened, so that a compensation is introduced by the very method that brings on the tendencies.

Rational Column Formula, Involving Least Radius Gyration—If the material is drop-forged mild steel of a good selection, the constants for wrought iron will serve very well, and the formula may be written thus:

Let,

p = ultimate strength per square inch.

l = length of connecting rod in inches.

r = least radius of gyration for the section.

when,

$$p = \frac{40{,}000}{1 + \frac{1}{20{,}000}\left(\frac{l}{r}\right)^2}$$

Since the above formula solves for the ultimate strength it is necessary to consider a factor of safety, and in view of the ills of excess weight, this factor should be limited, which may be done if the material used is from a careful selection. A factor of safety of 4 would seem to be adequate.

The Use of Bronze Is Deplored—Under no circumstances can the use of bronze for connecting rods be justified; it is high priced; of limited kinetic ability; likely to hold hidden flaws, and limited in ability from the point of eccentric columns. Die frogings of steel are not high priced, they may be of great strength, and under proper conditions the machining process is a simple operation, attended by great accuracy, and with full assurance that "wasters" will be reduced to an infinitisimal percentage. The formulae, as given, may not, with safety, be used in connection with bronze.

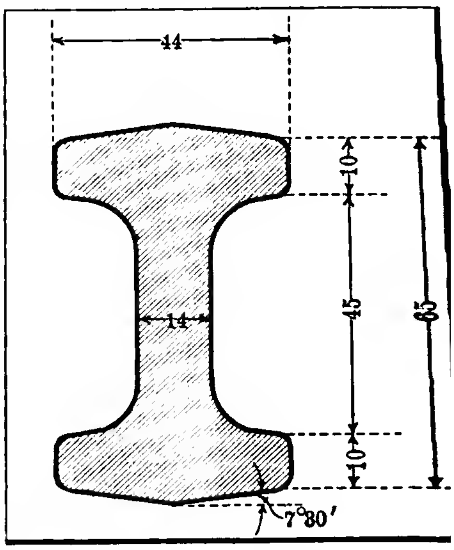


Fig. 2—Economical form of I section as used in connecting rod work

SCIENCE OF JUMP SPARK COILS*

By J. A. Williams

AS used in gasoline engine ignition, the jump spark coil occupies rather a neglected place in the art. The reason for this lies in the fact that because it is apparently a very simple piece of apparatus, and the principles under which it operates are supposed to be so well known, comparatively little electrical engineering thought or effort has been applied to its development along the best lines.

It is generally supposed that a jump spark coil consists of a core of soft iron wires, surrounded by a primary winding of comparatively few turns, which is surrounded by a secondary winding of relatively a great number of turns, a vibrator for interrupting its circuit, and a condenser for absorbing the extra current of induction, as it is called, or the spark at the points. This definition seems to pretty thoroughly cover the average man's idea of a jump-spark coil.

The jump-spark coil when properly designed and constructed, and used in connection with the proper system of jump-spark ignition, will do even more for stationary engines than it has for the automobile or motor boat.

The difficulties to be overcome in automobile ignition are relatively easy, as compared with the conditions to be met with in stationary engines. Practically all automobiles have reasonably low compression and use mixtures quite rich in gasoline vapor; for economy of fuel in the automobile art has not been considered a necessary factor, and it has been partly sacrificed in order to obtain greater reliability.

In the modern engine, compressions have been carried to the very limit permissible with the kind of fuel used, with the end in view of getting the greatest possible fuel economy throughout all the various ranges of load.

The iron wire core consists of a bundle of soft iron wires and occupies axially the central position in a spark coil. The iron wire used should be extremely soft, possess great magnetic conductivity, and the property of instantaneous and complete demagnetization. The function of the iron wire core is to receive from the primary winding and store up in the form of magnetic energy, the electrical energy that is applied to primary winding.

The primary winding consists of a few turns of heavy, well-insulated copper wire of high conductivity. In the usual coil it consists of from 200 to 300 turns. The function of the primary winding is to receive the battery or magneto current and circulate it around the iron wire core, so as to charge it with magnetic lines of force. Furthermore, it has an additional function in acting as the primary winding of a transformer when operating under the condenser discharge and producing a secondary spark in the secondary winding.

Very Many Turns to the Secondary—The secondary winding consists of a great many thousand turns of very fine silk insulated copper wire and surrounds the primary winding. The function of the secondary winding is purely that of a transformer, as it multiplies the voltage of the primary winding and at the same time reduces the amperage in a ratio entirely dependent upon the number of its turns, as compared to the number of turns in the primary. For instance, if there are one hundred times as many turns in the secondary as there are turns in the primary, then there will be one hundred times as many volts in the secondary as the condenser discharge delivers to the primary winding and conversely one hundred times less amperage in the secondary winding than there are amperes passing through the primary, due to the condenser discharge.

The vibrator of a spark coil consists of a stationary electrode which is tipped with a platino-iridium point and a movable or vibratory electrode which consists of an iron wire core and is held by spring tension away from the iron wire core and keeps its own platino-iridium contact in firm contact with the platino-iridium point of its stationary member. The function of the vibrator is purely that of a circuit breaker. It simply breaks or interrupts the primary current and stops the flow of primary current when the iron wire core has been charged sufficiently strong with magnetism to produce a satisfactory secondary spark.

The condenser consists of a number of alternate layers of tin foil and mica, or tin foil and properly prepared paper. So many of its sheets are positive, are connected together, and lead to one electrode of the vibrator. An equal number of its sheets are negative, connected together, and lead to the other electrode, but are insulated from the positive sheets by means of mica or paper, but usually the former.

Functions of a Condenser—The function of the condenser is not, as commonly supposed, merely to stop the sparking at the platino-iridium points when they interrupt the current. True, it performs this function, but merely incidentally. Its true function is to receive the kick of the coil, thus receiving and storing the impulses of electricity generated in the primary winding by the rapid demagnetization of the iron wire core upon interruption of the primary current, then instantly surge or throw this increased amount of electrical energy through the primary winding.

This is the principle that all dynamos or mechanical generators of current operate on. It isn't the mere fact of possessing lines of force threaded through the axis of the winding that creates a current, but it is the rate of change that produces current. An increase in number of the lines of force will produce an increase of voltage or current in the opposite direction. We therefore see that the rapid abstraction or accretion of lines of force will set up a powerful electromotive force or voltage within the primary winding. This electromotive force charges the condenser with a heavy current of strong voltage. The condenser in turn reacts in the opposite direction and sends a strong current through the primary winding, which in turn demagnetizes the iron wire core. It in turn rapidly demagnetizes and sends a surge of current back into the condenser, thus creating an oscillatory effect. This produces by induction several surges of current back and forth through the secondary winding.

Now as the turns of wire in the secondary winding of this particular coil are one hundred times greater than the turns of wire in the primary winding, the voltage in the secondary winding is one hundred times greater than the voltage set up by the discharge of the condenser in the primary winding, and is of sufficient strength to jump a long air gap or to shoot the compression in the cylinder of a gasoline engine.

It is common knowledge that the arc produced by a kick coil between the electrodes in the cylinder varies from 75 to 100 volts, according to the size of the kick coil and the amount of current used in charging it, yet the battery that is charging the kick coil may be only four or five volts. The increase in voltage is due entirely to what is called the extra current of induction, or what is commonly called "the kick of the coil." On account of having a condenser which absorbs or prevents sparking at the circuit breaker points on the vibrator, the voltage induced will be very much higher than that produced by a make-and-break spark, or "kick coil," where the demagnetization of the iron wire core is slower on account of having an arc or spark through which to let the current pass gradually.

*Extracts from a paper read before the National Gas and Gasoline Engine Trades Association, South Bend, Ind., June, 1909.

In summing up the action of a spark coil, we are brought face to face with the enormous importance of the condenser and the large part it plays in energizing the coil and producing the spark. Without the action of a condenser it would be impossible to produce a jump spark of sufficient intensity to ignite the charge.

The spark produced by a single interruption, while it looks just like one spark, if split up and analyzed, will be found to consist of several sparks; the first one will be the largest, representing the first surge of the condenser through the primary winding, and each succeeding one smaller. In other words, the oscillation dies out just as would the oscillation of a pendulum.

Spark Coil Builders' Greatest Problem—The greatest problem in spark-coil building is so to proportion the condenser and windings and so build the coil that there will be just as few oscillations of the condenser as possible, thus giving to each oscillation a greater amplitude, causing a larger spark more dynamic in its character and of greater heat value. With an improperly proportioned condenser and improperly insulated windings, the condenser discharge becomes very rapid and consists of a large number of small oscillations, which produces a static spark of no heat value and, consequently, worthless for ignition.

There is one very important feature of the action of a jump spark coil. This is the extra or additional condenser effect that is set up between the primary winding or the coil and its secondary winding, due to the common practice of connecting one end of the secondary winding to the primary winding.

When using a spark coil under these conditions, the more turns of wire on the secondary and the longer the spark gap, the more highly charged becomes this condenser.

The secondary end of the winding connected to the plug forms one plate of the condenser, and the primary winding, together with the engine, and all other parts which are connected to the primary, form the other plate of the condenser.

Now for jumping a small gap or shooting a rich mixture of low compression, when no great electro-static stress or strain is placed upon this self-constituted condenser, but when a coil of this type is used on stationary engine work, where high compressions and thin mixtures of high electrical resistances are met with, it is practically impossible to create a dynamic spark of large heat value, for the energy of the secondary current all goes into charging this unwelcome condenser, and rapid oscillations are set up which renders the spark static and of no heat value.

Improved Insulation Aggravates This—One might think that this condition could be easily overcome by having extra good insulation between the primary and the secondary winding. The fact of the matter is, the better the insulation you use between the two windings, the more aggravated these conditions become, because, as a general rule, that insulation which is the best also has the highest specific inductive capacity. A glass tube or a mica tube would be the very worst insulation to use between the primary and secondary on account of this property of high specific inductive capacity. The best that can be done is to use an insulation of sufficiently high resistance to prevent direct discharges or punctures between the primary and secondary winding, and at the same time have as low a specific inductive capacity as possible.

The only way in which this extraneous and deleterious condenser effect can be practically eliminated is by bringing out both ends of the secondary winding and not grounding either end through the frame of the engine, the primary winding, or anything else; but each end of the secondary winding should run to its own spark plug.

I would suggest for all stationary engines of high compression the use of two spark plugs per cylinder so located in the cylinder of the engine that a circle drawn from each spark plug as a center, the circumferences of these circles touching each other, and also touching the diametrical, opposite sides of the cylinder bore, thus giving each plug a position as nearly central to each half of the compression chamber as possible. This would then give a pure dynamic spark under the adverse conditions of stationary engine ignition from any spark coil of good grade and sufficient size, and would give two instantaneous sparks at widely separated points, which would tend to complete combustion of the charges very much quicker than one spark emanating from one point only.

I wish to state here, and now, that it is absolutely impossible to make a jump spark coil that will shoot compressions of from 135 to 150 pounds with thin mixtures and do it with a dynamic spark where one end of the secondary winding is grounded. I therefore strongly recommend the use of two spark plugs per cylinder and the bringing out of each end of the secondary winding of the coil to these plugs. When used in this way it is easy to construct a jump spark coil that will give a dynamic spark of intense heat and of sufficient voltage to punctuate any compression and to shoot any mixture, no matter how thin or how high its electrical resistance.

It cannot reasonably be expected that a spark coil, which is only strong enough to properly shoot 60 pounds compression, will shoot 160, but larger spark coils should be used on heavy stationary engines. True they cost more money than smaller ones, but they can be made to last as long as the engine lasts, or longer, for if properly made there is nothing about them to deteriorate.

While I have not had an opportunity to test an engine with two spark plugs and with coil as above suggested, still at the same time I would hazard a guess or prediction that this form of jump spark ignition will be found to develop greater power.

INCOMPLETE COMBUSTION IS WASTEFUL

This phase of the subject is sometimes cared for without regard for details, and the magnitude of the saving which follows if the fuel is burned to finality,

(a) Carbon dioxide (CO_2), and (b) water (H_2O).

If some of the fuel is reduced to carbonic oxide, (CO) the loss is enormous, on that account, as the following figures will adequately show:

PRODUCTS OF COMBUSTION FULL AND PARTIALLY LOADED

	Full load	Partial load	Slow free
Carbonic oxide	3.13	6.9	—
Hydrogen	1.19	2.4	—
Hydrocarbons	0.30	0.9	—
Carbon dioxide	11.90	9.9	6.3
Oxygen	.23	0.3	11.2
Nitrogen	83.33	79.6	82.5
Total	100.0	100.0	100.0

Fuel value of carbon burned to carbon monoxide = 4,400 B.T.U.
Fuel value of carbon burned to carbon dioxide = 14,500 B.T.U.
Fuel value of hydrogen gas to water = 62,032 B.T.U.
Fuel value of hydrocarbon fuels to carbon dioxide = 20,000 B.T.U.

If we assume that the total as above given is 100 pounds, and taking the fuel values as above set down for the respective elements and compounds, it will be possible to show that the loss will be enormous if the combustion is incomplete, as, for illustration, 6.9 pounds of carbonic oxide (shown at the top of the column for partial load) would mean a loss of 62,790 British thermal units of heat (B.T.U.). What is more to the point, the 2.4 pounds of hydrogen would mean a loss of 148,877 B.T.U. In the same way, all the losses may be determined.

DETAILS ATTENDING SOLID TIRE USE

In pleasure vehicles, when solid tires are used, it is well to remember that the best performance will follow if the section of the tires is not too great. The diameter of the wheel should be considerably greater than is the practice with pneumatic tires, and the weight of the rim should be restricted; this is easily attained in view of the better performance if the tire section is reduced considerably below that which seems to be good practice in pneumatic tire work. In high wheelers, tires are not made with narrow tread to save cost, as some are prone to believe; the performance of the vehicles is better, due to restricting the "bounce" which would follow were the tires in greater presence.

LETTERS INTERESTING AND INSTRUCTIVE

CAUSE OF ENGINE MISSING

Editor THE AUTOMOBILE:

[1,965]—Can you explain why my four-cylinder four-cycle motor, which runs perfectly when under moderate or heavy load, skips badly when running idle or under light load? This annoyance continues regardless of the speed of the motor or of the adjustment of the carbureter. The carbureter is a Schebler. J. R. K.

Philadelphia.

Missing is almost invariably caused by the lack of a spark, and since you say nothing about your ignition system or troubles, it is practically impossible for us to give a correct or reasonable diagnosis of the trouble. It would be well for you to look over all wiring very carefully, as it sounds like a case of a wire with the insulation worn through. With the engine running rapidly, and therefore smoothly, this bare spot in the insulation is not disturbed, but as soon as the speed is reduced the vibration begins to be very noticeable. In this latter case, the bare spot in the insulation is moved against some metal part or something which is a good conductor, and a short circuit results. The result is that no spark occurs in the cylinder, and then what happens is that the cylinder passes an explosion, or misses, as it is more usually called. That the above is reasonably close to the real trouble is shown by the statement which you make to the effect that the trouble continues regardless of carbureter adjustment.

ENGINE ABILITY

Editor THE AUTOMOBILE:

[1,966]—On my car there is no control of ignition. That is, the magneto is fixed (which is the way very many cars are being turned out this year in France). Therefore, when the car begins to labor on a hill, the throttle being wide open, even when going very fast, but slowing down, a "knock" develops. The consequence is the throttle has got to be turned off some to stop this.

My chauffeur is anxious that we should get the control of the magneto on the steering-post, which it is possible to do, but we are both in doubt as to whether the engine would develop more power with the throttle wide open and a slightly retarded spark, or a more advanced spark and the throttle half open, as it is now. I am a little doubtful if I have made myself understood, but the following is our course now in going up a long hill:

We have our throttle wide open, the engine slows down a little, a knock develops; we close the throttle an inch or more, the knock ceases. Now, instead of reducing the amount of gas in the engine, if we could retard the spark gradually as the engine slowed down, would we get more power? AMATEUR.

Toronto, Ont.

If we understand your case correctly, it would not be advisable to make the change from the present fixed spark to a variable spark position. The only difference which this would make is that you would retard the spark very slightly on hills leaving the full throttle opening. As to power, it is doubtful if the engine would develop as much on the average, although the change would allow you peace of mind as far as hill climbing is concerned, which might be worth the sacrifice of some power.

To actually obtain the maximum power, not only a full throttle opening is necessary, but also the largest possible spark advance. Pulling ability on hills, which introduces a number of other variables, should not be confounded with maximum power, the former requiring a retarded spark from the very nature of the work being done, whereas the latter calls for the greatest possible advance.

Since you have asked for our advice, which you would not do unless you wanted it, we would advise against the change, on the ground that you would lose more than you gained, since you climb hills infrequently, but otherwise run the car much.

Another and a different chauffeur probably would want the control simplified as much as possible, while this one seems to want to have it complicated more than it now is. It might be interesting to you to know that the modern tendency is away from the hand control toward automatic.

IN RE SKIDDING

Editor THE AUTOMOBILE:

[1,967]—Regarding No. 1,955 in your last issue, "What to do on wet pavement," I have found it a good thing, when your car commences to slip, particularly when not going very fast, to apply the brake without removing the clutch. If this is done gently but firmly the rear wheels will straighten out quickly and without putting much strain on the engine. When going fast and your car begins to slip, either give "her" more gas or throw out your clutch and put over your wheel so as to throw your steering wheel in the same direction as you are slipping. If you can materially increase your speed your wheels will get a better grip on the road and straighten you out OK. ALBERT J. MAYER.

New Orleans, La.

The first part of Mr. Mayer's remarks sounds all right, but as to the last part we wish to take exception to the idea of turning the steering wheel in the same direction as the car is skidding. This would simply result, when the front wheels had reached a perfect right angle to the direction of the side slip, in increasing the latter, since the resistance at the pivot point (the front wheels) is thus reduced to a minimum. In other words, it would appear to us as if this mode of procedure would increase rather than decrease the amount of the slip. The advantage of increased speed at a time like this is also very doubtful. When the wheels are already slipping and so have no grip on the road surface, it is hard to see how greater speed will increase the grip on the road. In fact, it would seem as if, granting that the trouble is due to too high speed in the first instance, greater speed later would only result in more skidding and more trouble.

Pulling out the clutch cuts off the power from the wheels, with the result that the car drives itself rather than the engine. This seems to result in the elimination of the objectionable and dangerous side slip.

CLEANING OFF CARBON

Editor THE AUTOMOBILE:

[1,968]—Will you please tell me through "Letters Interesting and Instructive" if the carbon can be burned from the tops of the pistons and from the cylinder walls by pouring coal oil into the auxiliary air valve of the carbureter, while the engine is running? ROAD EATER.

Rossville, Ind.

No. This will not remove the carbon wholly, although it may take off part of it. The kerosene in combination with the jarring action loosens some of it, but as far as burning it off that is impossible, for the carbon is a residue from a burning action. The best way is to use a decarbonizer or else take down the entire motor, scrape it clean, and then paint with a very thin coat of paraffin. It is said that this will aid very materially in preventing the formation of more carbon.

The most important thing about the formation of carbon is to learn that it is caused by incomplete combustion, which also means fuel going to waste. So you should clean the motor and then run it so as to attain the whole use of the fuel, and thereby prevent the formation of future scale to be cleaned out later on. You know the old saying, "An ounce of prevention is worth a pound of cure." It holds good in this case.

ROTARY VALVE ENGINE

Editor THE AUTOMOBILE:

[1,969]—A bit of news that will be of interest to readers of "The Automobile" at this period, when all gas-engine designers are developing gasoline motors for automobile purposes, and especially (judging from interesting editorials in your paper), the subject of rotary valves.

There are a series of tests being made at Atlanta by W. H. and E. F. White, with a rotary-valve engine upon which they have worked in an experimental manner for four years. It looks from the tests as if they have hit the mark, and will be ready to demonstrate inside of thirty days, with a motor having rotary valves in the head, cylinders in block 3 1-4 in. x 5 in., ballbearing crankshaft, water cooled by the hopper arrangement.

This engine, in its operation, does away with valve stems, springs, camshafts, water pumps, piping and radiator. It is understood that it will develop for a long test under load 40 per cent. more power than the formula used to rate gasoline engines.

I understand that the engine will be on exhibition at the show to be held here in the fall. I happened to be one of the few that found out about the construction and tests, and knew that it would be of interest to your many readers to know that Atlanta is to have the first successful rotary valve engine on the market. Another thing: it seems that these young men should be brought to the attention of the manufacturers of automobiles. They have gone about their work very quietly, and one cannot gather any information from them whatsoever, nor do they ever mention it, which I think has been a mistake on their part, as it seems that publicity is what is needed in making an article of this class. I believe that you will do them a great turn if you will mention the fact in "The Automobile." B. F. ULMER.

Atlanta, Ga.

In the statement that the engine develops more power than the rating for this sized engine, Mr. Ulmer doubtless means the A. L. A. M. rating formula. According to this, an engine of the size mentioned would be rated at 16.9 or practically 17 horsepower. To exceed this by 40 per cent. would mean that the motor must develop 23.8 horsepower, which is not beyond the range of the possible.

The statement about rotary valve engines and Atlanta having the first (in case this one is successful) is a little bit overdrawn, since several rotary valve engines have been developed in this country and abroad. For instance, in THE AUTOMOBILE for May 13, was described a new French production, the Anzani engine, which was equipped with rotary valves. This motor is successfully running to-day, as is evidenced by the fact that Bleriot's monoplane, which has just accomplished the passage of the English Channel, is equipped with a three cylinder Anzani engine.

SUGGESTS BETTER ROUTE

Editor THE AUTOMOBILE:

[1,970]—Being an old subscriber to your magazine, and a member of the Executive Committee of the Capital to Capital Highway Association, I would ask that you allow me the privilege of correcting the route given in the July 22 issue of "The Automobile," probably furnished by the press, or the Herald-Journal scout cars, as well as some of the comment thereon. These cars did not follow the true Capital to Capital route south of Columbia, S. C., and thereby encountered much worse roads and a ferry. Both would have been avoided had they followed the route below Columbia, by way of Augusta and Crawford, instead of going via Elberton, Ga. We do not wish that the Capital Highway route be misplaced so early in the proceedings, and, in justice to the roads and our own work relative to the same, do not want to be held responsible for impassable roads and a ferry which do not belong on the proper route. We are not in any way out of sympathy with the Herald-Journal project, for their progress through the country has been of vast importance in the way of stimulating good roads everywhere, and in the neighborhood of routes covered particularly. I am inclosing a correct map of the Capital Highway.

E. M. WHALEY,
Pres. A. C. of Columbia.

Columbia, S. C.

Part of the map, the part dealing with the specific change suggested by Mr. Whaley as an improvement over the one previously given, is herewith reproduced. While an inspection of the new route on a large scale map apparently shows an increase in the distance from Columbia to Atlanta of about 20 miles, this, considering that the total is about 200 miles, and taking into account the elimination of the ferry and the vastly better roads, matters very little.

MORE COMBUSTION CHAMBER

Editor THE AUTOMOBILE:

[1,971]—I have read with interest your answer to my inquiry, published in the July 15 issue, "The Automobile," but your explanation strikes wide of the mark.

After going more carefully through Prof. Watson's article, I find that his figures for an hemispherical combustion chamber are not correct; thus, taking Case C for instance: the volume is given as 233 cc., the area as 205 sq. cm., and the ratio of surface to volume as .88. This volume means a diameter of 9.619 cm. or 96.19 mm., a surface of 145 sq. cm. and a ratio of .665.

The dimensions for my own cylinder reduced to metric measurements would give a ratio of .525.

Referring to the last paragraph of your answer, I wish to say that I have long ere this been convinced that the capacity of a vessel can not very well be changed without altering the wall surface.

But in the case of the cylinder of a gas engine with a hemispherical combustion chamber, your statement is erroneous, as then the ratio of wall surface to volume is a constant, no matter what the compression may be; this is self-evident and does not even require the use of arithmetic.

To close the argument, I suggest that the blame be put on Prof. Watson, who evidently was using a cylinder with a hemispherical top of a diameter less than the cylinder, so that his combustion chamber was composed of two parts: the top, that is, the hemisphere, and the bottom, a section of his cylinder; only he did not say so.

Los Angeles, Cal. A. B. PLAUT.

Prof. Watson may have made a mistake in figuring the wall surface of the theoretical sphere, but in refiguring this, we do not agree with Mr. Plaut either. However, laying that aside, the latter part of the above letter attracts attention in that it is stated that the ratio of surface to volume is a constant. Thus, taking a full half sphere of 88 mm. or 8.8 cm. diameter, the volume is 176 cc. and the area 121.5 sq. cm. These two give a ratio of .69. If to this is added a portion of a cylinder of 80 mm. diameter (in this case the cylinder diameter), 1 inch in height adds 50.2 cc. to the volume and 25.1 sq. cm. to the area, which makes the ratio .648. A similar further addition of another inch makes the ratio .621.

STILZ ENGINE DEFENDED

Editor THE AUTOMOBILE:

[1,972]—Relative to the criticism by Hugo C. Gibson on my constant pressure engine, which was described in your issue of July 8, I would refer to an article appearing in "Engineering News" of April 22, 1909, in which there are developed the calculations involved in this type of engine. The matter there disclosed, will, I believe, refute most, if not all, of the points which he raises against development along such lines.

The statements in the criticism regarding the efficiency and weight per horsepower developed are quite true for the Brayton engine, which is one type of constant pressure engine. Nevertheless, the engine for which calculations are made in the above-mentioned article show a theoretical efficiency of 51 per cent. without the aid of an exhaust gas heater, and 74.5 per cent. with the heater. The actual efficiency from heat developed to delivered brake load will probably be in the vicinity of 50 per cent. (see equations 11, 16 and 17), and, therefore, higher than any heat motor yet produced.

The heat in the exhaust gases is most certainly not lost beyond recovery, for it may be transmitted to the working fluid when this is about to be admitted to the expansion cylinder.

The cooling of the air during compression is indeed lost work, but since the pump is a negative element, this is therefore a negative loss, and hence a gain in efficiency, since, after the work of compression is completed all the heat which was conducted from the air while work was being done upon it is again supplied while it is passing through the exhaust gas heater.

That the rotation of the engine shaft is produced by the differential action of the expansion and compression strokes is true of all combustion engines. That these operations are effected in different cylinders in the constant pressure engine is certainly not to the disadvantage of this type.

It is not difficult to imagine what opinions would be held of an engineer who would advocate replacing the cooling water of an air compressor by a heating fluid, or of one who would advise passing cold water through the steam jackets of a steam engine. And yet such suggestions would be in line with current practice in combustion engines. Of course, when operating an engine at such a very high temperature, it is necessary that the working surfaces of the cylinder and piston be provided with cooling means; but it is not necessary to include with these other surfaces of considerable area within the cylinder, which can readily be protected from such cooling action. Then, it is quite practicable to compress the charge within cylinders which are especially adapted for such purpose, instead of within the working cylinder where it becomes heated at the very time that it should be at the lowest available temperature.

The conditions which surround the working fluid of the ordinary combustion engine are a compromise between two desired opposite extremes, it being quite impossible to even approach the ideal for either operation, where both compression and expansion must take place within the same cylinder.

Then, too, where is the engineer who, from the standpoint of economy, would propose a steam engine having a clearance as large as is found in the standard combustion engine? Still, all of these adverse conditions are essential in the explosive engine, in order to make it operative; so that any further thermodynamical improvement seems impossible unless there is a change in the cycle.

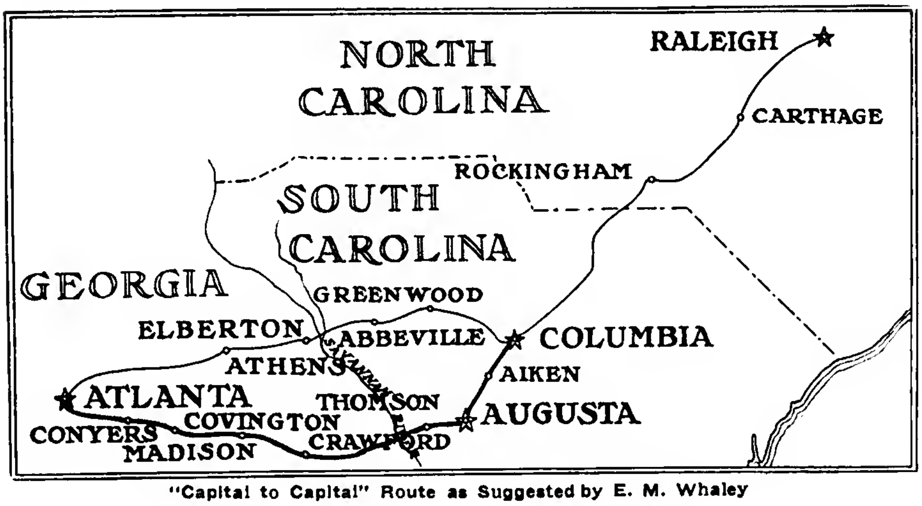
The air-cooled engine described in your issue of July 8, having two cylinders, will deliver as many working strokes per revolution as the ordinary four-cylinder four-cycle engine. It is reasonable to suppose that the two working cylinders can be constructed with about the same weight of material as two cylinders of the other type having a corresponding piston displacement and maximum working pressure. Certainly the two compression cylinders will be much lighter than the two expansion cylinders. Since the expansion and compression are effected under conditions especially adapted to their specific needs, the difference between the positive and the negative work will be a maximum, and therefore the power delivered to the shaft greater for the constant pressure than for the explosive engine. The fact that the clearance in the constant pressure engine is reduced to a minimum assists to this end. Moreover, the working pressure being limited only by the strength of structure comprising the engine, the readiest expedient is available for producing an engine of great compactness and light weight.

It is not understood why the fluid friction should be considered greater in the constant pressure engine. Certainly the passages to the working cylinder need not be of so large an area for air compressed to 500 pounds per square inch as would be required at the pressure of the atmosphere.

The serious error in Mr. Gibson's criticism lies in his desire to embody a few narrow facts about one design of engine into a set of fundamental principles which can be held to apply to any engine designed along somewhat similar lines. I am very glad, however, that these points have been raised, as such actions tend to awaken an interest in a line of effort which bids fair to be a matter of much practical importance in due course of time.

H. B. STILZ.

Bath, Me.



"Capital to Capital" Route as Suggested by E. M. Whaley

New Four-Cylinder Reo Has Graceful Body Lines, Long Wheelbase, and Large Wheels

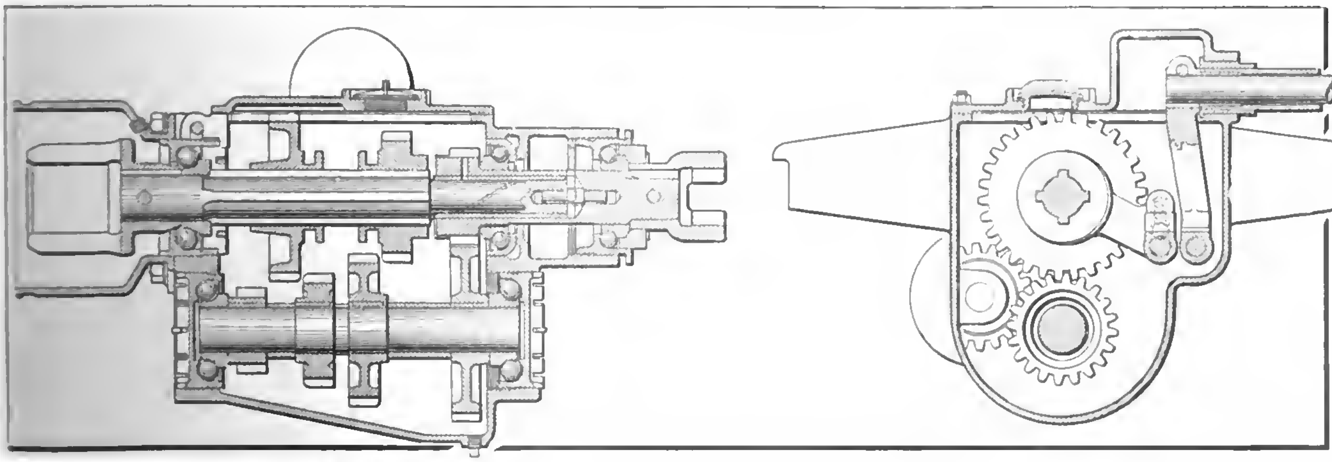
As the foremost exponent of what foreign automobile constructors have been pleased to term the American type of machine, namely, the automobile with a single cylinder or a pair of cylinders placed horizontally under the body, R. E. Olds is known the world over. The public, always fickle, however, demands new forms of construction, and to meet these demands Mr. Olds, now at the head of the company which bears as a name his initials, the Reo Motor Car Company, Lansing, Mich., has brought out an excellent example of a modern four-cylinder, five-passenger, medium-powered motor car.

This new and most popular type of machine will be known to the trade as Model R, and is rated at 30-35 horsepower. The principal body form will be the five-passenger touring car, shown in finished form in the heading above. This car, being made to meet a popular demand, will be sold at a popular price, the figure set for this being $1,250, with top $75 extra.

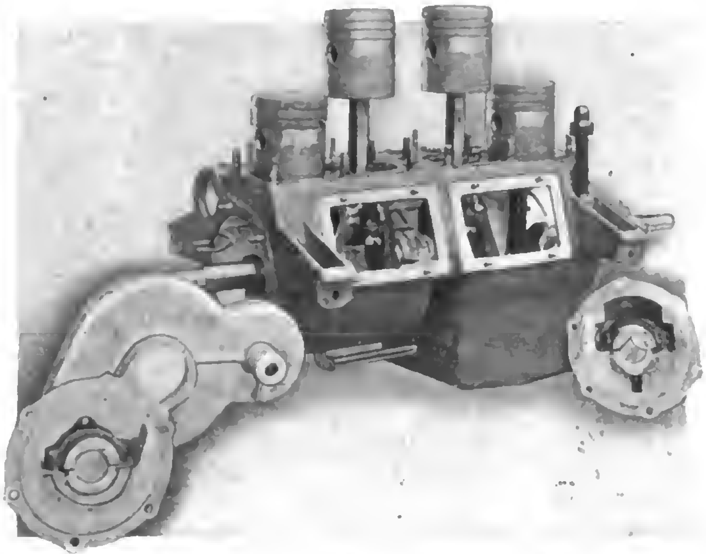
While combining the very best foreign and domestic practice, the new car will be strictly American in general design and construction, even going so far as to have the control concentrated on the left side, a practice that is gradually coming into extended use. Aside from this feature, the whole car follows standard lines as laid down by America's best designers. Thus, the body is of the modern straight line type, with approved fender shapes. The tonneau is close to the so-called baby tonneaus and yet partakes of a large and generous size, so that the occupants will not be crowded. This clever combination results in a fast, racy-looking car with very comfortable riding qualities, yet not extreme in any particular.

Large tires, coupled with adequate springing and a long wheel base make for easy riding, without which the best of other parts would be useless, and the finest design, together with first-class workmanship and material, would be wasted. The first-named, workmanship, is well cared for in the very large and modern shops at Lansing. These rank among the foremost in the country, and much time and thought is brought into play to keep them in that position at all times.

What the New Power Plant Shows—Four vertical cylinders cast in pairs characterize the motor, the dimensions of which are 4-inch bore and 4½-inch stroke. This gives a ratio of bore to stroke of 1 to 1.125, showing again the most modern tendency toward a relatively long stroke. The cylinder pair castings are of a special grade of close-grained gray iron. A one-piece crankcase is used as reducing the cost of manufacture, as being a more rigid construction, and as being more advantageous to handle, both at the factory and by the owner. This form contributes much toward the furtherance of an efficient lubricating system. The latter is of the pump circulative type, in which a large plunger pump, driven from the camshaft through an eccentric, delivers oil from the reservoir in the bottom of the case and forming part of it, to the three main bearings and to the gears. The bottom of the case is divided into a series of compartments, into which the oil drips from the bearings. These pools of lubri-



Three-Speed Selective Transmission is Small and Compact Yet Business-like



One-Piece Crankcase Unit Shows Up Well

cant then form the basis of a splash system, which takes care of the whole interior of the engine.

Lest this method prove too generous and flood the whole inside with oil, splash plates are provided which effectually prevent more than the necessary amount from rising up into the cylinders. In this arrangement of the motor oiling, there are no outside pipes to leak or otherwise give trouble, no stuffing boxes to be periodically replaced, and no adjustments to make. With a screen to clean the oil and protect the pump, and a small three-quart reservoir to be kept filled, it seems as if the important problem of lubrication is reduced to its simplest terms. Aside from the one-piece crankcase being perfectly tight, much care is exercised to have all other joints oil tight, resulting in a clean and neat power plant at all times.

High-Grade Material Freely Used—Special manganese steel is used for the crankshaft, this material being famous for its strength, rigidity and other qualities so necessary in the crankshaft. This particular steel has a tensile strength of 110,000 pounds per square inch with other qualities in proportion. The use of paired cylinder castings allows the use of a central bearing, which brings the number of crankshaft bearings up to three. These are 1½-inch in diameter, with an aggregate length of 10½ inches. This total length is one of the most important details of engine design, since insufficient length means short life and consequent expense. The crank pins are also 1½ inch in size by 2¼ inch long. Offsetting is resorted to in both the crank and camshaft, to avoid excessive side thrust, which soon wears out the parts and necessitates renewal.

Both the main bearings and the connecting-rod bearings may be inspected or taken up very readily through the two large hand-hole plates provided on each side of the crankcase. This provision for adjustment from the outside is a very important one, since otherwise it would be a source of much trouble and endless work to take down the whole lower part of the engine to perform a simple act of adjustment.

In a machine which possesses many unusual features, it is a hard matter to select a few for special mention, but a feature that at once attracts about the engine is the location and size of the valves. These are so placed as to allow of their being unusually large, the advantages of which are too well known to require additional mention here. The exhaust valve is placed on the right-hand side in a pocket, while the inlets are located in the head, in a removable cage which facilitates regrinding. The separated positions of the two allow of both being very large, which is seldom the case, despite its advantages. All valve lifters are adjustable, and faced with fibre to decrease the noise of operation to a minimum.

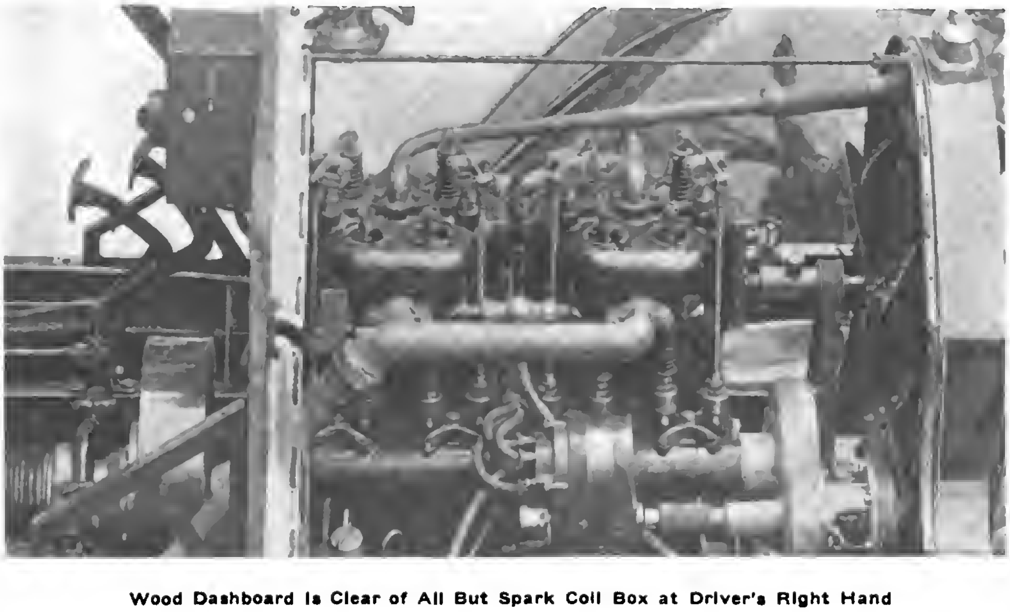
Valves of Large Diameter and Bevel Seated—All valves are bevel-seated and composed of 35-point nickel-steel heads electrically welded to cold rolled-steel stems. The silent feature is furthered by using, for the operation of the camshaft, spirally-cut gears. The shaft runs on three long bronze bearings, and is itself of a very large diameter.

Connecting rods are of a heavy I-beam section with two bolts. The latter are fitted with an ingenious locking device. A square-headed screw is used, fitting tightly in the upper part of the rod end and screwing into the lower end. Its length is so proportioned as to allow of its projecting through about an inch. Upon this extension is set a clamp, which is bound together or clamped by a small buttonhead screw. The latter is also very long and projects through the clamp so as to set against the body of the rod. By placing this clamping screw on the proper side of the holding bolt, so that in unscrewing, the bolt would bring the small set screw to bear against the rod, this unscrewing action is effectually prevented.

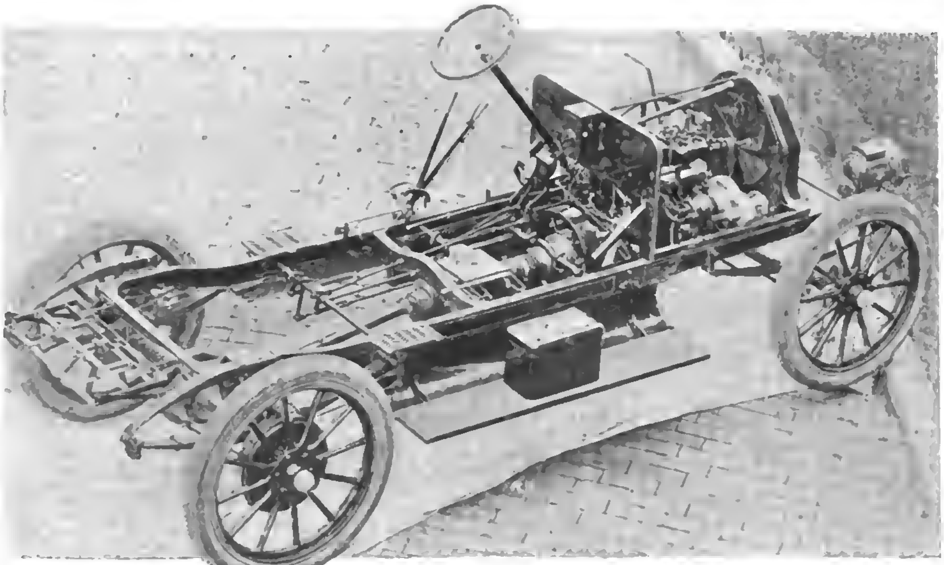
In the clutch another modern tendency is discernable. This is of the multiple disc type, with alternate discs of hardened steel and phosphor bronze.

Clutch Discs Are Hardened and Ground—The steel discs are ground after hardening to secure a perfectly flat surface. A large ball thrust takes up the spring pressure, the spring being a single, easily adjusted unit. When the clutch is out of engagement, there is no end thrust. The size and number of the plates composing the clutch are such as to secure a very large surface of contact, this allowing of simpler lubrication, smaller spring pressure, easier engagement and disengagement. The clutch connection to the transmission is through a double universal joint of liberal proportions, encased and packed in grease. It is of the full universal type and by its use complete freedom of motion, between engine and transmission is obtained.

Three speeds are afforded by the transmission, which operates on the selective plan, a swinging lever located on the inside close to the driver, where it can receive all necessary attention, being the prime mover for all



Wood Dashboard Is Clear of All But Spark Coil Box at Driver's Right Hand gears. Gears are of a special gear steel, cut to six pitch with ⅞-inch face, hardened, and ground after hardening. So, too, with the shafts, which are hardened and ground. The gears slide on four keys formed integral with the upper shaft, the lay or jack shaft being placed below the main shaft, but in the same vertical line. The case is a single casting with removable ball bearings and a single large removable top cover. The latter has an oiling aperture in the center, which allows of lubrication without removal. Shifting rods are enclosed, which with the one-piece case should eliminate the usual gear-case oil leaks.


As New Reo Looks with Body Removed to Show Construction

Both axles are conventional in so far as the general design is concerned, the front being of an I section, one-piece drop forging, and the rear, semi-floating. At the rear axle, the bevel gears are mounted on adjustable ball bearings and the outer ends of the shafts, on roller bearings. The front axle is of manganese steel, carefully heat treated, with the spring saddles forged integral. All front-axle bearings are of bronze, with hardened steel pins rotating within them. For protection's sake, the cross connection is carried at the rear of the axle.

A sixteen-inch steering wheel gives the driver command over the direction of the car through the medium of a gear of the bevel type. In this, a large diameter bevel pinion acts upon the hardened steel pinion. A single adjustment is easily accessible. The steering wheel has an aluminum spider, upon which are mounted the hard rubber rim pieces.

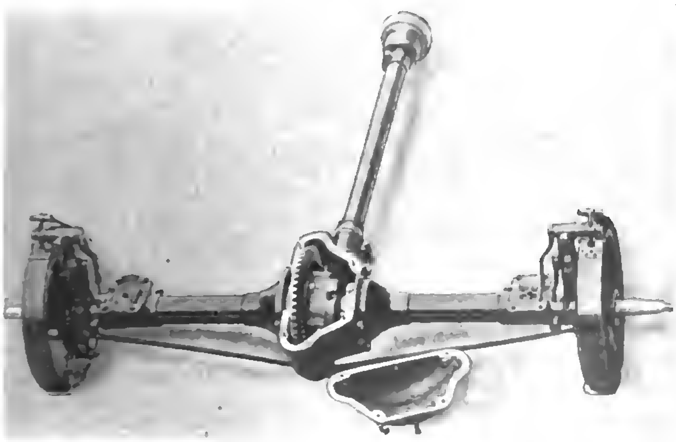
Ample clearance is provided at the low points of the chassis, that under the front axle being 12 inches. At the rear axle, the lowest part of which is the differential housing, this is increased to 12½ inches. This case is made with a large and easily removed cover, through the medium of which the driving gears may be adjusted. After removing this cover, the adjustment is simple, a pair of adjustment rings being provided, which are set into the desired position and locked. The torsion tube, which encloses the driving shaft, runs on ball bearings, these being readily adjustable from the outside.

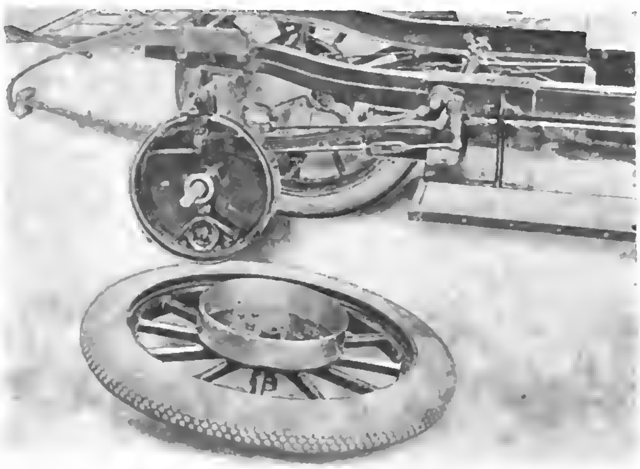
The upper end of the torsion tube is formed by a large diameter spherical ball joint, which is hung on the rear shaft of the transmission. This, forming a universal connection at an important point, is also enclosed in grease, so as to require no outside lubrication at any time. A leather boot covers the whole joint and is protection against the loss of any grease, which would be both objectionable and dangerous.

Large Wheels and Long Wheelbase Make Riding Easy— Since nothing is more desirable than easy and comfortable riding qualities, these are sought after in the use of large wheels, 34 inches in diameter, equipped with 3½-inch Michelin quick-detachable tires. So, too, the length of the car contributes much, the wheel base of 108 inches being of great service. The front axle is located on a line with the radiator, while the frame at the back overhangs the rear axle by 8 inches. This frame is of pressed steel, hot riveted and well braced. A sub-frame carries the engine and transmission, while sheet-steel sides close in the space between sub-frame and side-frame members. The frame is upswept at the rear to obtain easy riding and a low center of gravity. The sub-frame is set as a slight angle so as to help the straight line action between engine and rear axle. Springs are always an important item in the matter of easy riding qualities, and this has been covered by the use of semi-elliptic fronts and three-quarter elliptic rears, all two inches wide.

Ignition is by magneto as the principal dependance, but storage batteries are provided as an auxiliary. The magneto is attached by a single strap, so that the turning of a wing nut loosens it for removal. A universal joint in the driving shaft permits of disalignment without serious trouble.

Control is on the left side and consists of a pair of side levers, the swinging transmission lever and another for the emergency brakes. The latter is the outer lever and is interlocked with the clutch. Of the two foot pedals, the right controls the band brakes on the outside of the rear-brake drums, and the left, the clutch. A muffler cut-out pedal is also provided. Spark and throttle levers are on the steering post, but below the wheel.


Semi-Floating Rear Axle and Differential Case


Both Sets of Brakes Operate on the Same 14-Inch Drum

Viewed from the Side, Christie's Seventh Car, a Racer, Looks Very Fast and Business-Like

As an ardent and altogether consistent advocate of front driving, from the construction of his first car in 1904 right up to date, Walter Christie is well known. His long and costly apprenticeship has culminated in the present example of a chassis, designed to take either four cylinders 5½-in. bore x 7-in. stroke with a touring car body, or four cylinders 7½-in. bore x 7-in. stroke when equipped as here shown for a racing car.

Christie has built, in all, seven different cars, all front wheel drive, all wheel bases between 100 and 106 inches, wheels 30, 32, or 34 inches, all direct on high speed and all fitted with a low forward speed and reverse, two speeds only, as follows: His first car, January, 1904, had four cylinders, 5 x 6 in., with automatic intake valves. This was fitted with a 5-passenger touring car body, and weighed about 1800 pounds. The crankshaft was placed cross-wise of the chassis, in line of the front wheels, which were driven by universal shafts from the crankshaft end direct on high speed, had a clutch and 5 to 1 reduction, low speed and reverse. With its 5-passenger touring body this car had a record of a mile in 55 seconds, straightaway.

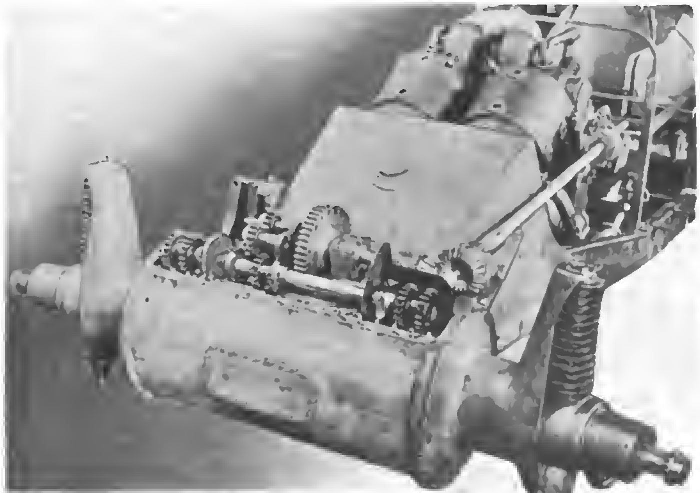
Front driving characterized the second car, January, 1905, which had the same general arrangement with four cylinders 6¼ bore x 7-in. stroke, racing body, weight 2100 pounds. At the Ormond Beach meeting, January, 1905, this car made a straightaway mile in 40 seconds, and was the only American car to finish in the International race of 100 miles, back and forth on a 16-mile stretch of beach. Christie's third was placed on the road in April, 1906; had the same front drive with four cylinders 7⅛ x 7 inches. This, like previous engines, showed a preference for short stroke.

Made a Speed of 113 Miles Per Hour—The weight was 2150 pounds. This car made a recorded mile in 35 seconds, at Atlantic City, April, 1906. This same car made 1906 mile records on circular tracks: 53 seconds at the Empire, 52 seconds at Readville, and 52 seconds at Minneapolis, which are yet the American circular track records.

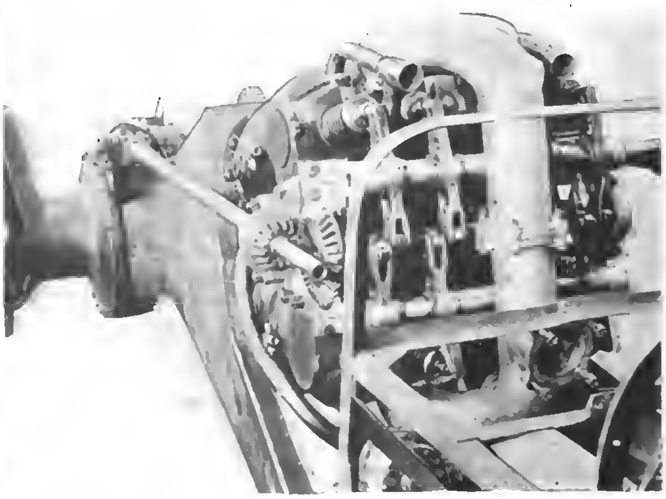
In this same year, Christie built a small touring car with four cylinders 5¼ x 7 in., automatic intake valves, 60 pounds compression and fitted with a 7-passenger touring body. Weight 2300 pounds with touring body and 1900 pounds with racing seats.

This Christie racer was entered for the 1906 Vanderbilt race, but broke a steering arm at East Williston, L. I., before the race, ran into a telegraph pole, was wrecked, and was never rebuilt. Christie ran the race with his little 1906 car and nearly finished the ninth lap of the Vanderbilt course at the time the winner finished his 10th lap. This small 1906 car was subsequently purchased by W. Gould Brokaw and taken to France, where it made 290 miles on 10 gallons of gasoline, 29 miles to the gallon, two passengers up.

His fifth car was a new chassis built to take the 1906 motor placed on the road in July, 1907, and entered for the French Grand Prix race of that year. The car was forced to withdraw



Transmission Is Simple and Placed Over Front Axle



Overhead Valves Are Used and Very Large Carbureter Pipe with a broken valve stem at the end of 235 miles. This car did a mile at Ormond Beach, March, 1908, in 33 seconds, not officially timed.

Sixth on the list was the front drive cab, placed on the road June 1, 1908. The motor is four cylinders, 3¼ x 5 in., 60 pounds compression, all valves mechanically operated.

Seventh and Last Car a High Power Racer—Lucky seven is the number held by the car here shown, which was placed on the road July 8, 1909. This car is fitted with three sets of wheels, 30-inch for circular tracks, 32-inch for road work, and 34-inch for straightaway road or track racing.

Long Front Slope Which Eliminates Wind Resistance

This is a long record of experimental cars, all of which were fast, economical of fuel, and showed the advantages of front drive.

Undoubtedly Christie erred in his choice of automatic intake valves, abandoned in favor of mechanical operation in the last two models, the cab and 1909 racer.

Herewith is shown the car which was built to show the advantages of the front drive under all conditions, and is fitted to take not only the three sets of wheels, but two different motors. One, here shown, for racing, four cylinders, 7½ x 7 in., and one for touring, four cylinders, either 5½ x 7 cr 6 x 7 in., so, with this one chassis all conditions can be met to give needful comparisons with rear driven cars.

In car number five, the cylinders were inclined somewhat to the rear, to obtain a better distribution of weight, and in this seventh model, the cylinders are very much inclined. The connecting rods are made extremely long, 30½ inches, to carry the cylinders far enough to the rear to equalize the front and rear tire loads. This car in racing form is expected to make the straightaway mile in 30 seconds, and the novelty of form and arrangement lend great interest to its future.

Details of the Present Car, Inclined Cylinders Noticeable—The front wheel drive, direct from crankshaft to front wheels, gives the latter a heavy load to start with, if the cylinders are vertical. This load would be increased by placing the radiator in its usual position. This 1909 racer is designed to place about the same load on each axle. For a touring car with this same general chassis arrangement the radiator will be much lower and the front-board, placed close to the cylinder heads, will stand in about the usual location on the chassis.

Greatly varied from the ordinary form is the front construction by carrying the frame up to take the motor-base. This is finished to two angles to take the two banks of cylinders. The motor-base is flanged all around, 3 inches in depth, and the side flanges are riveted to the frame extension. An inclined cover extends forward and is riveted to a full length bracket, integral with the cylindrical bronze crank box. This is opened on top to take the low speed and reversing gears, while a flat part of the crank box top is planed to take the slow speed shaft bearings. The camshaft is driven from the first shaft through two pairs of bevels.

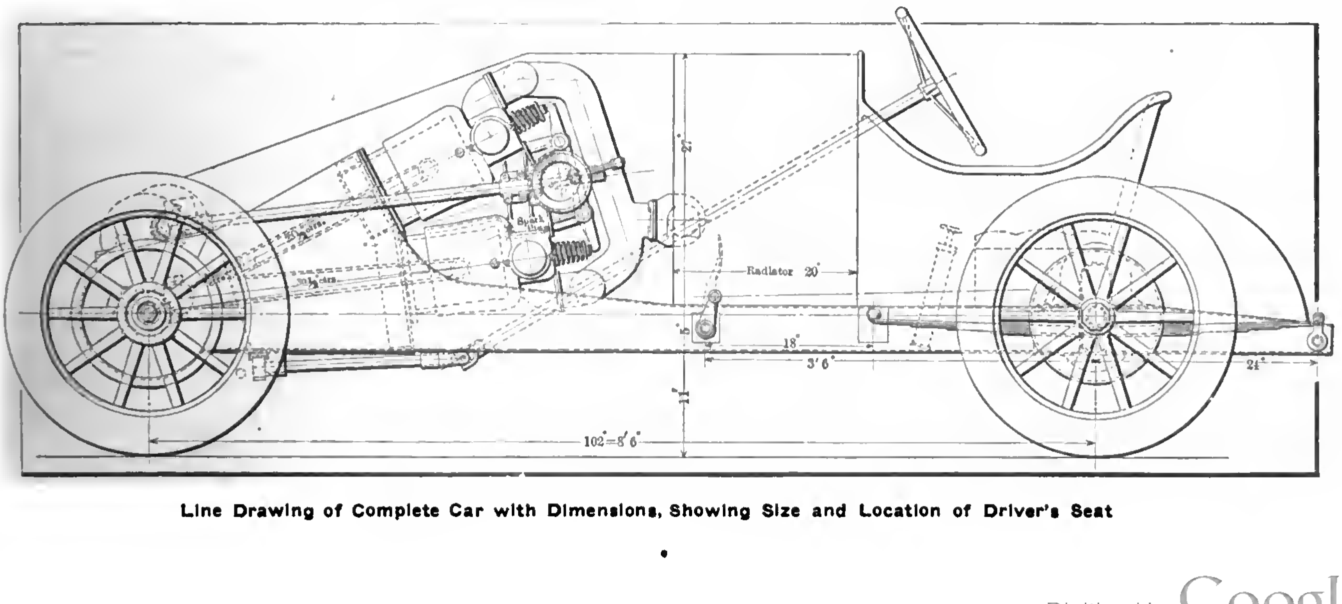
Unusual Size and Shape of Radiator—The radiator is very large, open-arched in form, 29¾ inches high by 35 inches crosswise and 32½ inches lengthwise. It is made up of 80 tubes in two arches, 40 tubes in each arch, total thickness 2 5-8 inches.

Like the radiator, the motor is an unusual form; the crankshaft has two throws only, and the cylinders are single units placed in upper and lower pairs, the center line of the latter at an angle of 8 deg. and that of the former 28 deg., to the horizon, making the angle between the pairs 20 deg. The two lower connecting rods go directly to the cranks and are 30 1-2 inches center to center. The upper connecting rods are 23 1-2 inches, center to center, and do not go to the crank pins, but are jointed to the lower rods at 7 inches radius from crank pin center.

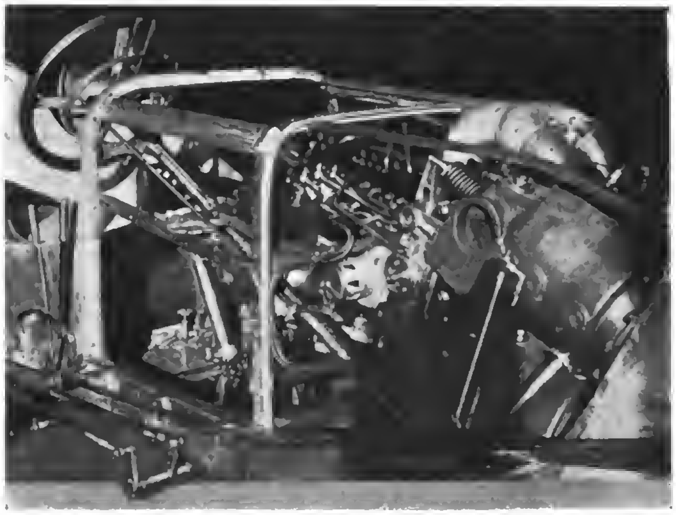
This angular separation of the two pairs of cylinders permits placing the camshaft in the rear of, above, and between the cylinders, with integral cams.

The front wheels have steel hubs and inserted tubular spokes. The rear wheels have integral steel casting brake-drums and spokes, to which the tire-rim is applied.

How the Transmission Works—The crankshaft is normally free, and at each end carries the driving members of a disc clutch which can be clutched to the inner ends of the universal shaft sleeves. To obtain low speed and reverse, the intermediate crank-arm is given the form of a toothed gear, 11 inches pitch diameter, which engages a pinion 8 inches pitch diameter, fitted with a multiple disc clutch. The integral pinion shaft has fixed to its left end the first bevel pinion of the camshaft gear train, which is thus driven when the crankshaft runs. The right-hand pinion drives a third pinion through an intermediate second pinion



Line Drawing of Complete Car with Dimensions, Showing Size and Location of Driver's Seat



Accessories Are Conveniently Located Inside Radiator Arch

to obtain reverse; it also engages a transfer pinion, and between the reverse pinion and the transfer pinion, there is placed a gear fixed to a sliding shaft.

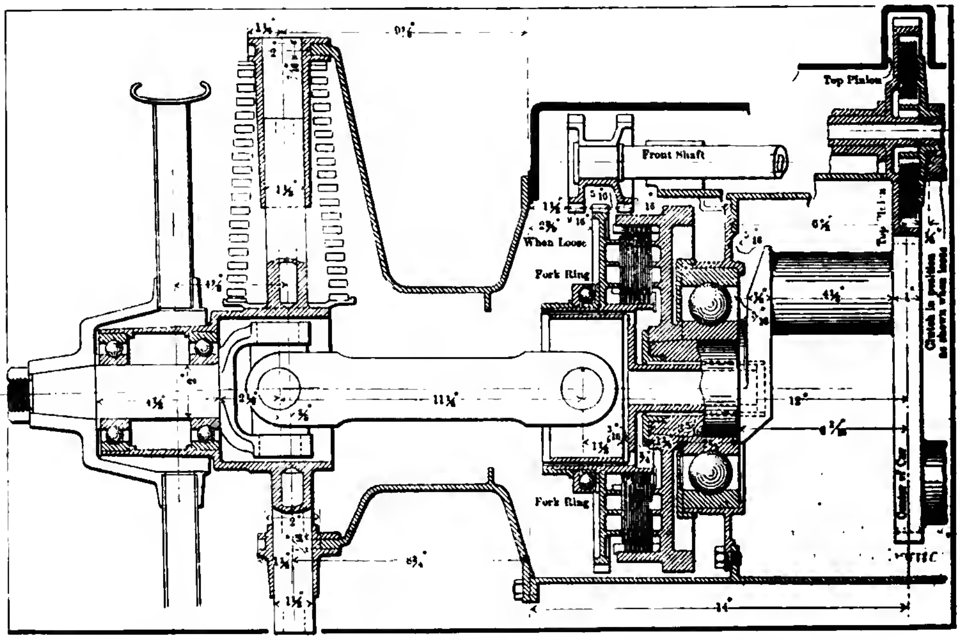
Operation of this drive is as follows: With all clutches disengaged, crankshaft driving the camshaft gears and camshaft only, the motor is started by giving a double stroke to the hand operated gang of four charging pumps. Then, with the motor working, the top pinion clutch is engaged, starting the reverse and forward slow-speed pinions; according to direction desired, the front shaft is made to slide to the right for backing or to the left for slow forward. Front shaft pinions slide into engagement with universal-sleeve gears, and so start the front wheels. The front shaft is made to slide endwise by rocking a vertical fork-shaft interlinked with the direct drive clutch fork, so that when the direct fork is moved the front shaft slides the low speed pinion out of engagement before the direct drive clutch is operatively engaged. Reverse is not interlinked with direct clutch.

Differential Is Eliminated—This form of front drive does not include a "differential." Two pairs of pinions, one pair on each end of the front shaft, have considerable "lost motion," so that the outer wheel can overrun the front shaft in turning corners. The regular touring car drive will include a bevel balance gear on the front shaft. For turning very short corners with the direct drive, the clutch pressure is partially removed by foot pressure. For rounding large radius curves, the drive takes care of itself. This method of gaining the advantages of the differential without its inherent complications is more than praiseworthy.

Christie's "self-starter" is a bank of four carbureter-sucking pumps. 1 3-8 bore by 8 inches stroke, all four piston rods being fixed in one cross-bar used as a hand-grip by the driver who first pulls towards him. filling the pump barrels with mixture from the carbureter; then pushes inward, discharging the mixture through 1-8-inch pipes into the cylinder. The starting spark is had from a dry battery through a hand-moved commutator which delivers a spark to each cylinder. The regular ignition is by two magnetos, the angularity of the cylinders making it impossible to time correctly the spark with a single magneto. The magnetos and the commutator are driven from a rearward extension of the inclined bevel gearshaft, the magnetos, by spur gears, and the commutator, by a bevel gear. The hand-starting pumps, magnetos and commutator are all placed on supports inside the radiator framing, and are covered by the radiator when in position. This makes all accessories handy to the driver.

Wheels Are Special With Steel Tube Spokes—The front wheels for this car are 30, 32 and 34 inches tire diameter; three entire sets of wheels. Spokes are steel tubes, 1 5-16 diameter outside, walls 3-32 thick, inside ends forced into seats in the steel hub. The outside over-all diameter of the spoke sockets is 8 1-2 inches and the inside diameter of the spoke socket circle is 6 inches. The spokes abut against shoulders in the sockets. The hub is deeply cupped to go over the ball-bearings, the cup being 4 5-8 inches total depth, 3 inches from the center of the sockets to the inside of the hub-flange, which is 9-16 thick in the vertical member and 3-8 thick in the cup-wall. The outer end of the hub is keyed on the stub-axle taper and held up with a hex nut. The hub taper seat which takes the stub-axle is 2 1-2 inches long, outside diameter, 1 7-16, inside diameter, 2 inches. The universal joints have yoke eyes 13-16 thick, 5 inches over all, 3 3-8 opening to take the cross-body, 2 1-8 diameter, which is shouldered down to 1 1-2 inches diameter for the cross trunnions. The universal shafts are 2 1-4 inches diameter, steel, solid, and have forks 2 3-4 inches wide x 13-16 greatest thickness. The universal forks are turned to globular form outside. The joint trunnions are hardened steel bushes, forced in, and have 7-8 holes through them, these holes being threaded at the outer ends to take threaded heads, 1-4 thick. This construction leaves a large chamber in the cross-hub which is packed with heavy grease. Shallow cuts are made in the trunnions to deliver grease to the inside ends of the bearings in the yoke eyes, this grease working outward by centrifugal action. The universally jointed stub-axles are in two circles of 11-16 diameter balls, ball circles about 3 3-16 diameter and 3 3-8 between circles.

Details and Dimensions of Axle Sleeves—These are 5 7-8 outside diameter at inside ends, 4 3-8 long, bored 5 3-8 to take the universal joints inside; this inside part has integral trunnions, vertical when placed in the front axle shell, trunnions each 1 1-2 inside diameter, upper trunnion 10 1-16 and lower trunnion 9 1-16 inches, trunnion end to sleeve center. These trunnions, on which the front wheels swing in steering, are bored 5-8 diameter for the top one and 3-4 diameter for the bottom one from the outer ends to the hub sleeve. These slide in a bronze bushing below and a nickel steel bushing above, these bushes being provided with double flanges which take the axle yoke flanges in the grooves, where they are secured with five screws 7-16



Construction Drawing of Front Drive and Section Through Transmission diameter. The outer member of the axle sleeve is 4 3-4 outside diameter and 4 3-8 inside diameter, flanged to stop the ball cups, as before described.

This axle sleeve has about 5 1-2 inches clear vertical travel by the sliding of its integral trunnions up and down.

Front springs are volute (spiral), rectangular in section, 11-16 x 1-4, 4 1-2 inside, outside diameter at bottom and 3 1-4 outside diameter at top end, 18 turns, 17 spaces 1-4 inch wide, giving 4 1-4 inches spring closure. This spring closes under 800 pounds load and carries about 600 pounds when standing still on the road. The lower end of the spring rests on a flanged steel washer, 4 3-4 inches outside diameter.

Because of greater length, owing to the spring placing, the top trunnion is made the heavier, and is supported in a nickel steel sleeve, while the shorter and lighter lower trunnion is supported in a bronze sleeve.

The steering arms are nickel steel forgings, oval section at the root, about 1 1-2 x 1 1-8, applied to the large part of the axle sleeves and retained with 11 rivets, each 5-16 diameter. The steering arm eyes, 1 1-4 diameter by 9-16 thick, with 5-8 diameter pin-holes, are about 12 1-2 inches radius.

Another Strong Supporter of the Disc Clutch—In the Christie front drive there are three separate disc clutches, one in the top pinion, and one at each end of the crankshaft. The discs are all spring tempered, saw steel, ground flat. The top pinion clutch has 10 discs, 6 1-8 inches effective outside diameter. The direct drive clutches are each 18 discs, 11 3-8 effective outside diameter x 7 3-16 inches effective inside diameter. The top pinion clutch is normally disengaged, has no spring, and is engaged by pushing the engagement-disc capped-and-pointed-sleeve-end into engagement with the short arm of the engaging bell-crank, the points of contact being hardened. The crankshaft clutches are normally engaged by spring pressure applied to the clutch linkage; the engaging fork ends, hardened, bear against a hardened ball thrust bearing ring. The fork hand lever is in a quadrant and is latched to hold the clutch out.

All principal members are carried on ball-bearings, Hess-Bright, including the crankshaft, camshaft, and bevel gear shaft. The front and rear wheels are on ball-bearings; the crankshaft bearings are very large, 8 7-8 inches outside diameter, balls 1 5-8 inches diameter.

Front axle is a cylindrical bronze casting, 15 1-8 inches diameter, 3-16 wall thickness, flanged at each end to take bronze heads, which are cast integral with the spring forks. The diameter of the spring forks member is 7 1-2 inches, walls 3-16 thick.

The rear axle is a steel tube, 2 1-4 diameter, with 1-4-inch walls, the axles 1 3-4 diameter, entering the tubular body, retained by shrinking and pinning.

Naturally, the Springs Are Decidedly Different—The rear springs are semi-elliptic, 48 x 2 inches, 5 leaves, top 3 leaves banded together, front eye jointed to frame, rear eye linked to frame by links in tension, spring passing under axle. The rear axle travels up and down in slots in the manganese bronze castings which form intermediate members of the frame sides. The frame sides are of sheet steel 1-8 thick, 5 inches greatest depth in rear of motor x 1 1-2 inches wide. The greatest side-frame depth occurs at the top corner of the motor base, and is 21 3-4 inches. There are two widths to the frame, 30 inches rear to front of radiator, then drawn in on a straight taper to 18 1-2 inches width where the frame front end joins the cylindrical box which forms the body of the front axle.

Save for unusual connecting rod length, the motor is of ordinary water cooled construction, cylinder bore 7 1-2 inches, all valve ports 3 inches in diameter, all valves mechanically operated and all located in the cylinder heads. The piston packing is four snap rings, all above the piston pin. The camshaft is midway between the cylinder heads, and the valve action is by beams turning on hollow shafts.

Water circulation is by a two-pinion water pump, chain driven from the rearward prolongation of the side shaft.

The crankshaft is a steel forging, 19 inches over all, having two crank-throws, 3 1-2 inches radius, cranks set at 180 degrees. The crankshaft has journals 3 1-2 inches diameter at each end, in Hess-Bright ball-bearings about 8 13-16 diameter, 1 3-8 diameter balls. The crank-arms are each 7-8 thick. What would be the middle crank-arm is a gear, 1 inch face, 11 inches pitch diameter, which engages the 8-inch pitch diameter pinion to drive the top shaft. The crank-wrists are 3 inches diameter x 4 1-2 inches long. The connecting rod wrist bearings are offset on the rod. The ends of the crankshaft are tapered and fitted with nuts to force the friction disc clutch cup onto the taper, which is about 5 degrees.

The brakes are internal, only, in the rear wheel hub-drums, are 14 inches diameter x 3 1-2 inches face, and are fiber-faced expanding bands, one end of the band fixed and the other end jointed to the short arm of the brake rock shaft.

Carbureter an Original Design with One Standpipe—The carbureter is Christie's own construction, a float feed with a single standpipe, an automatic air intake and a mechanically operated air admission which is linked to the throttle, so as to decrease air supply as the volume of cylinder charge is diminished. The carbureter supply pipe is of very large diameter.

Steering action is by a pinion and rack, hand wheel 18 inches in diameter, steering shaft pinion 2 1-2 inches pitch diameter, one turn of the hand-wheel to full sweep of the front wheels. The spark control is forward of the hand wheel and stands upright for ordinary position. The throttle control is at right side and forward of the hand wheel. There are three pedals on the footboard, one for the brake and two friction clutch pedals. There is a small lever latched in its quadrant, at the driver's right, which disengages the normally spring engaged, high-speed clutches, these being of the multiple disc type.

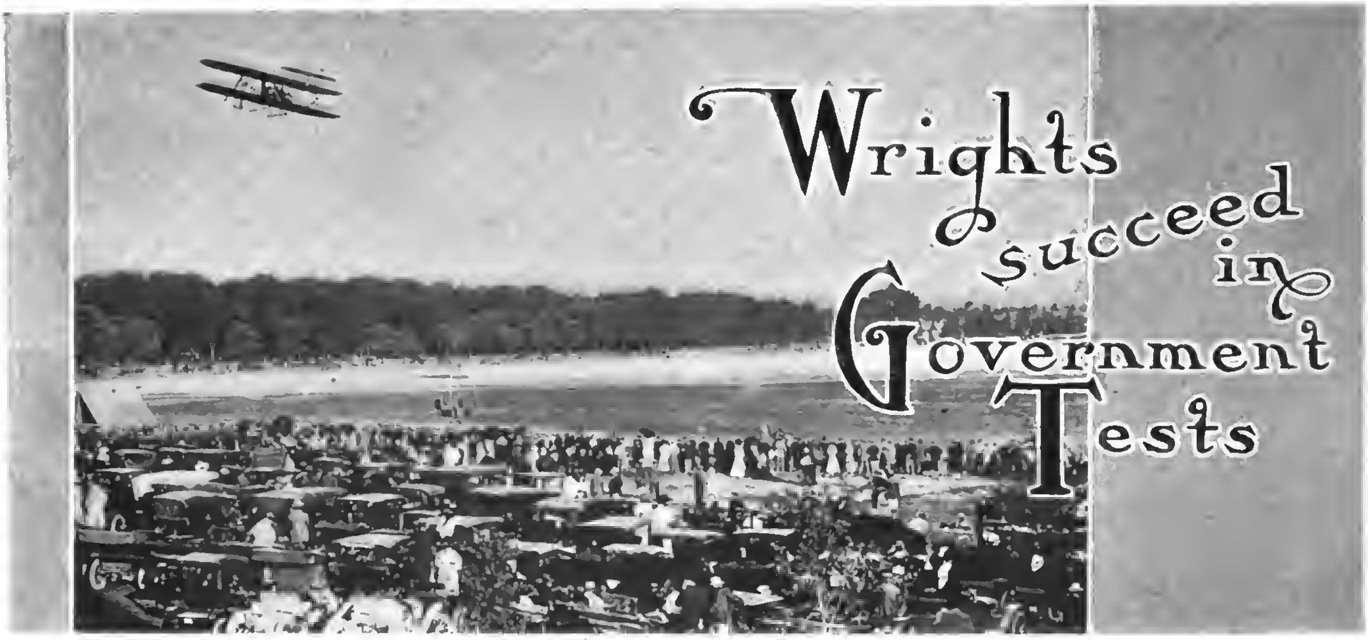
CHRISTIE THE BRIGHT STAR AT GROSSE POINTE

DETROIT, MICH., Aug. 2—When, during the first day of the "national circuit" automobile races at Grosse Pointe track last Friday, Walter Christie in his 100-horsepower space-eater negotiated a mile in 57 seconds, a new mark was set for the local track. Saturday Christie not only repeated, but clipped nearly three seconds off his former achievement, making the mile in 54 3-5 seconds. Christie's course was surrounded by difficulties. The track was not banked sufficiently at the turns to permit his making them at anything like full speed. As a result he was compelled to shut off his power and make the curves under the tremendous momentum gained on the straightaway. Once the turns had been covered, the gray racer fairly flew through the air, the half-mile mark in one trial being passed at a speed of over 100 miles an hour. Christie is confident that on a straightaway like that at Ormond Beach he can do a mile in 28 seconds with this car, and those who witnessed its performance believe he can.

Christie had as rivals Barney Oldfield, S. K. Crocker, Joe Matson in the Chalmers-Detroit "Blue Bird" (with which he won the Indiana Trophy over the Crown Point course), Billy Knipper, Gelnaw and others, but his record was never in danger, although good time was made in the various events.

Matson, in a Chalmers-Detroit, did five miles in 5:48 4-5, an excellent showing for a 30-horsepower car, and twenty-five miles in 29:36 2-5. In the fifty-mile event, Knipper in a Chalmers-Detroit put one over on Matson, his teammate, making the distance in 58:13.

"Mistah Jack" Johnson, colored pugilist, who modestly announces his desire to become a professional auto racer, drove out to the track, and divided attention honors with the speed stars.



Start of the Official Trial for Speed at Fort Myer, in Which Orville Wright Made a World's Record of 42.6 Miles Per Hour

WASHINGTON, D. C., July 30—This evening Orville Wright successfully made the second of the two official test flights, a ten-mile cross-country trip, and his aeroplane has been accepted by the Government. The average speed was 42.6 miles an hour, and as the contract price was $25,000, with a bonus of $2,500 for each mile over 40 miles an hour, the Wright brothers receive the snug total of $30,000. Incidentally, the flight may well be called a world's record, as never before has an aeroplane flown over such rough country, and that, too, with a passenger on board.

The course was a five-mile air-line to Shuter's Hill, near Alexandria, Va., and return to Ft. Myer. The turn and the half-way point were marked by captive balloons. The original time limit to the flights expired last Wednesday at midnight, and the Wrights attempted to complete them on time. Wednesday, however, was a day of disappointments. A high wind in the morning wrenched loose the balloons marking the course, and one of them was lost. At 7 o'clock the machine was brought out, but the motor refused to work and much time was lost before it was finally discovered that the gasoline feed pipe was clogged up. By the time it was in running order again it was too dark to fly, and the crowd went home disappointed.

Wilbur Wright then conferred with Secretary of War Dickinson and obtained a three-day extension of time. Thursday a severe rainstorm prevented any flights. The brothers wanted to make a trial in the early morning the next day, but as the army officers, who were to act as observers at Shuter's Hill, would have difficulty in reaching their posts on time, it was agreed not to attempt this unless to-day, too, was unpropitious.

The day opened with a series of thunder showers, and it was not until the middle of the afternoon that it seemed possible to hold the trials. About four o'clock the clouds began to break up, and at six the aeroplane was brought out and set on its starting rail. Some time later Wilbur and Orville appeared, accompanied by Mrs. Wright and Miss Katherine and a party of friends. After a conference with the judges, Wilbur dragged a big rock out into the middle of the field and laid it on top of a square white cloth. The white mark on the dry grass of the parade ground was to show Orville when he crossed the starting line, from which he was to be timed.

Then Orville and Lieut. Foulois, who was to be the passenger, started the motor. It skipped several times and needed some adjustment to the spark-timing before it would operate satisfactorily. At last all was ready. Lieut. Foulois climbed into the middle seat, next to the motor, and Orville, dragging his cap down over his eyes, took the driver's seat. The motor speeded up, and the propellers threw a hurricane of wind behind them.

"All ready!" shouted Wilbur; Orville nodded, and released the starting clutch. The aeroplane slipped easily down its rail and swept across the field, very close to the ground. To many of the spectators it seemed that the start was a failure. But on the turn near the balloon shed Orville tilted his forward plane and the machine rose gracefully. A cheer broke from the spectators. Two circuits of the field the machine made, rising higher and higher, until at an altitude of 150 feet he crossed the line and shot away to the south. The time was 6:48:30.

The first balloon at the two-and-a-half-mile mark was easily visible, and the fortunate spectators with field glasses could make out the second at Shuter's Hill. The aeroplane was seen to head slightly to the west to meet a cross wind from that direction, but soon after was lost to sight. The two narrow edges of the planes are all it presents to the view, and they are very hard to distinguish in the twilight at any distance. The spectators at Ft. Myer had to wait some ten minutes before the keenest-eyed among them could distinguish those two thin lines against the gray sky.

Then came the most dramatic moment of the flight. As the aeroplane was crossing the deep valley that lies across the course nearest to Ft. Myer, it suddenly plunged downward and disappeared behind the hill. A downward draft of air had caught it and pulled it down from its path. The crowd remembered the accident last year, and held its breath. But soon the machine came in sight again, struggling up the hill of air with the propellers whirling at full speed. After the first gasp of relief there was frantic cheering. That was the last incident of the flight. The aeroplane swept on toward the parade ground at express train speed, crossing the line again at 7:03:10, made a sweeping circle about the field and settled to earth as lightly as a drifting leaf. The cavalrymen had all they could do to keep back the crowd that would have rushed out to congratulate the successful aviators.

Later in the evening reports came in from Shuter's Hill. The army field telephone had refused to work, and there had been no means of communication with Ft. Myer. The aeroplane had appeared over the tree-tops almost unexpectedly. The officers of the Aeronautical Board were still struggling with the refractory 'phone when a trooper dashed up on the gallop and announced that it was in sight. The machine swung a wide circle around the balloon that marked the turning point, nearly 300 feet in the air, and then tilted the planes and rose even higher as it straightened out for the return trip. It had disappeared over the hills in less than a minute after it first came in sight. Orville seemed as much at ease as if he were driving an automobile, and Lieut. Foulois held his field glasses steadily to his eyes.

The elapsed time of the flight was about 14 minutes and 40 seconds, but the official time will be less than this, as the turn around the balloon at Shuter's Hill is regarded as a control. For some reason the board declined to give out their time, but announced the average speed as 42.58 miles an hour.

The Wrights Planning for the Future.

WASHINGTON, D. C., July 31—The Wright brothers and Miss Katherine Wright left to-night for Dayton, O., bearing among them a Government order for $30,000 in payment for the aeroplane. Before their departure the brothers submitted to an interview, during which Orville said that had it not been for the troublesome cross wind and the down-draft in the valley on the return trip the aeroplane might have averaged a speed of better than forty-five miles.

Wilbur Wright had a long conference with General Allen, of the Signal Corps, and although neither would make any statement, it is believed that the army chief wished to know whether the Wrights would not furnish aeroplanes on future orders at about one-quarter of the present price. Orville was authority this morning for the statement that the price of aeroplanes for private individuals will be about $7,500. The heavy price paid by the Government may be regarded as a penalty for the extremely severe tests required. An aeroplane is already being manufactured at Dayton for Russell A. Alger, of Detroit, and many other amateur aviators have filed orders. The brothers. however, have adopted one rigid rule—that they will never sell an aeroplane to any man unless he shows a marked aptitude at controlling it.

As soon as the brothers return from Dayton they will begin the training of the Signal Corps officers in the management of the aeroplane. For this purpose a tract of land has been selected in Maryland, just below Washington, which is much better fitted for use as a training ground than Ft. Myer. The brothers also have a contract to demonstrate their machine for the German government. It is probable that Orville will undertake this alone. while Wilbur remains at Washington.

GERMAN AERO SHOW IN PROGRESS

FRANKFORT, GERMANY, July 29—The first international aeronautical show ever held is now open at Frankfort-am-Main and will continue till the middle of October, forming the center for tests and ascents of numerous new dirigible balloons and aeroplanes. The new central exhibition hall is flanked by a variety of sheds for the accommodation of airships already arrived or on the way. Conspicuous among these is the mushroom-shaped hangar of the Gans-Fabrice aeroplane. A spacious test ground has been laid out, but up to the present time the weather has rendered it impossible to hold any of the competitions for balloons, aeroplanes or dirigibles in which the program is so rich. No less than 450 exhibitors have taken a share in the proceedings.

In the central hall attention is at once drawn to the fully inflated balloon "Preussen," which fills up the space under the doomed roof and which holds the present height record of 10,500 meters, accomplished in 1901 during a meteorological survey. Then the Krupp and Ehrhard stands with their balloon guns are of no little interest. Krupp, however, believes that guns are of no avail for fighting airships and that it is a case of setting a thief to catch a thief, a prognostication that brings aerial warfare within the bounds of possibility.

The aeroplane section is rendered interesting by the presence of a Wright flyer; a second one will be used in the outdoor department for demonstration work. There are also to be seen the Voisin and Gans-Fabrice aeroplanes, the Grade flyer, the Lilienthal monoplane lent by the Munich museum. propellers, models innumerable, aerial motors, scientific instruments, diagrams, parts and accessories. The Continental Rubber Company, which made the envelopes for Zeppelins II, III and IV, the second Parseval, etc., is showing its balloon materials, as are also Metzelers, Clouths and Peters.

Outside around the aviation park the sheds are grouped, the Zeppelin home being by far the largest of all. Zeppelin III is expected to arrive late in August when Count Zeppelin will gives a series of tests, without carrying passengers.

"SILVER DART" AEROPLANE IS WRECKED

OTTAWA, ONT., Aug. 2—The aeroplane, "Silver Dart," with which W. W. Baldwin and J. A. D. McCurdy made many successful flights at Baddeck, Nova Scotia, last winter, was wrecked this morning at Petewawa Military Camp, where trial flights were in progress for the Canadian government.

The aeroplane had made four successful flights of half a mile each at a speed of more than forty miles an hour, with both aviators on board. On landing from the fourth trip the sun rising over the hills shone squarely in their eyes, and as they were descending the machine struck a knoll, ricochetting and striking again with such force as to wreck the wings and controlling apparatus. The two operators escaped with a few scratches and bruises, and were enthusiastic over the performance of the machine before the accident. They already have a new aeroplane under construction.

The "Silver Dart" was the product of Prof. Alexander Graham Bell's experimenting association, which built several machines at Hammondsport, N. Y., before moving to Nova Scotia. Glenn H. Curtiss, at present engaged with his aeroplane at Mineola, L. I., was formerly with the association.

HERRING AND GOVERNMENT DEADLOCKED

WASHINGTON, D. C., Aug. 2—Apparently the War Department will be content with the Wright aeroplane this year. Gen. James Allen, Chief Signal Officer, said to-day that he had heard nothing further from A. M. Herring since he notified him last Saturday that his contract could not be extended again. Mr. Herring's time for delivering the aeroplane expired last Saturday. General Allen says that he was sure no more aeroplane contracts would be let this year.

Reports from Mineola, L. I., say that Mr. Herring has his aeroplane nearly ready for trial. He says that he will demonstrate what his machine can do and that if the Government wants it he will be prepared to deliver it by September 1. If the Government does not want it, Mr. Herring asserts that he will be able to dispose of it to a foreign government.

Where the Nation's Chief Executive Witnessed the Flight

Seated in the President's tent, from left to right, were Senator Aldrich, of Rhode Island, President Taft, Representative Payne, of New York, and General Edwards.

SIMPLEX WINS BRIGHTON'S "24"

The Simplex Camp

"Wag" as the "Man with the hoe"

When the Struggle was at its height

Robertson and Poole.

Among those who Officiated.

Simplex winner, and Rainier runner-up

Waiting for Something

HOW THE BRIGHTON BEACH RACES WERE CONDUCTED

NEW YORK, July 31—Sport lovers of the metropolis turned out 15,000 strong to see George Robertson and Al Poole with the Simplex to-night win the Brighton twenty-four hour race. The score was but 1,091 miles, eighty-six miles below last year's record. The Rainier, driven by Disbrow and Tund, after a steady and consistent performance, finished second, with 1,041 miles to its credit. The Palmer-Singer, another conservative, made 968 miles under the guidance of Howard and Lescault. The Stearns and the Lozier, after providing most of the excitement and fast driving, had to be content with fourth and fifth respectively, their scores being 919 and 885 miles. Fiat and Haynes did not finish.

Robertson was picked to win before the start, and was the popular favorite. After the Fiat met with an accident early Saturday morning he had a long lead over all the other competitors, and settled down to a steady grind. Had it not been for the exciting brush between the Stearns and the Lozier in the last few hours the race would have been very dull. But these two, although they had long given up all hope of winning set out to show a little speed, and succeeded beautifully. They lapped the leaders time and again, and drew forth the only real enthusiasm of the day.

Start and Progress of the 24-Hour Contest

The race began at 9:05 o'clock Friday night. The stands were crowded, and a solid row of automobiles lined the parking enclosure. In the glare of electric arcs and calcium lights it made a very picturesque and exciting scene, just the sort to attract the evening crowds at Brighton and Coney Island, as well as the more fastidious automobiling contingent. This was the line-up:

1—Acme, 60, Cyrus Patschke and H. A. Vantine.
2—Lozier, 50, Ralph Mulford and Harry Cobe.
3—Simplex, 50, George Robertson and Al Poole.
4—Blank.
5—Stearns, 30-60, Laurent Grosse and J. B. Marquis.
6—Palmer-Singer, 60, Ray Howard and Frank Lescault.
7—Rainier, 45-50, L. A. Disbrow and Charles Lund.
8—Fiat, 45, Ralph De Palmer and E. H. Parker.
9—Haynes, 36, Frank Swelgert and John Looney.

Robertson made the quickest start and took the rail on the first turn, closely followed by the Stearns, and held the lead for six miles. Then the Stearns drew ahead. Its time for the ten miles was 11:29 4-5. On the twenty-third lap it met with trouble and retired to the paddock, leaving the Fiat in the lead with Simplex second. De Palma made fifty-three miles in the first hour. About midnight the Stearns, which had returned to the track, met with the accident that put it out of the running. Marquis had just relieved Grosse at the wheel, and on his first lap, driving fast to catch up with the leaders, he took the turn into the homestretch at such speed that the car turned turtle. Robertson was just behind, and had to do some quick work to avoid running into the wreck. Neither Marquis nor Lang, his mechanic, was seriously hurt.

The Fiat had tire trouble at intervals, and finally hit a fence post, which strained the front axle. As it fell behind the Simplex drew further and further into the lead. On the tenth hour it was twenty-three miles ahead of the Rainier, now in second place, and fifty miles ahead of the Fiat. The Rainier was running steadily, but had not the speed to overhaul the red car. From this time on the race was featureless. In the afternoon the Acme came from the paddock after an extended vacation and did a little fast driving, but soon had to retire again.

By 5 o'clock in the afternoon the track was so badly cut up on the turns that the race had to be stopped while repairs were made. The management had advertised that the race would be run without intermissions, but they claimed that the police demanded that the track be put in better shape. The turns at each end of the homestretch had been worn into deep ruts, and the dust was blinding; the only part in condition for fast time was the backstretch. The intermission lasted an hour, during which the cars were kept "in control," and no working on them was permitted. The drivers, however, were glad of a chance to rest, and many of the crowd took the opportunity to get supper.

When the race was started again only five cars were in line. The Haynes had quit in the fourteenth hour with a broken crankshaft, and in the seventeenth the Fiat's damaged axle forced it to retire also. The Acme was in the paddock, but not officially out. Poole, now in charge of the Simplex, set a pace of about thirty-five miles an hour, and the Rainier and Palmer-Singer, who now were sure of second and third places respectively, followed him. This was good generalship, but not calculated to please the crowd. The Stearns, however, gallantly started to furnish some excitement, and in this entertaining effort it was soon joined by the white Lozier. In the darkness the two tore around the track at real racing speed, repeatedly passing the trio of conservatives and drawing hearty applause from the grandstand.

In spite of the fact that the prices had been nearly doubled over last year, a big crowd of Saturday evening pleasure seekers turned out, and by 8 o'clock the capacious grandstand was full. Automobiles occupied all points of vantage and kept up a continuous honking. The track was well illuminated, and the racers with their glaring headlights made a fine spectacle. The performance of the Lozier was particularly impressive. Both car and drivers were garbed in dusty white, giving it a ghostly look as it swept past the stand; and then the dark Stearns with its roaring exhaust furnished the right contrast.

When only a quarter of an hour remained Robertson again took the wheel of the Simplex and undertook to win a share of the applause. He reeled off some fast miles, and by his example aroused the Rainier and the Palmer-Singer, so that at its finish the race was quite exciting.

Friday's Preliminaries Had Several Smashups

The usual preliminary events on Friday afternoon furnished several accidents. The first race, for motorcycles, had hardly started when Fred Voelker, on his 7-horsepower N. S. U., made a dive through the canvas fence on the turn into the homestretch. A moment later Edward Seery, also on an N. S. U., went through the same hole and bumped into Voelker. Both drivers were bruised and scratched.

The 100-mile Marathon saw the only broken record of the meet, Lorimer's time of 1:52:00 3-5 being over a minute under the mark set by Clemens and a National. Soon after the start of this race the Midland skidded through the fence on the dangerous turn into the homestretch. The crew escaped injury, and the car was patched up in time to re-enter the race and take third place. The Kisselkar and the Acme, the only other competitors, had tire trouble and withdrew. The mile and five-mile time trials were slowed down because De Palma, the principal competitor, was saving his car for the twenty-four hour race.

William Pickens, the manager of the Buick racing team, protested the action of the Motor Racing Association in limiting the 100-mile and twenty-four hour races to cars costing over $2,000, thus barring the Buicks. He said that the whole Buick team, with two cars, was in New York, and would have entered both these races if they had been permitted. Certainly entries were sadly needed. Of the sixteen cars, which, it had been predicted, would start in the twenty-four hour race, only eight appeared, and most of the time half of these were in the paddock. If the entry list had been full, the track could never have stood the wear. Unless some strenuous measures are adopted, the next twenty-four hour race will have but scant support.

Later the M. R. A. announced that the next twenty-four hour race would be held August 27-28, and further said that fourteen entries had been pledged, mostly by members of the association. Summaries of the various events follow:

Ten-Mile Motor Cycle Handicap—Won by Stanley Kellogg, Merkel; time, 10:16 2-5; J. F. McLaughlin, N. S. U., second; F. B. Baker, Indian, third.

Mile Time Trials—Ralph De Palma, Fiat; time, 0:54 3-5; Louis Chevrolet, Buick; time, 0:58 2-5; Charles Bowers, Red Dragon; time, 1:06 4-5.

Fifty Miles, Cars $1,251-$2,000—Won by Louis Chevrolet, Buick; time, 59:39 2-5.

Five Miles, Free-for-All—Won by Ralph De Palma, Fiat, 5:51 3-5; Charles Bowers, Red Dragon, second.

Five Miles, Cars $851-$1250—Walkover for E. M. F.

Brighton Marathon, 100 Miles, Cars $2,001-$3,000—Won by Lee Lorimer, Chalmers-Detroit; time, 1:52:00 3-5; John Juhasz, S. P. O., second; W. O. Stokes, Midland, third.

TABLE SHOWING PROGRESS OF THE RACE AND STANDING OF COMPETING CARS AT END OF EACH HOUR

Car	Hours—1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Simplex	47	102	153	197	246	295	343	391	440	490	539	589	636	680	724	765	811	855	896	938	980	1017	1052	1091
Rainier	46	95	143	193	238	287	331	372	421	467	513	554	601	644	685	724	766	813	852	888	927	968	1001	1041
P-S	45	90	136	178	224	264	305	348	386	427	472	507	543	589	628	668	706	745	789	820	862	895	930	968
Stearns	51	101	141	141	141	182	228	273	299	353	362	406	447	495	538	580	625	671	715	758	795	838	876	919
Lozier	48	95	138	176	219	267	298	298	317	323	371	420	466	505	551	597	645	685	729	760	769	797	805	885
Acme	41	87	123	129	158	199	222	232	283	310	310	310	310	320	320	322	322	322	352	385	385			
Fiat	53	104	154	204	254	292	343	366	391	440	486	537	580	623	654	678	691							
Haynes	41	86	122	122	122	122	122	122	122	122	144	164	205	219										

PRESIDENT MAY FIND RACES MORE ATTRACTIVE THAN GOLF

LOWELL, MASS., Aug. 2—Although President Taft has not yet been able to definitely signify his acceptance of the invitation of the Lowell Automobile Club to be its guest at the big race meet, to be held over the Merrimac Valley course, during the week of September 6, the specifications for the main grand stand that is to be erected call for a Presidential box in front of the main pavilion. They also show the 100 boxes that will occupy the lower part of the stand, and beyond these boxes will be arranged seating capacity for 5,500 spectators. Other stands will be erected along the course.

The stands for the judges, the press and the musicians will be erected on the opposite side of the course, and connected with an overhead bridge to the main stand. A special bridge will be constructed over Dunbar avenue and above the course, to permit entrance and exit after the races have been started. The Boston & Maine Railroad and the Boston & Northern Railway parallel the course, but upon the opposite side of the Merrimac River. In order to give direct transportation, the War Department has been asked to sanction a plan for erecting a pontoon bridge, the river being United States waters. The total cost of running off the program is estimated at $50,000, exclusive of the Vanderbilt Cup race, provided it should be decided to run that race over this course.

The Lowell carnival will be officially opened on Saturday evening, September 4, with a banquet by the Lowell Automobile Club, at its new club rooms, which occupy one entire floor in the Richardson Hotel. The racing program, as arranged by days, is as follows:

Monday—250-mile road race, for light stock cars.

Tuesday—Mile straightaway records.

Wednesday—318-mile race, for large stock cars.

Thursday—Athletic events.

Friday—Motorcycle races under F. A. M. rules.

The course is now undergoing a thorough oiling, and the back stretch, which last year was rough in spots, is rapidly assuming track smoothness under the combined labors of 250 workmen. The course will be guarded by a military patrol, and a complete telephone system will connect all points of the circuit. Every precaution will be taken to insure the safety of both the contestants and the public.

FOREIGN CARS ELIGIBLE IN FAIRMOUNT PARK RACE

PHILADELPHIA, Aug. 2—After thoroughly considering the question from every angle, the contest committee of the Quaker City Motor Club, under whose auspices next October's 200-mile Fairmount Park stock chassis race will be run, has decided to accept foreign cars as entrants, with the proviso that they be owned by Americans. The committee was about evenly divided as to the advisability of this action, but when the fact was emphasized that the exclusion of foreign cars would be attributed by some to a fear of the result, the "antis" flopped over in a body, and the final vote in favor of their admission was practically unanimous.

The race will be run on Saturday, October 9, probably in the afternoon. Twelve hundred of Philadelphia's "finest," with miles of rope, will furnish a replica of the course-guarding which so surprised and delighted visitors last year, and set a standard in this respect which other race promoters have vainly endeavored to equal.

Mayor Reyburn, who, with Frank B. Hower, of the A. A. A., has been named as honorary referee, is intensely interested in the affair, and is devoting no little time to perfecting the details. The committee which will represent the club in its dealings with the representatives of the charitable institutions which will participate in the distribution of the receipts consists of Frank Hardart, Sr., Chairman; Fred. C. Dunlop and William J. Donnelly.

Not only will the Quaker City Motor Club not benefit financially from the sale of parking spaces, seats, etc., but the club has asked for the reservation of fifty parking spaces at the rate decided upon by the beneficiary institutions' committee, and a check therefor will be sent to the proper person as soon as the Mayor names the committee.

The contest committee finally decided on the disposition of the $5,000 cash (or plate, at winners' option) which will be distributed among the first four cars to finish, as follows: $2,500 to first; $1,250 to second; $750 to third; $500 to fourth. In addition, there is also heard from some of the public-spirited "laymen" who have already become deeply interested in the race and its charitable feature, a suggestion that additional enthusiasm might be aroused by newspapers, prominent business concerns and others hanging up trophies for fastest lap, consistent running, best tire record, etc. This suggestion has already been acted upon and there will be at least two such trophies in addition to the $5,000 in "frigid gelt" which the club has hung up.

On Saturday, just one day after the entry blanks were mailed, Secretary Harbach received the first entry—that of an Acme car with Malin Leinau nominated as the driver.

Start of the "Water Rats" from Charing Cross, London, for Brighton

LONDON, July 24—While the Paris Salon will not be held this year, the Olympia Show will take place in November, as usual, and judging from present indications, a most successful show it will be. Improvements have been recently made in the building, with the result that there will be room for over 150 stands on the ground floor, as well as the accessory exhibits in the galleries. The whole of the available space has been applied for, and there seems to be no doubt that Olympia will be the business center of the European automobile trade for the coming winter.

The Grand Order of Water Rats, some 300 strong, went down to Brighton Sunday, the 4th, on a hilarious automobile trip. This order, it may be well to explain, is composed not of rodents, but of members of the "profession"—theatrical; a Good Samaritan free masonry, with a rare capacity for enjoying itself. The order assembled 68 cars, and after a headlong dash for the seashore, lunched at the Metropole with much merriment and speechmaking. Harry Tate, whose comic struggles with a refractory automobile convulse the vaudeville audiences, acted as marshal, and Fred Ginnett, as King Rat, had a huge gray "property" rat perched on the hood of his car.

The headlight trials of the R. A. C., which were held last week, attracted a number of entries, and although the results have not yet been published, there is reason to believe that they will be very interesting to automobilists. Special prominence is given in the rules to the reduction of the dazzling effect, about 36 per cent. of the total marks depending on this feature. For effectiveness of illumination 54 per cent. is set apart, and the remainder goes to practical and mechanical considerations. All the acetylene jets, electric bulbs, etc., were previously tested to find the amount of light available; the trials determined what part of this was effectively used in service. The photometer test was held in the Crystal Palace grounds on Monday and Tuesday evenings. American makers were represented by the Badger Brass Company and Rushmore Lamps, Ltd.

The R. A. C. itself is steadily increasing in numerical strength, and the total of members, ordinary and associated, is over the 16,300 mark. The number of associated automobile clubs is over 96 and still increasing.

A SCHEME FOR INTERNATIONAL TOURING RECIPROCITY

PARIS, July 28—Europe has a scheme in hand which, if carried to completion, will make touring through her various countries a matter of less formality than motoring through the various states of the Union at present. Under present regulations it is necessary to have as many driving licenses, as many registration numbers, and pay as many entry fees as there are countries in which you desire to travel. If the new scheme is carried through, a driving license issued by any European country will be recognized in every other country; a car registration in one land will be good for all other lands; finally, the deposit of one sum will procure an international triptyque, admitting to all European countries, the sum being returned on the car's return to its native country.

America has as much reason to be interested in the scheme as Europeans, for her citizens form a very respectable percentage of the international tourists who skim over the highways of France, Germany, Italy, England, Holland and Austria. Curiously, however, America is the only nation that is out of the scheme; it is more than probable, however, that she will shortly be admitted.

The idea of simplifying touring regulations originated in Germany in 1907, the German authorities suggesting to the French that as they were at the head of the automobile movement they should call a conference of the leading powers to deal with the subject of international regulation. The French government accepted the proposal, and in due time invited government officials of other countries to meet her and talk over this subject. Other nations became interested, asked to be admitted, and were admitted, with the result that the proposed conference was postponed on several occasions. Now every nation in Europe, without a single exception, is enrolled in the scheme, and should have met in Paris this week, at the Ministry of Foreign Affairs, had not Belgium and Holland asked for a postponement, which was granted, the revised date being October 5.

Three main points will be brought before this meeting of the nations. It will be proposed that the driving licenses of any nation shall be accepted by all other nations. At present most European countries issue driving licenses only after a practical examination. The exceptions are Belgium, which has no special regulation, and England, which, like New York State, is only interested in receiving the registration fee, and does not care a rap about the applicants' ability or otherwise to handle a car. France will accept the British Royal Automobile Club's certificate and the Motor Union's license as proof that the holder can drive a car, but, of course, will not accept the British government's license. Germany will accept the French license providing it is endorsed by a German consul, but not otherwise. An American driving license would not be accepted anywhere in Europe.

After each nation has put its house in order and instituted a driving license issued only after examination, as in France, Germany and Italy, it is proposed that such license shall be recognized by all the countries of Europe without further examination or formality. Here America is directly interested, for a tourist who is going to "do" the Continent would only have to obtain one license for all the countries he intends to visit. If America comes into the scheme, even her license may be recognized by European countries.

A similar arrangement is proposed regarding registration numbers. At present, if driving in France you must carry French numbers, though you are not called upon to pay French fees. If you tour in England you must carry English numbers and pay full fees whether your stay is one of six hours or six months In Belgium you hook on that country's number in addition to your own. In some other countries the customs officers give temporary numbers that must be attached and maintained while touring in that country.

The object of the conference is to devise a scheme whereby one registration number will be accepted all over Europe. It is not a difficult task, providing each of the contracting parties will undertake to look after the few black sheep that are to be found in every community. Here again America is directly interested, for whereas a United States number is sometimes admitted to be used in France for a short period—the holder being given a certificate to that effect to save trouble with the police—under the new scheme such a number would always be admitted, not only in France, but in all European countries.

The question of an International Automobile Passport, as suggested by the Touring Club of Italy, is even more important Under the old method of touring it was necessary to deposit the duty on a car on entering the country, the amount being returned on leaving. The result was that plenty of gold had to be carried in the coinage of the land the motorist was about to enter, and there were long delays when leaving the country, for unless the station was an important one the officers never had the amount of cash on hand. This, of course, was repeated for every country visited. At the present time the automobilist can deposit the customs duty with the Touring Club of France, and various other organizations, even before leaving his home land, receiving in return a triptyque which admits him free and without formality. A separate triptyque must be returned for each country about to be visited, and separate fee deposited, the amounts being returned either at the central office or through the holder's banker at home.

Under the Italian Touring Club's scheme there would be but one triptyque for the whole of Europe, the amount to be deposited being that of the country with the highest duty. This amount would be deposited with the home authority on issuing the triptyque, and only returned when proof had been given that the car had been brought back to the country of its origin. In the meantime it might pass through half a dozen different countries without depositing a cent.

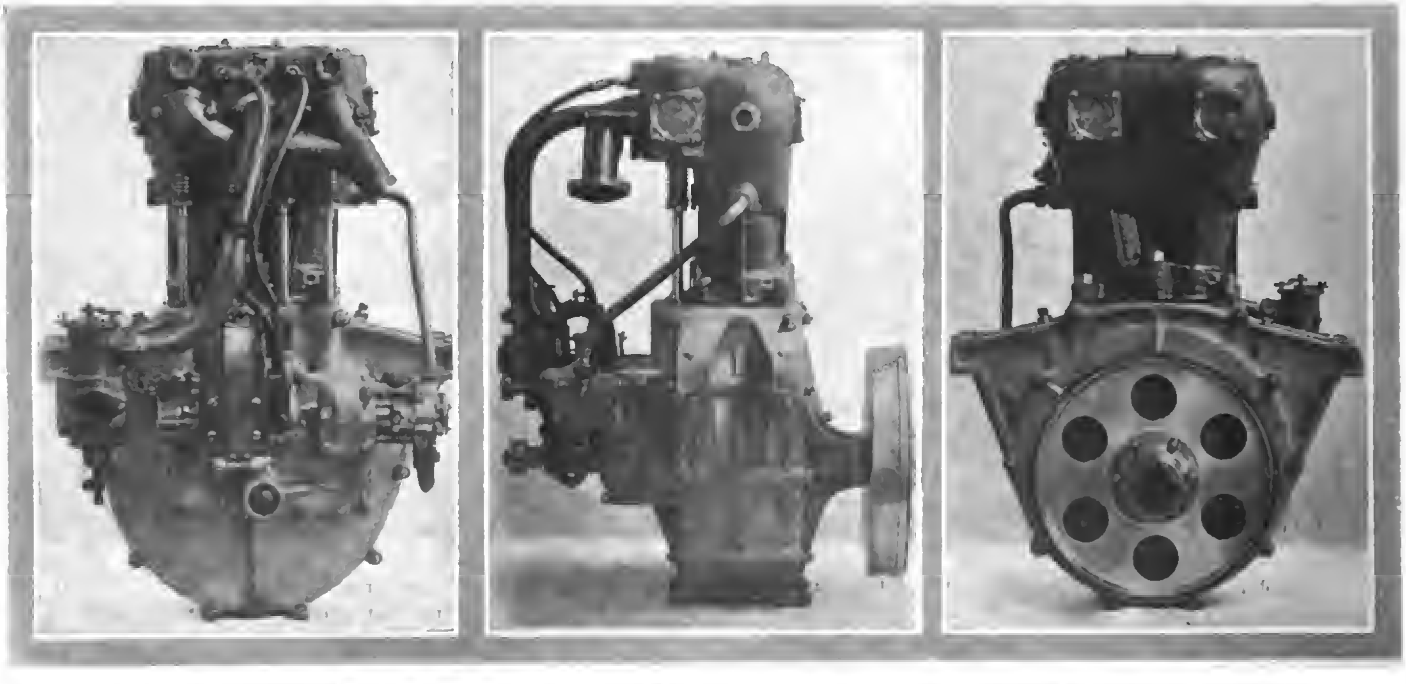
This scheme also interests Americans more than any other nation, for they travel in more different countries than the average European, who, as a rule, is content to confine his operations to one land at a time. The scheme, bold as it is in the eyes of red-tapeism, does not present any serious difficulties of realization.

The important point about the conference to meet in the Fall is that it is not composed of delegates from automobile and touring clubs, limited to the expression of their ideas on what should be done, but is made up of official delegates appointed by the various governments, having power to vote in favor of any practical scheme. Automobiling is growing to such an extent that it is fast breaking down the artificial barriers which have existed in old Europe for generations.

TWIN CYLINDER OF FRENCH PRODUCTION

Paris, July 21—More than local interest attaches to the new Lion-Peugeot two-cylinder motor from the fact that it is the direct outcome of the limited bore race regulations enforced in Europe for the last two years. The firm, in common with such others as Sizaire-Naudin, Delage, De Dion, Werner, etc., has specialized in the one-lunger, and has indeed never previously built an engine with multiple cylinders. For the present racing season three cars were experimented, two of them having one cylinder only, of 3.9 inches bore by approximately 10 inches stroke, and the third a twin cylinder in V. Out of three races the twin has been victorious in two, and finished with second place in the third one. Doubtless with their abnormal stroke and immense valve—three inlets and three exhausts for one cylinder—the singles were a trifle faster than the twin, but this latter possessed such qualities that the firm felt justified in adopting it as their standard model for next season.

The two cylinders are in a single casting, and are only very slightly inclined, the angle from the vertical being 20 degrees. They are set across the frame, and not lengthwise, as in the standard vertical twin cylinder engine, the valves, magneto, carbureter and pumps being in front. This construction allows of an engine so compact that it can be mounted on the same chassis as the one-lunger without any changes whatever. The



As seen from the front — A view from the side — As seen from the rear

Lion Peugeot Two-Cylinder Motor Which Has Created a Sensation in European Racing Circles crank case is of the single-cylinder type; that is, it is divided vertically, the two halves being united hy horizontal bolts. Interior flywheels are employed, with a built-up crankshaft, as in the singles, the two connecting rods being attached to one pin, one of the rods fitting on direct, while the other has a forked end.

Although the cylinders are inclined, the valves are vertical, and are all in one line, as will be seen from the illustration, at the front of the engine. The two exhaust valves are at the outside, while the two inlets are together in the centre. A single camshaft operates all the valves, and is fitted with a couple of supplementary sliding cams for relieving the compression in order to facilitate starting. A pinion on the camshaft meshes with a pinion on a secondary shaft, on which are mounted the magneto and oil and water pumps. The carbureter is also at the front of the engine and to the left of the magneto, in a thoroughly accessible position. There is a single length of intake piping for the two cylinders, entering the intake manifold cast with the cylinders midway in the block. As this "buried" manifold is heated by the circulating water, the mixture is warmed before entering the cylinders, thus avoiding any necessity for jacketing the carbureter.

One of the most interesting features of the engine is the ratio of bore to stroke. On this motor the cylinders are 75 by 150 millimeters (approximately 2.9 by 5.9 inches), which is a ratio of two to one. Certainly but for the experience gained in the limited bore races, such a long stroke would never have been adopted on a standard pleasure car. On their present single-cylinder models, indeed, Lion-Peugeot employs a "square" engine of 110 by 110 bore and stroke. The experience with their racers, where the stroke was carried up to a value two and a half times that of the bore, has led them to adopt the long-stroke engine for pleasure car models. This model would also appear to indicate a tendency to break away from the single-cylinder model which has been so strongly developed in France during the last two or three years, and has been brought to a wonderful degree of efficiency, making it far removed from the noisy spasmodic creations of a few years ago. There is now practically only one firm of importance producing single-cylinder engines only. On the other hand, there is hardly an important firm in existence in France which does not build, if not one-lungers, at any rate some two-cylinder engines. In the few cases where large four-cylinder engines are alone produced it is because of innate conservatism of the management, or for financial reasons that the company would not care to make public.

NEW FIRM GETS LARGEST TRUCK ORDER

Worcester, Mass., Aug. 2—Probably the largest truck order ever placed was that which General Samuel Pearson, representing the American-South African Commerce Company, Johannesburg, has just given the newly-formed R. L. Morgan Company, of this city. This is for 100 trucks, to cost $3,500 apiece, and be delivered, 20 per year, until the contract is filled, if it is not increased in the meantime. The first car is to be delivered on September 1 to the company, which conducts an immense mining and development business in South Africa. The trucks will be used for hauling ore and supplies to and from the mines. Previous to placing the order, the company's representative, General Pearson, known to fame as the Boer army purchasing representative, journeyed from the American headquarters, at Allentown, Pa., to the factory in Worcester, which latter was inspected in detail.

SIXTEEN AUTOMOBILES IN A SEWER

Baltimore, Aug. 2—Every day sees another most novel use for the automobile, and a "stunt" pulled off here lately ought to rank among the very novel. This was on the occasion of an inspection of the city's new trunk sewer. Preceded by Mayor Mahool in a Winton, no less than sixteen automobiles made the six-mile trip, the way being lighted by powerful searchlights.

WHEN A TIRE SHOULD NOT BE RE-TREADED

Chicopee Falls, Mass., Aug. 2—That 90 per cent. of the old tires that are re-treaded ought not to be, as far as the owner's interests are concerned, is the opinion of one of the Fisk Rubber Company's experts. An autoist may have a casing that has given him a few thousand miles of good service and is still apparently in good condition. He consults the manufacturer of the tire in regard to having it re-treaded, and is advised against it, on the ground that the inner fabric is weakened. The autoist, unheeding, goes to some alleged tire expert, who perhaps has served a few months in a garage before branching out in business for himself, and is told that the company is all wrong. When this repairer does the job, as a rule only the cheapest quality of scrap rubber is used and the crudest methods employed. Should the re-treaded tire last only a week or so, the autoist has no redress from the repair man, who does not guarantee his work, and coolly says, too late, that the tire "was no good in the first place." He has no reputation to lose and is not greatly worried.

The great essential point in the life of a tire is proper inflation. Users of Fisk tires who have driven them 5,000 miles or so properly inflated, frequently bring them back for re-treading, and in this case a serviceable job is possible and the tire will be good for a few thousand miles more. But if a tire has not been driven at the proper degree of inflation, it is almost certain that the fabric has been so strained that re-treading will be useless. A real expert knows what to advise in such cases. The ordinary garage or repair man goes ahead and re-treads, anyway—and collects for it.

MAXWELL TRANSCONTINENTAL TRIP ENDS

San Francisco, Cal., Aug. 2—After just 35 days of touring Mrs. John R. Ramsay, of Hackensack, N. J., drove her Maxwell car into San Francisco, completing the first transcontinental automobile trip ever made by a woman. Not only did Mrs. Ramsay successfully make the tour of nearly 4,200 miles, but she drove the car from start to finish, made all adjustments and changed the tires when necessary. From Laramie, Wyo., where their progress was last reported, the going was bad. Deep washouts, long since dried, some of them 10 or 12 feet deep, had to be traversed. When Salt Lake City was reached on July 19 a sight-seeing trip of several days was enjoyed by the ladies before resuming the journey westward. In some respects the trip to Reno, Nev., was the hardest part of the tour, for in addition to the hard climbs over the Sierra Nevada mountains, made doubly hard by the rough roads and underbrush, much loose shifting sand was met with. From Reno to Sacramento, Cal., there were some rather stiff grades to climb, but once in sight of San Francisco and the Golden Gate all difficulties were forgotten.

STEP TAKEN TO CHECK PRICE-CUTTING

Buffalo, N. Y., Aug. 2—Pursuant to their announced intention of reducing the objectionable price-cutting habit to its lowest possible terms, the Weed Chain Tire Grip Company, of New York City, announce that they have secured a restraining injunction in the Federal Court of the District of Western New York against the International Automobile League of Buffalo from selling Weed chain tire grips or parts thereof at lower prices than those marked on the bags containing the grips, or upon the Weed price-list.

The Weed people are the first to make successful fight against the International Automobile League, and their victory should receive the endorsement and support of every fair-minded motorist and accessory dealer. They have been uniformly successful in insisting upon fair business methods, have been pioneers in the struggle for the maintenance of prices, and their victory not only protects the trade in general, but makes for the betterment of every one interested in the automobile industry. Although price-cutting as a rule is objectionable, it must be admitted that many automobile accessories are listed at exorbitant prices.

WESTERN AUTOMOBILE BLUE BOOK

This week Volume IV of the Blue Book series, broadly covering the Middle West, is issued by the Automobile Blue Book Publishing Company, of New York and Chicago. Its routes begin at Buffalo and extend in a general way to the Mississippi and Missouri rivers.

By a far stretch this is the largest and most important route compilation ever attempted west of Pittsburgh, and the through lines of the route contain 20,800 miles of routes, nearly all of which were covered in the spring and early summer by the Blue Book cars. For every mile of travel, odometer measurements have been taken, and other data sufficient to enable the locally unacquainted tourist to travel the entire territory without trouble.

It is now possible for the owner of the Blue Books to leave almost any point in New England, New York State, Pennsylvania or New Jersey, and travel to Cleveland, Columbus, Cincinnati, Louisville, Indianapolis, Chicago, Detroit, Grand Rapids, South Bend, Madison, Wis.; Peoria, Galesburg, Davenport, Clinton, Cedar Rapids, Omaha or St. Louis, with facility. To further assist the tourist, 124 route maps and 79 city maps illustrate the 174 different routes. For the first time a general map has been made, giving in their proper geographical relation the main-traveled routes of Ohio, Indiana, Michigan, Illinois and portions of Kentucky, Wisconsin and Iowa.

By means of numbers placed clearly on the routes, it is possible for the user to find almost any route desired with a minimum of inconvenience, while initial and terminal points are cared for by an extensive "index of places."

The Automobile Blue Book Publishing Company has opened permanent headquarters at 1200 Michigan avenue, Chicago, where the full series of Blue Books will be kept permanently on file. They can also be had of the leading hotels, garages and booksellers in the principal cities, or from the Eastern office of the publishers, 239 West Thirty-ninth street, New York City.

BLUE BOOK ABSORBS N. E. RED BOOK

An important deal was consummated last week, when the publishers of "The Official Automobile A. A. A. Blue Book" purchased outright the entire route book and map business of F. S. Blanchard & Co., of Worcester, Mass., publishers of the "Red Book Automobile Guide of New England" and the "Pilot Maps." The "Red Book" will be consolidated with the New England section of the "Blue Book," and the information heretofore contained in the two volumes will hereafter be given in one.

Henry MacNair, the well known typographer, who prepared the routes and maps for the "Red Book," has joined the staff of the "Blue Book," and will continue his work in New England.

Tuesday of this week the New England road crew, consisting of E. R. Mixer and Mr. MacNair, started on the work for the "1910 New England Blue Book." Next week John Mixer and Robert Bruce will start in car No. 2 through New Jersey and the South, and car No. 3, in charge of John P. Dods, will leave Chicago to begin its work on the "1910 Middle West Book."

"El Toro: A Motor Car Story of Interior Cuba"—This is a story that is worth the reading, for, though it is written by E. Ralph Estep, advertising manager of the Packard Motor Car Company, and tells of a trip in a car of that make, the writer has not yielded in the least to the temptation to exploit the particular automobile in which he is naturally most interested.

Hence, he tells his story of Cuba brilliantly and interestingly, and it gives one the desire to tour in the "Gem of the Antilles." Of course, the book is profusely illustrated, and since no price is mentioned in its publishing, it is more than probable that the Packard Motor Car Company, Detroit, Mich., is prepared to supply a limited demand to those who may take the trouble to write and ask for the book.

THE AUTOMOBILE CALENDAR

Shows, Meetings, Etc.

Aug. 5-7.........Chicago, Midsummer Meeting Society of Automobile Engineers.
Sept. 21-23.......Cleveland, Good Roads Convention, American Automobile Association.
Nov. 6-13........Atlanta, Ga., Auditorium-Armory, National Automobile Show.
Dec. 31-Jan. 7....New York City, Grand Central Palace, Decennial International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.
Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.
Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Races, Hill Climbs, Etc.

Aug. 5...........Chicago, Fourth Annual Algonquin Hill Climb, Chicago Motor Club.
Aug. 7...........Richfield Springs, N. Y., Hill Climb, auspices of the "Earlington."
Aug. 26-27.......New York City, Brighton Beach, 24-Hour Race. Motor Racing Association.
Aug. 26-28.......Minneapolis, "Little Glidden Tour," Minnesota State Automobile Association.
Aug. 19-21.......Indianapolis Motor Speedway, First Race Meet.
Sept. 6-11........Lowell, Mass., Automobile Carnival, Lowell Automobile Club.
Sept. 10-11.......Baltimore, 24-Hour Race, Motor Car Racing Association of Maryland.
Sept. 15..........Denver, Col., Start of Flag to Flag Endurance Run to Mexico City.
Sept. 21..........Riverhead, L. I., Long Island Derby, Motor Contest Association.
Sept. 21-29.......Washington-Boston and Return, Munsey Reliability Run.
Oct. 7............Philadelphia, Second Annual Stock Chassis, 200-Mile Race, Fairmount Park, Quaker City M. C.
Nov. 9...........Atlanta, Ga., Track Races, Atlanta Automobile Association.
Dec. 29-30........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

FOREIGN

Races, Hill Climbs, Etc.

Aug. 22-29.......France, Reims, Aeroplane Races and Grand Prix, Aero Club of France.
Aug. 24-29.......Belgium, Circuit des Ardennes, and Coupe de Liedekerke, Belgium Automobile Club.
Sept. 5...........France, Mont Ventoux Hill Climb.
Sept. 19..........Austria, Semmering Hill Climb.
Sept. 22..........Austria, Coupe Rochet-Schneider.

WASHINGTON-BOSTON PATHFINDER AT IT

WASHINGTON, D. C., Aug. 2—With entries coming in rapidly and the work of mapping out the route under way, the Munsey reliability contest is beginning to take definite shape. The following entries have been received during the week: Walter Cram, Mitchell; Carter Motor Car Corporation, Cartercar; Lambert Automobile Company, Maxwell; Olds Motor Works, Baltimore branch, Oldsmobile. This brings the total up to eleven.

The Chalmers-Detroit pathfinding car left Washington last Friday with the following party on board: Karl Schnorr, driver; Thomas S. Rice, George Deatel and D. E. Taylor. Rice will write the pathfinding stories, Taylor will do the picture work, and Deatel will arrange for hotel accommodations, gasoline supplies, etc. The pathfinders were given a great send-off. Before the start President Taft received them at the White House and was given a brief history of the car's achievements.

Charles J. Glidden, in a telegram to the managers of the tour, said: "I wish to extend my congratulations to Mr. Munsey for arranging a tour of this character, which will be of unusual interest. You are sure to have a large number of entries and can expect some from this tour after its finish in Kansas City."

AUTOMOBILE ENGINEERS MEET AT CHICAGO AUGUST 5

THE annual meeting of the Society of Automobile Engineers will be held at Chicago, August 5, 6 and 7, with headquarters at the Illinois Athletic Club, whose hospitality has been extended to all members of the society, with attending advantages. such as rooms for the members and living facilities. Members of the S. A. E. who are members of the I. A. C. will be the guests of F. J. Newman, chairman of the local committee of the S. A. E., and this, together with other calculating preparations at the hands of a very active local committee, must, as a natural sequence, result in an enjoyable visit of the members of the society.

Among other events of interest, to act as a magnet in drawing a large attendance, will be the annual hill climb, known as the Algonquin. This event will fall on August 5, and provision has been made for all members who may care to enjoy the ride. On Friday, when the members will be back from the hill climb, serious business and a fine selection of papers of a technical character will be presented. Visits to the shops of the industry in that locality will be made, and entertainment of a varied character is promised.

The society, now a four-year-old, has grown and prospered; its doings are heralded as of the greatest importance to the industry, and the membership is composed of the engineers and associates, who are largely responsible for the growth and stability of American-made automobiles. That there is a great advantage attending the Association of Automobile Engineers on a neutral basis is self-evident, and when standardization of parts is taken up at greater length it must be done under the direction and authority of just such a body, independently of any taint of trade affiliations.

That there is a demand for a society such as this is proven by the events in its history, dating from the struggle of its first president, A. L. Riker, whose privilege it was to wrestle with inertia which is bound to influence any new movement; after two years, Mr. Riker handed the reins to Thomas J. Fay, who, as second president of the society, held four meetings during that year and inaugurated a campaign of membership, ending in quadrupling the same. Henry Hess, the third and present holder of this important office, brings to bear a wealth of administrative ability and a zeal which promises to break all bounds. The committee work is in the hands of a band of workers of whom it may be said that failure is wholly unknown. The committee assignments, as promulgated by President Hess, are as follows:

Meetings—H. M. Swetland, chairman; H. E. Coffin, David C. Fergussen, A. L. McMurtry, F. J. Newman.

Finance—H. M. Swetland, chairman; B. D. Gray, W. S. Gorton, W. R. Wall, R. H. Whiting.

Membership—F. J. Newman, chairman; H. G. Chatain, James H. Herron, J. C. Perrin, John Wilkinson.

Publication—Prof. Rola C. Carpenter, chairman; H. F. Donaldson, Charles E. Duryea, E. A. Rutenber, E. T. Birdsall.

Papers—Prof. Rola C. Carpenter, chairman; H. F. Donaldson, Charles E. Duryea, C. B. Hayward, Herbert L. Towle.

Library—H. G. Chatain, chairman; Herold B. Anderson, J. M. Elsworth, Henry Souther, F. B. Stearns.

House—H. E. Coffin, chairman; A. C. Bergman, A. J. Moulton, Henry Souther, G. A. Wells.

In view of the large attendance, by the large Eastern contingent, the members concluded to engage a special car on the Twentieth Century Limited, over the New York Central & Hudson River Railroad, which left the Grand Central Depot at 3:30 P. M., on August 4. This contingent included many members from New England, although members from Boston, Worcester and vicinity preferred to go by a more direct route, by way of Albany. Buffalo is also well represented.

GOOD ROADS DELEGATES TO MEET AT CLEVELAND

CLEVELAND, Aug. 2—The large amount of road construction which is being done near this city gives it many advantages as a meeting place for the second annual National Good Roads Convention, which will be held here September 21-23 under the auspices of the American Automobile Association, the National Grange, the U. S. Office of Public Roads and the American Road-Makers' Association. The work of the convention in Buffalo last year attracted much attention among automobilists and engineers, and it is expected that as a result the delegates this year will be more numerous and more representative.

F. A. Pease, chairman of the Demonstration Committee, has made out a tentative plan of the exhibits of practical road work, and is now preparing a map of the city showing the different localities selected. Examples of almost every known sort of road construction are included.

East of Cleveland Heights the County Commissioners are building a brick road, the brick being four inches deep and laid on a four-inch concrete base, between Portland cement curbs that are molded in place. This stretch is about four miles long, and during the convention may be studied in all its stages, from sub-grading to completing the finished surface. Through the same village a new macadam road is being built, the surface being trap rock three inches in depth laid on a twelve-inch limestone telford base. Another extensive improvement is being made on Euclid Boulevard. Here the foundation is nine inches in depth, of crushed limestone, the surface to be filled with asphalt or coal-tar sufficient to render it impervious to water.

An illustration of economical work will be seen on Lee Road. The construction consists of six-inch blue sandstone, hammer-broken, and placed on the sub-grade as closely as possible. Stone screenings are scattered over the surface and thoroughly flushed in before rolling. After the sandstone is compacted a four-inch wearing surface of blue limestone is rolled on, the top layer being filled with coal tar as the work progresses. The cost of this construction is about 70 per cent. of that of the trap-rock roads.

The committee is also planning to give a very thorough illustration of culvert work, and A. Felgate, the Bridge Engineer of Cuyahoga County, will read a paper dealing with their construction. Examples will range from 36-inch box culverts to a magnificent concrete arch of a span of 280 feet now being erected over the Rocky River, west of Cleveland. Another question that will be taken up is that of the testing of materials, and the committee will emphasize the necessity for the careful inspection of such materials while also illustrating the methods by which accurate tests may be made.

The committee in charge of the tests and demonstrations includes, besides F. A. Pease, the chairman, L. W. Page of the Office of Public Roads, Washington, D. C.; J. C. Wonders, State Highway Commissioner of Ohio; Col. W. D. Schier, State Highway Commissioner of Massachusetts; Robert Hoffman, City Engineer of Cleveland; A. B. Lea, Engineer of Cuyahoga County; W. A. Stinchcomb, Park Engineer of Cleveland; G. T. Barnesley, Road Engineer of Alleghany County, Pa.; William Dilger, Detroit, Mich., Superintendent of Parks, and H. H. Johnson and E. A. Merritt, of the Cleveland Automobile Club.

Capitalist Edwards Delivers Deed to Manager Morris

Climax of the ceremonies attending the breaking of the ground for the new factory of the Model Automobile Company, at Peru, Ind., which will be devoted exclusively to the manufacture of Great Western automobiles.

MODEL BREAKS GROUND FOR NEW PLANT

PERU, IND., July 31—Wednesday was a big day for the industry in this city, as it was the day set for breaking ground for the new factory of the Model Automobile Company, makers of Great Western cars, which will total in length some 470 feet. The occasion took the nature of a civic holiday, and the parade was under the auspices of the Automobile Club of Peru. All makes and styles of autos were in the procession, but all paid courtesy to the home concern by carry streamers bearing the legend, "Great Western Building Celebration," and proceeded to Oakdale, the suburb where the new factory is to be located. A large platform wagon served as a stage for the ceremonies, which took place at three o'clock in the afternoon and consisted of songs by the Model male quartet, speeches by C. Y. Andres, president of the Commercial Club, and A. L. Bodurtha, vice-president of the Model Automobile Company; presentation of deed and abstract to ground, by R. A. Edwards, president of the Oakdale Improvement Company, and acceptance by E. Mack Morris, general manager of the Model Automobile Company. The first shovelful of dirt was turned by R. H. Bouslog, secretary and treasurer of the Model Automobile Company. Max Kraus officiated as chairman of the meeting, and the exercises were concluded with the national anthem by the Third Regiment band. Light refreshments were served to the crowd, the Model people acting in the capacity of hosts.

Model Automobile Company Using Tents to Finish Cars

So pressed for space have the makers of Great Western automobiles become that it was necessary during the past month to erect tents to carry on the construction work during the erection of the new plant.

REGAL FINDING GOOD ROADS IN WEST

RAWLINS, WYO., July 29—Good is the best word to describe the condition of the roads as the Regal transcontinental plugger is finding them West of Denver. Leaving there after a very hearty send-off, and on a perfect day, the trip to Greely, 57 miles out, was made in excellent time. The course pursued took the car over the course of the annual Rocky Mountain Endurance run. Not contented with Greely as a day's work, the run was continued to Pierce, a boom town, and beyond that to Carr. The riding between the last two towns was the best by far that has been encountered thus far.

North of Carr and approaching the Wyoming line, the country suddenly broke into a series of small, sharp, steep foothills. The road surface continued so good, however, that the first hundred miles out of Carr were traversed in three hours and three minutes. Just beyond this darkness fell and the car was obliged to "creep" into Cheyenne, having no gas tanks.

Thursday morning found the car facing the first real climb to the summit of the Great Divide, the day's program being something like 6,000 to 8,000 feet of climbing to be done in 14 miles. With a bright day, cold sharp air, and continued good roads, the "stunt" was accomplished before noon, a lucky shot from the tonneau near the top bringing down the first game, a wildcat. After a short stop to inspect the Ames monument erected at

Home of the Guide That Showed the Regal the Way

This shack is located on the plains about 50 miles from Denver, and is the home of the guide that escorts tourists across the desert stretches where the road is hard to follow.

the Divide by the Union Pacific Railway, the tourists pursued their onward course to Laramie.

This was reached in a short time, because mostly down grade, the trip down being characterized by but one incident, that of losing the road. Little time was lost in finding the trail, however, and the day was closed with a fast run into Rock River.

Starting early the next morning from Rock River, trouble was also met very early, the car accompanying the pluggers being found three miles West, hopelessly sunk into an irrigating ditch. With the aid of block, tackle and stout manilla line, the car was quickly extricated, and they went on their way rejoicing that the pilot was on hand to direct them to the right roads. With this aid, six hours of hard work saw them into Medicine Bow, where the night was spent.

To-day saw the long fight lasting from Medicine to Rawlins, 60 miles. Noon found them at Hanna for dinner, and beyond that, the Union Pacific had to be crossed, two hours being lost. Fort Steele was reached at 3 p. m. and finding the bridge down, it was necessary to cross on the rails and ties of the Union Pacific steel bridge. Permission had to be obtained first, which lost them several valuable hours. This having been obtained with only the loss of time and temper, the car proceeded to bump its way across the river on the ties of the railroad bridge.

After the climbing which has been undergone, the prospects for the immediate future are looked upon with equanimity.

WHY STUDEBAKER IS EXCEEDINGLY ACTIVE

DETROIT, MICH., Aug. 2—Is the automobile industry about to witness the formation of another "combine" that will combat the General Motors Company, at present holding the center of the stage through its acquisition of a string of factories in Detroit and throughout Michigan? Those actively identified with the latest move which is causing speculation, deny that there is any thought of a "trust." but wise ones shake their heads and opine that if nothing more tangible comes of it, a hot pace will be set for others as a direct result of the activities of the Studebaker E-M-F interests.

Following close in the wake of the E-M-F Company's purchase of the De Luxe Motor Car Company's plant, and the announcement of the Studebaker-Flanders "Twenty" for next season, comes the news that the same concern has bought outright the plants of the Western Malleable Steel and Forge Company adjoining the De Luxe property, and the Monroe Body Company, of Pontiac, Mich., consideration for both being in the neighborhood of $500,000.


Where the Studebaker-Flanders "Twenty" Will Be Built at Detroit

The acquisition of these plants puts the E-M-F Company in a position where it is practically independent in the matter of drop forgings (in the manufacture of which, on an immense scale, the Western Malleable Steel and Forge Company has been engaged) and in bodies.

Not content with what has already been accomplished, permits have been issued to the E-M-F Company for two new structures it will erect, on land adjoining the De Luxe plant, and which will cost $75,000. Both are to be three stories in height, one 460 x 56 feet on the ground, and the other 240 x 60 feet. It is this rapid expansion on the part of the E-M-F Company and its alliance wtih the Studebaker Company (which will market the entire output of the two local factories in addition to the Studebaker-Garford car) that has set tongues wagging anent the possibility of a "combine" to oppose the General Motors Company.

"Nothing to it," says Walter E. Flanders, president and general manager of the E-M-F Company. "We will be too busy the coming season producing 15,000 Thirties and 25,000 of the new Twenties, to bother about what the other fellow is doing. In order to manufacture cars on such a hitherto unheard-of scale, and turn them out on time, we must have sources of supply that will absolutely insure against anything going wrong. That has been the reason prompting us to acquire these additional properties—that and nothing more. We wanted to be independent. Within a few months, with the additions now being made to the E-M-F plant and the new structures that will shortly be commenced on the property just acquired, we will be in that position."

Fairview's Relations to Chalmers-Detroit

DETROIT, MICH., Aug. 2—The Fairview Motor Company, recently incorporated, is virtually a part of the Chalmers-Detroit Company, organized for the purpose of manufacturing and putting on the market a motor truck (with which experiments have been conducted for some time with success), taxicabs, and other vehicles of a business class. Plans are being prepared for a new $150,000 plant, to be erected near the Chalmers-Detroit buildings.

Rumors to the effect that the E. R. Thomas Motor Company of Buffalo was about to be merged with the Chalmers-Detroit Company gained wide circulation and were given some credence. Hugh Chalmers brands such talk as idle, declaring that a move of this nature is not contemplated. E. R. Thomas also is emphatic in declaring that no negotiations are pending, and that none have been started.

Timken Learns Detroit Is Growing

DETROIT, MICH., Aug. 2—The Timken-Detroit Axle Company has received a forceful but by no means welcome demonstration of the fact that, thanks in a large measure to the automobile industry, Detroit is growing by leaps and bounds. Upward of 300 employes were brought here from the parent plant at Canton, Ohio, when the local factory opened a month ago. Many of the imported men were unable to find houses for their families and returned to Canton. The shortage of houses still continues, and the firm is at a loss to know how the men and their families are to be housed that a sufficient supply of skilled labor may be kept on hand until new houses are erected.

SATISFACTORY END OF POPE RECEIVERSHIP

NEWARK, N. J., Aug. 2—More details of the wind-up of the Pope Manufacturing Company's receivership have been made public since the first announcement last week. According to the final report filed by Sherrerd Depue, representing Albert L. Pope, Egbert J. Tamblyn and George A. Yule, the receivers, 23,714 and a fraction shares of first preferred stock are involved in the reorganization scheme, and there are sufficient assets remaining to pay a dividend of 41.28 per cent. The receivers asked permission to pay into court $8,061.42, representing the dividend on the 195 shares of stock not included in the reorganization, for ultimate distribution among their holders. The report also indicated that the receivers paid to general creditors claims amounting to $1,505,798.30, with interest.

Vice-Chancellor Howell directed the receivers to turn back the plants of the company at Hartford, Conn., and Westfield, Mass., to the reorganization committee, composed of Harry Bronner, F. H. Ecker and Harry Hecksher. This committee further offered to pay all the expenses of the receivership. Mr. Depue also acted for the receivers of the Pope Motor Car Company, and in his report declared that all commissions of the receivers in the various jurisdictions, remuneration for receivers' counsel and all other charges pertinent to the receivership had been settled.

Told in the Progress of the Industry

Longest Trip on a Moon Car—Very recently a long tour, started on the spur of the moment, was taken by a Western man without any necessary repair or replacement to spoil the continuous pleasure of the trip. Starting from Chicago immediately after the Cobe and Indiana Trophy races, A. M. Robbins, manager of the Centaur Motor Co., of Illinois, drove to Jackson, Mich. The next day he drove to Detroit and, putting the car on a boat, he shipped it to Buffalo, running to Geneva, N. Y., that afternoon in a heavy rainstorm. Syracuse was made the next noon and Albany was reached that night, 168 miles in 6 hours and 15 minutes. The next day Robbins made 198 miles to Boston in 10 hours. After driving 700 miles around Boston he came back over the "scenic" route through the beautiful Berkshires and northern Massachusetts—Old Concord, Fitchburg, Brattleboro, Vt., Bennington and Troy. From Albany he drove through Canandaigua, Seneca Falls, Buffalo, Toledo and South Bend. Not once on the trip of 3,000 miles did he touch a tool to the car, not even to replace a spark plug. The day of his return the car went into demonstrating service without being even looked over.

For Premier Owners in Philadelphia—For the entertainment of its numerous patrons, the Motor Company, of Philadelphia, which handles the Premier car in the Quaker City, has promoted a roadability run to Cape May for September 11-12 next. Only owners of Premier cars will be eligible, and the first prize will be a solid silver punch bowl, which will go to the owner of the car who covers the route of upward of 90 miles, nearest to the secret official time. On arrival at Hotel Cape May, all the participants, drivers and friends will become the guests of the motor company, one whole floor of the hotel having been reserved for them. After 6 o'clock dinner there will be dancing in the ballroom, presentation of prizes by President H. O. Smith, and a late supper in the grill room. Sunday morning will be spent in the surf. sailing and fishing and, following midday dinner, the start for home will be made at about 2 o'clock. The company has made arrangements for stops for refreshments at Egg Harbor and Tuckahoe on the downward trip. Thirty-seven entries have already been received.

Injunction Granted to Mezger—In the past the automobile business has been famous for the ease and freedom with which ideas were borrowed bodily, patented ideas being no more sacred than others. Now the situation is beginning to improve, because owners of patents are beginning to fight to retain their rights under the government papers granted them. Thus, the C. A. Mezger Department of the United Manufacturers announces that it has secured an injunction against the New York Sporting Goods Company in the Circuit Court for the Southern District of New York, restraining the latter from selling imitations of the "Automatic" wind shield, or in any way infringing upon the patents controlling the same. Moreover, the Mezger Department announces that the future policy will be to protect itself under all of its patents.

Rambler Winning Honors on Coast—Four hundred and eighty-seven miles, the distance between Los Angeles and San Francisco, in 16 hours 46 minutes and 30 seconds is the new record established last week by L. B. Harvey, of San Francisco, in his new Rambler Close Coupled Model Forty-Five. Harvey left Los Angeles at 3 in the morning, reaching Santa Barbara in 4 hours and 55 minutes. Between Los Olivas and Santa Maria time was lost because of washouts on the road. A puncture delayed the trip at San Luis Obispo, and at one point the driver lost the road, thereby losing half an hour. This Rambler also holds the record for the round trip between Los Angeles and San Diego, winning the Chanslor-Lyon trophy in that run in December of last year. Three hundred and thirty-one miles in 10 hours and 32 minutes, over roads not prepared or patrolled, is the record in this contest.

Automobile Parts Business Expanding—Among the newcomers in Detroit, indirectly connected with the automobile business, is the firm of Schweppe & Wilt, of which W. H. Schweppe is president; A. D. Wilt, Jr., vice president and general manager; Marvine Gorham, secretary and treasurer, and F. R. Heym, factory manager. Starting about two years ago to manufacture steering gears, the growth has been so rapid that incorporation was deemed necessary. Recently the firm has moved into larger quarters on the corner of Meldrum and Champlain streets. In the new building many additions have been made to the equipment, including a large number of automatic and screw machines. With improved factory facilities and a highly specialized personnel, the business is growing by leaps and bounds.

Big Implement House Buys Ramblers—Within the past two or three years, implement dealers all over the country have taken to watching with careful eye the progress of the automobile. In this connection, it is significant to note that one of the largest, located in the middle West, has just completed arrangements to handle the Rambler. This is the Kingman St. Louis Implement Co., St. Louis, and the territory assigned to it is Arkansas, eastern Missouri and southern Illinois. Before selecting this car the implement company satisfied itself as to the selling merits of the same in competition with several well-known makes. The choice of the Rambler is then very gratifying to its makers, the Thomas B. Jeffrey Co., Kenosha, Wis.

Rider-Lewis will Build 3,000 Cars—Attention is called to the fact that when it was stated that the Rider-Lewis Motor Car Company would produce "a small but nearly perfect" number of machines, the word small was used in a relative sense. It develops, however, that this number has been increased to no less than 3,000 cars for the balance of 1909 and the year 1910. In the description of the output of this company in the July 22 issue of THE AUTOMOBILE, it was erroneously stated that the four-cylinder car was equipped with 2 1-2-inch tires. This was a typographical error for 3 1-2-inch tires, the actual size fitted.

Couldn't Have Won Without "Gobbo"—Of the eight starters in the last Brighton Beach 24-hour race, six were equipped with the god of luck, "Gobbo," showing that even the nerviest and most daring of drivers are superstitious. This was distinctly a "Gobbo" victory, as was also the 100-mile race at the same race meeting, in which the S. P. O. car went through the entire contest without tire or other trouble, due to the presence on the radiator of the good luck bringer. Its makers, the Motor Car Equipment Company, New York City, report a very large and growing demand for this and similar emblems.

E. & J. Build in Detroit—The Edmunds & Jones Manufacturing Company, makers of E. & J lamps, are building a new plant which will quadruple their present capacity. It is located at Lawton street and the Michigan Central Railroad. The building is to be three stories high and will be in two wings, 215 feet long and 6c and 90 feet wide. This will give the company a floor space of over 60,000 square feet. In addition there will be a power plant 40x60 feet. Connection will be made with the railroad by a private spur track The factory will be in operation in time to assure prompt deliveries in 1910.

Michelins "As Usual" at Brighton—After the recent Brighton Beach race were over, Wilbur Hobbs, manager o the New York branch of the Micheli Tire Company, although he had been o duty steadily, was not too tired to tal about its victories. "Michelins, 'as usual won first, second and third in the 24 hour contest," he said, "as well as in th 100-mile, and in addition we took fir in the 50-mile, the 5-mile and the mi events. In fact, we secured first pla in every event on both days except in a uncontested 5-mile race and the moto cycle races. That's going some."

Automobile Parade for King Wamb—One of the spectacular features of t King Wamba festival, which is to be he at Toledo, O., late in August, and whi has been extensively advertised througho the country, will be an automobile para It will take place at night, and handso and valuable prizes will be given for t winners in three classes, into which t kinds of decoration are to be divided, vi handsome, grotesque and mechanical. each class the winner is to receive a f silver loving cup with corresponding pri for secondary winners.

Glove Makers Have High Old Tim—On Saturday of the coming week th will be "nothing doing" at the plant the Fried-Ostermann Company, at Ro ford, Ill., since this is the day set as for the employees' outing. Taking steamer to Brown's Creek, the day be spent in having a high old time. elaborate program has been arran including athletic games, baseball gan together with much vocal entertainm An orchestra will be taken along, w the men and women have both for quartets.

Tire Prices Not Increased Proportionately—While the price of all makes of tires has been increased very recently, the manufacturers of Continental tires give it as their opinion that the prices have not gone up as much in proportion as has the price of raw rubber which tire makers are obliged to pay. Attention is also called to the new Continental list, No. 12, and a booklet that has been recently published entitled "Continental Ready-Flated Tires," which is now available for free distribution.

1906 Loco "on the Job"—George T. Lincoln, a Boston automobile enthusiast writes that his 1906 Locomobile has just finished a tour of 1,100 miles in England and Wales. He says the car is evidently determined that no Englishman shall suspect that it has already some 50,000 miles to its credit in the United States. It is running as well as a new car and much quieter than the English cars met on the road. Mr. Lincoln is now in France, where he expects to make a long tour.

Timken Axle Makers' Banquet—The Officers of the Timken-Detroit Axle Company tendered a banquet to their president, William R. Timken, at the Hotel Pontchartrain, Detroit, last week. Among those present were Mr. and Mrs. A. R. Demory, Mr. and Mrs. E. W. Lewis, Mr. and Mrs. H. W. Alden, Mr. and Mrs. F. C. Gilbert and Mr. and Mrs. W. H. Hutton, all of Detroit, and Webb Artz, of Cleveland.

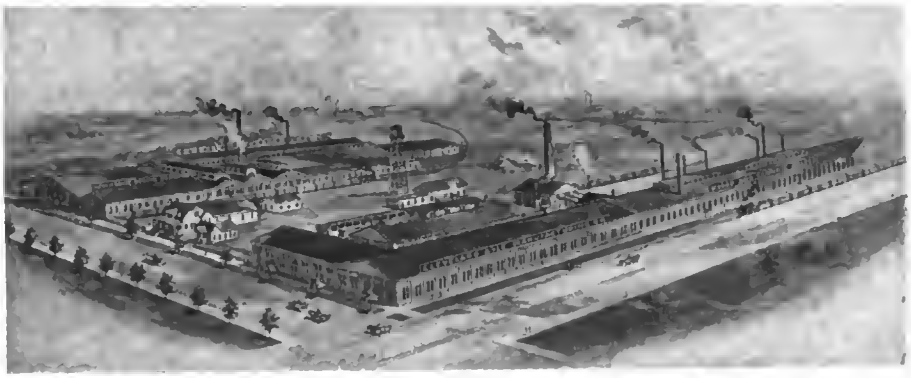
Ajax Shows Well in Glidden—Reports from Denver show that the pairs of Maxwells and of Brush runabouts in the Glidden tour have had remarkably little trouble with their Ajax tires. The Maxwells traveled from the factory, at Tarrytown, N. Y., to Denver, a distance of 2,700 miles, on the original air, and the Brushes would have made a similar record were it not for a single puncture on a rear tire.

PERSONAL TRADE MENTION

D. B. Marwick, formerly superintendent of the Columbia Steel Company, and more recently special steel export with the A. O. Smith Company, has been appointed general manager of the Stanley Steel Works, New Britain, Conn.

R. H. Williams has joined the ranks of the F. B. Stearns Company, of Cleveland and will represent it upon the road in the southern section of the country. He was formerly identified with the retail trade.

William S. Eaton, who, until lately, was with Burr & Co., New York City, has accepted the position of superintendent with James Cunningham, Son & Co.



Cleveland-Canton Spring Company's Factory As It Appears with the Latest Addition

CLEVELAND-CANTON SPRINGS

CANTON, O., Aug. 2.—The Cleveland-Canton Spring Company is now occupying a large addition to its factory, which was recently added to keep pace with its growing trade in automobile springs. It was not until about a year ago that this company seriously engaged in the manufacture of springs for automobile use, but it has met with remarkable success, and is now supplying a number of prominent manufacturers.

The company has spent considerable time and money in experimenting, and has decided that, aside from the proper quality of steel, the most important factor in the production of a spring to meet the exactions of automobile usage is the heat treatment. To carry out its ideas in this respect the company has installed special gas-heated kilns which can be kept at a constant known temperature, and in which the steel bars never come in direct contact with the flame. Supplementing these kilns are a series of oil baths kept at certain degrees of heat to assist in tempering.

The springs in different stages of development are put through many different tests. First is a chemical analysis of the steel bars, showing whether they come up to the specifications. Next are the tests for crystallization and permanent set. Finally the springs are tested for mechanical construction and for carrying capacity, and then, after the final grinding and polishing, they are ready for use.

The exclusive devotion of such a large plant to the manufacture of a single part is one of the best instances of the specialization now characteristic of the automobile industry. That it is a change for the better no one can doubt, as few car manufacturers could afford such scientific methods.

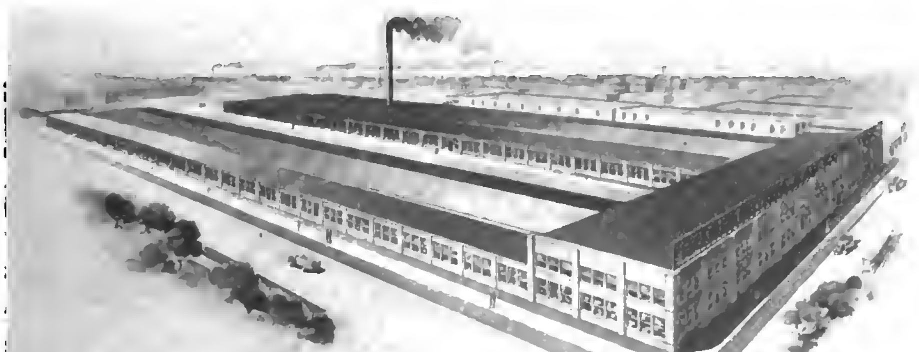
CHICAGO DEALERS' FIELD DAY

The second annual field day of the Chicago "automobile row" was held last Thursday at the Fox River Country Club. More than a hundred dealers, with their employees and friends, made the fifty-mile trip in automobiles and enjoyed a day out of doors. The program included all sorts of athletic and other events, and although no world's records were broken everyone seemed well satisfied. Henry Paulman, the Pierce-Arrow representative, won the golf championship; the bicycle race was taken by Harry W. Cooper, manager of the Excelsior Supply Company's branch; the 100-yard dash went to Harry Watts, of the United Manufacturers; the trap shooting to Thomas J. Hay, manager of the Ford branch; the pool championship to F. E. Sparks, of the United Manufacturers; the swimming race to George Gaidzik, of *Motor Age*, and the bowling to C. G. Sinsabaugh, also of *Motor Age*. Harry Watts took the Paulman trophy for the all-round championship by his victory in the sprint and second place in the swimming race. The roll of the dealers includes some real athletes, too, for George Gaidzik is the Olympic swimming champion.

IN AND ABOUT THE AGENCIES

Thomas, Boston—At the dealers' convention of the E. R. Thomas Motor Company, at Buffalo, last week, it was announced that Charles S. Henshaw has been engaged to open and manage a Boston branch for the sale of the Thomas line. The new arrangement took effect on August 1, and it is the company's intention to establish one of the finest branch houses in the East. Until the new location is decided upon, the Boston headquarters will be at 288 Columbus avenue, where Mr. Henshaw sold Thomas cars successfully for a number of years.

Pullman Agencies—The York Motor Car Company, of York, Pa., announces the following 1910 agencies for the Pullman: L. M. Alleman, Littlestown, Pa.; Longstreth Motor Car Company, Philadelphia; B. F. Futer, Lancaster, Pa.; Hamilton Auto Company, Allentown, Pa.; D. B. Hoffer & Sons, Reading, Pa.; V. A. Simrell, Scranton, Pa.; Syracuse Motor Car Company, Syracuse, N. Y.; Pullman Motor Car Company, Cleveland, O.



Extensive Plant at Detroit, Where the Hupmobile Cars Are Built

Recent necessary additions to the factory where the Hupp Motor Car Company holds forth have brought the size of the plant up to the present imposing appearance as shown in the illustration above.

RECENT BUSINESS CHANGES

King Leather Tire Company, of Milwaukee, Wis., on and after August 1, will occupy new quarters at 3417-3419 Vliet street. The large volume of business done forced the company to make this change.

Information for Auto Users

New Eames Socket Wrench—A socket set which looks as though it might earn its keep in automobile work, is that brought out by the Eames Manufacturing Company, 44 Broad street, Boston. The handle is hinged just above the socket holder, and may be used at any angle; it also has a removable T-head. Twenty-two sockets are furnished, including a special long one

FULL CASE OF EAMES SOCKET WRENCHES

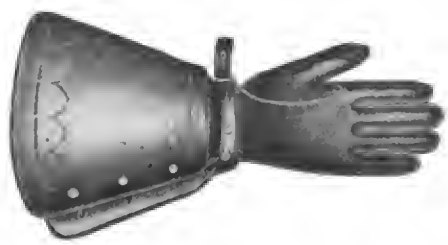
for spark plugs; they are of pressed steel, thoroughly annealed, and are held in place by a friction grip. All common sizes of hex and square nuts and cap screws are provided for. The case consists simply of a heavy wood block bound with brass, with a sheet of oak-tanned leather as cover. There are no hinges or catches to break and no thin wood cover to smash. The leather also keeps the wrenches from rattling. The entire set weighs only five pounds.

Veeder New Small Odometer—The Veeder Manufacturing Company, of Hartford, Conn., recognizing the fact that the small attachments on motorcycles are subjected to very hard usage, has brought out a special type of small odometer or cyclometer for this work. The case is larger in size than in the regular bicycle cyclometer, the gearing is heavier and it is equipped with a larger star wheel. A feature deserving special mention is the adjustable bracket, which can be adapted to any American or foreign motorcycle by adjusting a single nut. The instrument has both trip and season dials, with the mile figures in white and the tenths in red, on a black background. The figures are large enough to be easily read from the seat of the machine. The cut, about two-thirds full size, gives a very good idea of the neat and compact appearance of the instrument in its entirety.

SMALL VEEDER ODOMETER

General Accumulator Company Specialties—A good line of automobile specialties has been put on the market by the General Accumulator and Battery Company of Milwaukee, Wis. One of these is the "Radium" battery, of which the distinctive feature is the gauge, which tells the available charge at any time, and obviates the possibility of running out of current on the road, as well as the danger from overcharge. This company's decarbonizer has been on the market for four years, and has found a wide recognition among autoists who tried its use in cleaning their cylinders. The advantages of the chemical method of removing carbon over the mechanical method are now widely admitted. A third specialty is a new spark-plug, which is doubly insulated. All the lower inside walls are lined with durable fireproof porcelain, in addition to the usual porcelain insulation, so that short-circuiting is practically impossible.

New Price Automobile Gauntlet—A new style of the Price gauntlet has been put on the market by the makers, the Fried-Ostermann Company of Rockford, Ill. Many autoists will find this gauntlet very convenient, as its construction permits either a broad, flaring cuff, as in the familiar non-adjustable types, or one

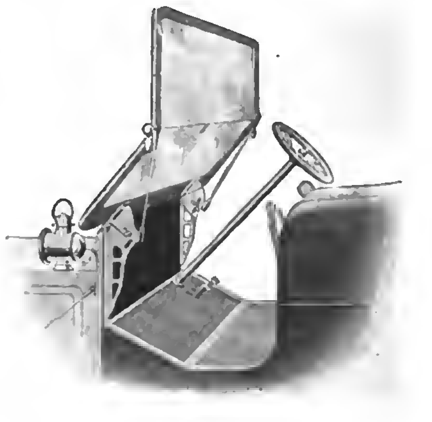


NEW STYLE PRICE GAUNTLET GLOVE

that will fit the sleeve of a light-weight coat snugly, keeping out the dust. The adjustment is accomplished by means of snap buttons and requires only a few seconds' time.

Perry Non-Skid Tire Chains—This new device, marketed by the Perry Chain Grip Company, of Lansing, Mich., differs in several respects from the usual type. All the cross chains are swiveled, so that they wear on all sides equally. Then, too, each cross chain has a spring tension hook, which keeps it tight and prevents rattling. Should one break, there is no need to go on with the ends rattling against the fenders, as a new one can be snapped in place in a few seconds. The separate cross chains are sold at a nominal price and a few of them can be kept in the tool box.

The Burrowes Wind Shield—The Burrowes wind shield, made by the E. T. Burrowes Company of Portland, Me., is of the divided type, but differs from the usual construction in that the angle of both the upper and lower portions is adjustable. It may thus be placed in half a dozen different positions to suit the driver's convenience. It may be set with both sections vertical, in line with the dash, in the usual position; or the upper section may be folded down on



DIVIDED TYPE OF BURROWES SHIELD

the lower, and both tilted back, so that their upper edge is well below the driver's line of vision. For work with a cape top in stormy weather it may be set with the lower section tilted back and the upper vertical; in this position its upper edge is far enough below the top to allow a ventilating current of air to pass, while at the same time it is far enough behind the front edge of the top to keep out the rain. Another desirable feature is that there is no horizontal brass bar on the dividing line to obstruct the driver's view. The frame of the shield is made in wood, either birch or mahogany, reinforced with metal. A rain-drip extends over the joint with the dash, thus preventing water from running down on the inside. The plate glass of the top section is 3-16 inch thick and that of the lower section 1/4 inch; the upper overlaps the lower 1/2 inch, thus making a rain-proof joint. When adjusted and locked in any position the shield will not rattle, and, in fact, is said to be more rigid than most non-adjustable screens.

Stamped Aluminum Floor Covering—The Factory Sales Company, 1438 Michigan avenue, Chicago, announces a new automobile floor covering, for which is claimed many points of superiority over rubber, corkaline and other materials. This flooring is stamped from an aluminum alloy into pyramid shape, and is afterward sand-blasted to give a uniform rough finish. It is designed to lay over the regular floor boards, secured in place by special binding strips. The metal is much harder than ordinary aluminum, making it very durable. Its most attractive feature, of course, is its cleanliness. It is furnished in sheets 36 x 85 inches, and as it is finished clear to the edges there is no waste. This flooring is being adopted by several makers, and will be found especially helpful to those who are rebuilding or remodeling old cars.

To Keep the Machinery Clean—The Auto Waste Company, of Hartford, Conn., has placed on the market a high-grade Sea Island long-fiber waste, especially made for automobile use. The same company also makes a line of wiping cloths of all sizes.

VOL. XXI NEW YORK—THURSDAY, AUGUST 12, 1909—CHICAGO No. 7

THE AUTOMOBILE

VICE-PRESIDENT HONORS RICHFIELD CLIMB

Vice-President Sherman Presenting Trophies to "Billy" Bourque

Bourque, Knox Three-Time Winner In Action

RICHFIELD SPRINGS, N. Y., Aug. 7—Never before, in these United States, has one high in the councils of the nation favored an automobile event with his presence. Today's hill-climb had as its chief attraction, James S. Sherman, Vice-President of the United States, whose home is in Utica, not many miles from this delightful pioneer resort among the Otsego hills. Vice-President Sherman toured here from home in his own car, enjoyed a fast canter over the course in an ex-Vanderbilt race participant, and then graciously presented the prizes to the winners, punctuated more or less with the famous smile which has won for him the sobriquet of "Sunny Jim."

"Billy" Bourque, driving a pair of 1910 Knoxes, was the substantial winner of the meet, for his victories were gained with stock cars similar to those anyone may purchase from the factory in Springfield, Mass. Of course, the spectacular feature of the climb was contributed by Fred. K. Burnham at the wheel of the 120-horsepower Fiat racer which Lancia piloted in the Vanderbilt Cup race of 1906. But when one realizes that the car from Italy is rated at 120-horsepower, while the American stock contestant only boasted of 40-horsepower, the real honors belong to the latter, even in the free-for-all; for Bourque first tied Burnham in :47 2-5, though in the run-off the American fell back :48, while the foreigner cut its time to :45 4-5, which was a mile-a-minute for the nearly three-quarters of a mile course.

It so happened, in order to get the starting place in front of the Hotel Earlington (whose proprietor, Gasherie DeWitt, was responsible for the holding of the climb) that the distance was just twenty-seven feet more than the three-quarters, allowing for a flying start and plenty of room in which to slow down after passing the finishing mark. A most convenient road in the rear

Burnham, Driving ex-Vanderbilt Cup Fiat, Winner of Free-for-All

provided a return to the starting point without utilizing the course, thus preventing delay in running off the events. While the surface of the road was rather rough, it had been carefully prepared for the day, with dust practically eliminated. The arching shade trees added much to the natural beauty of the picturesque course.

Although there were some scratches in the entry list, the fifteen cars participating appeared several times, which, together with the practice spins, gave the spectators a sufficiency of sport. Next to the ex-Vanderbilt racer and the star Knox performer, the fastest car was a 90-horsepower Simplex, in which amateur Burnham again figured as the steersman. Its winning of the $4,000 and over class was accomplished in :52. The two Knox cars have new engines in which the bore has been increased an eighth of an inch for the 1910 season, one being equipped as a runabout and the other contesting in stripped form. Two of the new four-cylinder model Q Maxwells appropriated honors in the small-car class, with Arthur See at the wheel of the faster one, which made its climb in 1:13 4-5. The Pierce Arrow, with "Tony" Ledermann driving, had an unopposed victory in the six-cylinder class, and the Buick also took two events with nothing to compete against except the electric timer.

The clocking was attended to by P. A. Sayles and George McGraham, of the Timers Club, of New York. They had the device on hand which has been used at all of the prominent automobile race meets, and it gave the usual complete satisfaction. McGraham took care of the start, being on the line with Vice-President Sherman, and as each speeding contestant passed he pressed the key, which did the work at the business end of the instrument—at the top of the hill. Three stop watches were started, when the circuit was closed at the foot of the climb, and Sayles presided over them at the finish.

With Fred Wagner's characteristic celerity as starter all the events were run in slightly over an hour, with no waits except when the Chalmers-Detroit was stripped for the free-for-all, and when another car had to go down the back way to take part in the next class. The contestants were always lined up in readiness for the signal, securing a run of about 100 yards from the center of the town before crossing the tape. There is a slight dip just over the starting line and then the grade commences, so that the machines attained a considerable speed before beginning the ascent. The course itself is nearly straight, there being one slight curve to the left half way up, but this was not enough to cause skidding or any sensationalism. The roughness of the surface, however, caused some pronounced swerving when speeding towards the finish, and Bourque's stripped Knox did some jumping as it flew alongside a white fence at the roadside.

Competition opened with an event for the smallest cars admitted, those selling from $851 to $1,250, and this was taken handily one, two, by the new Maxwell runabouts of 22.5 horsepower. The Hudson was a close third, however, for its time was but four-fifths of a second more than the 1:13 4-5 of the winner.

A Chalmers-Detroit 40 was a splendid runner-up to Bourque's Knox in two classes, the cars being evenly matched in regard to engine size, and the Chalmers might have done better than its :54 3-5 in the free-for-all if its seat had not slipped off.

Burnham, with a Simplex, won the event for the four-cylinder general selling for $4,000 or over, his time being :52. Unfortunately, his machine was placed out of running order soon after passing the finish line by hitting a concrete culvert at the turn to the back road. Here he left it and jumped another car to get to the starting line for the free-for-all, in which he drove his big Fiat. Tony Ledermann, unopposed, took the

"Tony" Ledermann and the Pierce Six Which Had a Walk-Away class for sixes with a 48-horsepower Pierce Arrow.

Just after the finish of the contest the crowd at the hotel was given a real scare and only quick action averted an accident. Vice-President Sherman had been given his ride over the course, holding the prize won by Burnham in the free-for-all, and had been safely deposited at the starting line. Then Burnham started to turn to go to the garage, but his steering gear jammed and the big car, going at a 20-mile-an-hour clip, leaped for the sidewalk and the crowd. Brakes held, however, and the people scattered very quickly, so that when the machine stopped on the sidewalk no damage was done. It was considered particularly fortunate that the derangement occurred after Mr. Sherman had disembarked.

Burnham at Wheel of the 90-H.P. Simplex, Winner of Its Class

The day was truly a gala one for this part of the country, and hundreds of automobile touring parties arrived during the morning, parking their cars along the route of the climb or leaving them at the bottom and walking up. It was estimated that about three or four thousand people were on the roadside, and the course was kept clear by local police and firemen in uniform. Automobile clubs in neighboring cities had planned organized runs, but this idea gave way to the separate party method, and from Syracuse, Binghamton, Oneonta, Utica, Rome, Herkimer and even Buffalo and Albany the tourists came. The result was that all roads led to Richfield Springs yesterday and to-day.

The officials of the hill climb were as follows: Referee, Samuel B. Stevens; honorary referee, F. H. Elliott; clerk of course, Thomas J. Wetzel; starter, Fred J. Wagner; judges, H. W. Smith, president Automobile Club of Syracuse; George A. Frisbie, president Automobile Club of Utica, and George W. Baird, president Automobile Club of Oneonta; timers, P. A. Sayles, George McGraham; technical committee, C. H. Norris and C. A. Benjamin, of Syracuse, and Frank Miller of Utica; observers, G. H. Norris, H. L. Conde, M. W. Kerr.

The contest committee was composed of H. N. DeWitt, chairman; Fred Bronner, F. E. Munger, C. B. Conrad, I. J. Kent, Thomas J. Wetzel, W. H. Keller. The local committee included J. D. Cary, chairman; Gasherie DeWitt, W. T. Johnson, Otto Singewald, W. T. Welden, Richard Purcell, Frank Roff, G. W. Hyde, S. H. Conklin, A. J. Bloomfield, George Tunnicliffe.

Handsome silver loving cups were presented to the winners of the various classes, and in the free-for-all there was a second prize also. The DeWitt trophy for the open event was presented by Proprietor DeWitt, who was responsible for the day of sport, for which came automobilists from a large section of the Empire State.

Herewith are the summaries of Richfield's first hill climb:

Pos.	Car	H.P.	Bore	Stroke	Driver	Time
	FOUR-CYLINDER STOCK CARS, $4,000 OR OVER					
1	Simplex	90	6.1	5 3-4	F. K. Burnham....	.52
2	Thomas	53	5 3-4	5 1-2	H. L. Conde.......	1:07 4-5
	SIX-CYLINDER STOCK CARS, $3,000 OR OVER					
1	Pierce-Arrow ..	48	4 1-2	4 3-4	A. A. Ledermann..	1:15
	GASOLINE STOCK CARS. $3,001 TO $4,000					
1	Knox	40	5	4 3-4	W. A. Bourque....	:57 1-5
2	Chalmers-Detroit	40	5	4 3-4	C. G. Hanna.......	:59 3-5
	GASOLINE STOCK CARS, $2,001 TO $3,000					
1	Knox	40	5	4 3-4	W. A. Bourque....	:57 2-5
2	Chalmers-Detroit	40	5	4 3-4	J. S. Brown........	:59 2-5
3	Stoddard-Dayton.	36.1	4 3-4	5	O. M. Decker......	1:08 4-5
	GASOLINE STOCK CARS, $1,251 TO $2,000					
1	Buick	32.4	4 1-2	5	A. C. Warren......	1:04
	GASOLINE STOCK CARS, $851 TO $1,250					
1	Maxwell	22.5	3 3-4	4	Arthur See	1:13 4-5
2	Maxwell	22.5	3 3-4	4	Wm. Sickinger	1:14 1-5
3	Hudson	22.5	3 3-4	4 1-2	C. G. Hanna.......	1:14 3-5
4	Buick	22.5	3 3-4	3 3-4	Hugh Easter	1:15 2-5
5	Regal	25.6	4	4	F. H. Van Tyne...	1:57

Arthur See and the Model Q Maxwell, Small Car Winner

Chairman H. N. DeWitt Singled Out

Among Those Who Wore Badges

Wherein "Tony" is the Honored One

GASOLINE STOCK CHASSIS, 451 TO 600 CUBIC INCHES DISPLACEMENT

1	Knox	40	5	4 3-4	W. A. Bourque....	:48

GASOLINE STOCK CHASSIS, 231 TO 330 CUBIC INCHES DISPLACEMENT

1	Buick	32.4	4 1-2	5	A. C. Warren......	1:02 4-5

FREE-FOR-ALL—NO RESTRICTIONS

1	Fiat	120	7	6 1-2	F. K. Burnham....	:45 4-5
2	Knox	40	5	4 3-4	W. A. Bourque....	:48
3	Chalmers-Detroit	40	5	4 3-4	J. S. Brown........	:54 3-5
4	Thomas	48.4	5 1-2	6.1	J. G. Barclay......	:59 4-5

Automobile Club of Richfield Springs Organized

There were a large number of automobilists around Richfield Springs who have long wanted an organization to aid the good roads movement, to hold climbing contests and to facilitate the spread of touring information. This evening Mr. DeWitt of the Earlington; his son, H. N. DeWitt, who is chairman of the contest committee, which was formed temporarily for this meet; William T. Johnson, proprietor of the Hotel Berkeley-Waiontha; Fred Bronner, the postmaster, and a number of others formed the Automobile Club of Richfield Springs. There are about fourteen charter members, and many more have promised to join. The following officers were elected: President, William T. Johnson; vice-president, Thomas J. Wetzel; secretary, Fred Bronner; treasurer, John D. Cary. A committee on by-laws and constitution was appointed as follows: G. DeWitt, A. J. Bloomfield, G. E. Tunnicliff.

Four honorary members were elected—Hon. James S. Sherman and three Freds—Fred J. Wagner, Fred H. Elliott and Fred K. Burnham. Mr. Elliott represented the A. A. A. at the meeting, and assisted in the formation of the definite rules and plans of the organization.

The local club, supported by the hotels and townspeople, will endeavor to secure the first convention of the New York State Automobile Association, which will be held next July, with a large hill-climb at the same time.

Secret Time Run Round Canadarago Lake

Friday afternoon there was a "sociability run," the route being twice around Canadarago Lake, and the time was a secret held by William T. Johnson, who marked off the distance and set the schedule. Thirteen cars started, but one, Mr. Kent's, was unlucky and had a puncture and withdrew. The time which Mr. Johnson had decided upon was two hours, and the nearest to it was Adolphus Fiegenheimer, in an E-M-F, who consumed 1:29:31¼. The farthest from the guess was C. B. Conrad, who drove his Pope-Hartford around in 1:13:06 3-4, winning the consolation prize. C. W. Root drove his Haynes over in 55 minutes 8 seconds, but this was greater than the legal speed limit, and so the consolation did not go to him.

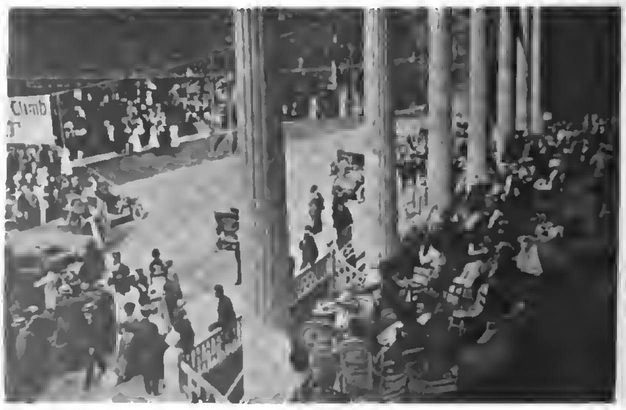
The following is the result of the run, with the time of each contestant:

Entrant	Car	Time
A. Fiegenheimer	E-M-F	1:29:31 1-4
Dr. C. C. Ransom........	Elmore	1:24:22 1-2
Percival Jones...........	Knox	1:21:15 3-4
H. L. Conde.............	Thomas	1:21:14 1-2
A. M. Zabriskie..........	Knox	1:20:21 1-2
Joseph Kaeslin	Ford	1:18:35
H. F. Mansfield..........	Stevens-Duryea	1:18:27 1-2
H. H. Cooper............	Stevens-Duryea	1:18:04 1-4
T. J. Wetzel.............	Selden	1:17:58 1-2
Oliver Drake-Smith	Cadillac	1:13:39 1-2
C. B. Conrad.............	Pope-Hartford	1:13:06 3-4
C. W. Root...............	Haynes	:55:08

The officials were: Judges, J. W. Ward, Benjamin Brown, C. H. Lang; starter, William T. Johnson; clerks, Richard Cary, L. G. Foster; timers, C. E. Caney, F. E. Mungor.

From the popularity of this little run, and the puzzle accompanying it, it is likely that a repetition will occur at an early date. A number of autoists who are spending the Summer in this locality have promised their support with entries.

Line-Up in Front of the Roomy Earlington



From the Hotel's Capacious Colonial Veranda

M. C. A. WILL HAVE RULES CONFERENCE AT INDIANAPOLIS

HOWARD E. COFFIN, chairman of the general rules committee of the Manufacturers' Contest Association, outlines most interestingly the matters which will call for consideration at the session of the committee to take place at Indianapolis, August 19, 20, 21, at which time the new Indianapolis Motor Speedway will have its dedicatory race meet. Unquestionably, the manufacturers who support racing should concern themselves in the framing of the rules, and while the regulations for 1909 have not met all the requirements, at the same time a big step was made in the right direction.

The M. C. A. leaves to the contest board of the American Automobile Association the final adoption and enforcement of the rules recommended by the M. C. A. Chairman Coffin, in outlining the work to be taken up at the Indianapolis meeting, has the following to say:

CONCERNING INTERNATIONAL COMPETITION—To a lack of proper preparation, rather than to an inferior mechanical excellence, can be ascribed nearly all the humiliating performances of American-built cars when entered in international contests. All of us, importers and American manufacturers as well, are prone to excuse a poor performance upon the part of our cars, whether the event be local, national or international, on the ground that we did not have sufficient time at some stage of the game to get either our organization or our cars into proper shape for the competition. This condition of chronic "unpreparedness" can, in the case of the American manufacturer, be partially ascribed to a lack of attention given to such matters on account of the prossure exerted in other lines directly associated with the producing and commercial ends.

Many times in the past, particularly in the case of events of national or of considerable local importance, insufficient notice as to date and conditions upon which and under which a contest is to be run has been given to those who have been asked to support the event with entries. An important bit of work which is now being pushed by the M. C. A. will certainly go far toward putting an end to this kind of trouble, with a result that the average car entered in 1910 competitions should make a much better showing before the public than in the past.

WHAT M. C. A. HAS ACCOMPLISHED.—The Manufacturers' Contest Association, embracing within its membership those American manufacturers and American importers of foreign cars who firmly believe in the value of that class of publicity which may be obtained from competition in properly governed and properly conducted motor car contests of every kind has, since its foundation in Chicago last February, taken many steps toward the elimination of the chaotic conditions pertaining to contest matters.

From the beginning the work of this organization has been aimed toward an elimination of the causes of the trouble rather than toward the application of a cure to each individual complaint. The removal of the causes that have gone to encourage the old excuse of "If we had only had another week's time," is certainly not the least of the several lines of work mapped out by the M. C. A.

The constitution and by-laws of the organization call for a meeting of the general rules committee each year in August. On this general rules committee are the representatives of twenty-five of those concerns—manufacturers and importers—who have shown the most activity in contest matters during the past two years. This meeting is scheduled this year at Indianapolis, Agust 19, 20, 21, at the time of the opening and initial race meet of the Indianapolis Motor Speedway—the first of the several great speedways that are being built or will be built in America on the plan of the famous Brooklands track, near London.

At this meeting will be discussed all recommendations regarding the rules, changes in rules, classification, etc., for 1910. All changes suggested by the actual experiences of the present season will be considered.

It is unfortunate that the incorporation of the M. C. A. occurred so late in the spring of this year that the revised classifications and rules could not be announced at the beginning of the season. Otherwise there would have been avoided much of the uncertainty that has existed in contest matters the early part of this year.

Plans for 1910—In September, immediately following the August meeting of the general rules committee, and as a direct result of the findings of this committee, announcement will be made as to the changes in the present governing rules and classifications, accompanied by the publication by the contest board of the A. A. A. of the annual rules book, wherein will be covered all conditions governing motor car events to be held between the dates of January 1 and December 31, 1910. At the same time will be published a complete schedule giving the approximate date and all necessary information pertaining to each and every contest of importance which is to be run during the season of 1910.

With such an announcement made in September, coupled with the publication of the rules and conditions, which become effective January 1, there can be little reason or excuse for a lack of preparation on the part of any manufacturer or importer who proposes to make entry in contests of any kind.

The M. C. A. does not control contests, local, national, or international. In all national affairs this association recognizes the direct and supreme control of the contest board of the American Automobile Association.

All international matters clear through and are handled by the Automobile Club of America. The exact relations existing between the M. C. A. and the other two organizations mentioned are outlined in formal contracts which have been or soon will be executed in due form.

Printed blanks have already been sent out from the secretary's office of the M. C. A. to those manufacturers and importers enrolled as members, and on these blanks are being sent in the suggestions which will outline the attitude of the majority upon all items of national and international importance. All recommendations on international matters will, after discussion at the August meeting, be formally transmitted to the Automobile Club of America, and will later, through its delegates, be presented at the international conference abroad.

Things to be Discussed.—Among the more important subjects to be discussed in Indianapolis are the following:

1. Recommendations as to changes in the classifications and weights for 1910 season.
2. Changes to be recommended to the contest board for the American Automobile Association rules of 1910.
3. The possibility of the support by the M. C. A. of an impartial and thoroughly capable technical committee, which shall serve at all competitive contests.
4. The arrangement of a definite and logical schedule of all important contests for the season of 1910, with a view to the announcement in September of this year of the approximate dates, character and general conditions governing all such events. (From information at hand it is a certainty that the promoters of all annual events will for 1910 be very glad to cooperate, as may be suggested by the M. C. A., in so scheduling these contests as to avoid interference of dates. The interests of the promoter and of the manufacturer who is asked to support the contest with entries are mutual.)
5. National events. How many shall be supported and of what character?
6. International events. How many shall be supported and of what character?
7. Endurance contests. Action to be taken upon the recommendation made by the National Association of Automobile Manufacturers, that only one endurance contest be scheduled for any one section of the country and not more than four be supported by manufacturers' entries.
8. Road racing versus track events upon specially constructed speedways of any less than two miles in circumference.
9. Shall racing on existing mile and half-mile horse tracks be countenanced or supported in any way?
10. A standard electrical timing device for the elimination of human error in the timing of all important speed events.
11. A satisfactory definition of the term "Stock Car."
12. Steps to insure the enforcement of the rule governing the character of the publicity matter employed by any maker concerning the performance of his cars in any contests. All such publicity must be in accordance with the facts.
13. A formula for the proper comparison of the performances of steam and gasoline automobile motors.

LIGHT CAR INNING WITH NEXT "24"

NEW YORK, Aug. 9—Light weight and medium priced automobiles will have a grind of their own in the race meet scheduled for the Brighton Beach track for August 27-28. The popular interest in long-time contests has proven so great that the Motor Racing Association has decided to allow the smaller class machines to race for six hours on the first day, so that a contest longer than any light car road race will result. The dividing line will be $2,500, and those above that price will be eligible for the 24-hour contest which will start in the evening as usual. The six-hour run will commence at 11 o'clock on Friday morning, and there will then be continuous racing throughout the afternoon. The entry fee for the small machines has been set at $75, and the prizes will amount to $50 in cash or plate, the first prize being $30. The amounts for the big fellows remain as previously—$500 entry fee, and prizes totaling $2,100.

Between the two long races there will be three short ones, a five-mile free-for-all, mile time trials, and a 25-mile event for cars costing from $1,201 to $3,000.

Chadwick Six Climbed Fastest at Algonquin

Zengle's Chadwick Six in Its Free-for-All Flight in Pursuit of the Famous Algonquin Cup

CHICAGO, Aug. 7—Excelling in perhaps the most brilliant hill-climb field of the season, Len Zengle's Chadwick Six captured the Algonquin cup in the fourth annual event of the Chicago Motor Club, held at Algonquin on Thursday. To get a "leg" on the trophy in which Frank Leland and the Stearns have an interest, Zengle had to break records on the two hills ascended, his margin of victory being 2 4-5 seconds.

The Algonquin cup, now a classic, was put up by the residents of Algonquin, and the conditions are that it goes to the car making the fastest total time on the two hills, regardless of class. The first winner was Frank Leland, who had the fight of his life to get it, there being only three-fifths of a second between him and George Salzman in the Thomas Six. The same car figured in the battle of Thursday last, and it was Greiner in this same Thomas that was the runner-up.

Eighty-five entries were made in 22 class events; 71 started and 67 climbed both hills. As usual, the meet was well handled, the only difficulty being to clear the hill of sightseers and vehicles, which delayed the start both morning and afternoon. It had been planned to have militia guard the course, and soldiers would have been available had it not been for the objection of a neighboring village, which evidently did not like to see Algonquin get so much of the limelight. However, local marshals did very well, and the whole card was run off without a mishap.

Only once was there the slightest accident, that occurring when Shetnitz, an amateur driving a Chalmers-Detroit, had his steering gear go wrong while climbing Phillips Hill in the afternoon. The tie-rod between the knuckles pulled out at one of the joints. It was near the top, and for a moment it looked as if disastrous consequences would result. But the amateur pluckily brought his car to a stop just before the tape was reached.

This year's climb differed somewhat from previous ones. The old system of classification by means of piston area was abandoned because it conflicted with the new scheme devised by the Manufacturers' Contest Association and adopted by the American Automobile Association for uniformity's sake. The field was, therefore, classified by piston displacement and also by price. Time decided the winners in all but class A 2, in which the results were reached by means of the club's formula, in which the piston area is multiplied by the time and the result divided by the weight of the car with its load. In addition to the regular A. A. A. card, there were added events for motor buggies and electrics, and the amateurs were also cared for. The owners competed with the tradesmen, but their time figured in deciding the amateur championship.

As in previous years two hills were used. In the morning Perry Hill, about a quarter of a mile in length, was tackled from a standing start. In the afternoon the contestants went up Phillips Hill, half a mile in length, and from a standing start. The time made on both hills was used in deciding the winners. Both hills were in the best of condition.

Father Time suffered most on Perry Hill, where four cars beat the old record of :24 1-5 and two others tied it. On Phillips Hill the Chadwick was the only one to get inside of Leland's :29 2-5, registering :28, whereas Greiner in the Thomas tied the record.

When the program was first announced, everyone looked for a speed battle in the free-for-all, for undoubtedly it was one of the best fields of the year. Denison in the big Knox was the first one to make the spectators sit up and take notice. Denison had made a good climb in the morning, and when he negotiated Phillips in :30 1-5 one hardly looked for him to actually lift the cup. Then Greiner shot his bolt, and tied the old record. With the shade he had over the mark in the morning it looked as if an amateur might reap the honors of the day.

But the Chadwick had yet to come up, it having been given the last number in the bag. So the crowd settled back for the grand finale, and it was not disappointed, for Zengle came up old Phillips with a roar and dash that made it clearly apparent even before he had crossed the tape that the cup belonged to him. And so it proved, for he had done :28, lowering the record 1 2-5 seconds and making his total time :50 3-5 as against :53 2-5 for Greiner.

Class F, division 1, limited to cars with displacement not exceeding 390 cubic inches, was styled the little free-for-all, and proved to be a classy event which attracted the Stoddard-Dayton, Buick, Knox, National, Corbin, Marion and Kisselkar, some of them having in two cars. The Stoddard driven by Bert Miller had the speed of the party, getting first place by one-fifth of a second over the Buick driven by Burman, the total times of the two leaders—:56 2-5 and :56 3-5, respectively—comparing most favorably with that of the cars in the big class.

The Knox drew first blood in division 1 of class B, for cars from 451 to 600 cubic inches of piston displacement. It was the big Knox, and Denison drove. Its time was :53 3-5, with Englebeck the runner-up in the Stoddard-Dayton, and he was only two-fifths of a second faster than his teammate, Miller.

Burman in the Buick was the top-liner in division 2 of this class, which was for the 301-450 class. In this Burman beat Miller in the Stoddard Dayton, who, however, evened up the score in the little free-for-all, where the positions were reversed. Denison in the little Knox was third, but 2 2-5 seconds slow.

The Corbin won in the third division, the 231-300 [illegible], its nearest competitor being the Moon, driven by Phil Wells. Both these cars were in the Indiana trophy road race last July. In this class the Falcar, also a reminiscence of the Crown Point races, made a good run into third place.

In division 4, from 161 to 230 cubic inches, the Velie, Chalmers-Detroit, Mason and Moline battled, and it was the Velie, a newcomer in competition, that won handily, beating the Chalmers driven by Knipper 1:03 4-5 to 1:06 1-5. A surprising climb was made by the two-cylinder Mason, which was only three-fifths of a second slower than the Chalmers. Earlier in the day the Mason had given indications of its speed when it tied the Velie in division 2 of class F for cars not exceeding 202 cubic inches piston displacement. In this each did 1:00, but the Velie improved on this in the event which it won.

In the motor buggy division two Holsmans and a Schacht fought it out, with the Holsmans running one, two. In the electric division the Babcock won with :34 1-5 on Perry and :47 on Phillips, a big cut of the records made two years ago.

There were six divisions in class A, in which the classification was made by price. In conjunction with this were run the formula events of class A 2, one climb sufficing for both. In division 1 Greiner, in the Thomas six, had a walkover. In division two just the two Stoddards ran, Englebeck winning in :59 and Miller being second in 1:00 1-5. The Knox had five seconds the advantage over the Kisselkar in division 3, with the Grout third. In division 4 seven cars started and the Oakland, driven by Howard Bauer of Buffalo, trimmed the Velie.

The two-cylinder Mason was the winner in division 5 of class A, the defeated being the Maxwell and Buick. In this event there was a difference between first and second of 13 1-5 seconds.

The card had been opened by a duel between the little Hupmobile and the Maxwell Junior, in which the latter scored.

How They Finished in the Formula

One of the closely-watched phases of the climb was the performance of the cars in six events, in which the winner was not necessarily the fastest car up the hill, but rather was determined by formula, in which the car weight with driver was divided into the product obtained by multiplying the piston displacement of the motor in cubic inches by the time in seconds required to climb the hill, the lowest result being the winner. The formula is intended to allow for the varied differences in car weight and motor sizes, and is really a motor efficiency test. The tabulation shows how closely the work of each car is covered. In division 4 premier honors would have gone to No. 8 Velie, but its disqualification for not carrying a muffler gave No. 10 Kisselkar the prize, on a percentage of 7.86. This was not so low a percentage as that made by the Apperson last year, which set a mark of 6.42, the best percentage ever obtained by any car in the climb. Second honors this year went to the No. 5 Mason and third honors to No. 10 Kissel. The summary:

No.	Car	Driver	A.M. Time	P.M. Time	A.M. %	P.M. %	Total %
	Division 6—$850 and Under						
1	Maxwell	Smith	42 3-5	64 3-5	3.89	5.89	9.78
2	Hupmobile	Hearne	46 3-5	75	3.86	6.22	10.08
	Division 5—$851 to $1,250						
5	Mason	Duesenberg	38 4-5	41 1-5	3.80	4.05	7.85
4	Maxwell	Illingworth	36 1-5	57	3.6	5.76	9.36
	Division 4—$1,251 to $2,000						
8	*Velie	Stickney	36	40 2-5	3.23	3.63	6.86
10	Kissel	Schoeneck	34 1-5	47 3-5	3.24	4.52	7.86
9	Oakland	Harding	31 4-5	39 4-5	3.95	4.45	8.4
7	Petrel	Fleichmader	34	50	3.91	4.58	8.49
6	Oakland	Harding	36 3-5	41 1-5	4.51	5.08	9.59
11	Marion	Mann	45 1-5	50 4-5	4.56	5.13	9.69
	Division 3—$2,001 to $3,000						
17	Grout	Halbert	32 1-5	44 4-5	3.38	4.65	8.03
15	Knox	Denison	21 3-5	39	3.4	5.4	8.44
18	Kissel	Schoeneck	29 2-5	39 1-5	4.3	5.75	10.06
	Division 2, $3,001 to $4,000						
19	Stoddard	Englebeck	25 3-5	33 2-5	4.04	5.27	9.31
20	Stoddard	Miller	25 4-5	34 2-5	4.08	5.44	9.52
	Division 1—$4,001 and Over						
21	Thomas	Greiner	33	42 2-5	5.9	7.6	13.5

*Disqualifed for not carrying muffler.

SUMMARY OF FOURTH ANNUAL HILL CLIMB OF THE CHICAGO MOTOR CLUB, ALGONQUIN, ILL., AUG. 5, 1909

CLASS C—FREE FOR ALL

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
85	Chadwick Six	40.0	5 x 6	2,790	Michelin	Bosch	Chadwick	L. J. Zengle	:22 3/5	:28	:50 3/5
78	Thomas Six	48.4	5½ x 5½	3,420	Michelin	Bosch	Mayer	A. W. Greiner	:24	:29 2/5	:53 2/5
83	Knox	48.4	5½ x 5½	2,530	Fisk	Bosch	Stromberg	A. Denison	:24 2/5	:30 1/5	:54 3/5
84	National Six	40.0	5 x 5	....	Micbelin	Bosch	Schebler	J. Aitken	:23 3/5	:32	:55 3/5
80	Stoddard-Dayton	44.1	5¼ x 5¾	2,994	Michelin	Bosch	Stromberg	B. Miller	:24 2/5	:31 3/5	:56 1/5
82	Stoddard-Dayton	44.1	5¼ x 5¾	2,994	Michelin	Bosch	Stromberg	C. Englebeck	:25	:32	:57
74	Stearns	46.0	5⅜ x 5⅞	3,230	Fisk	Bosch	Stearns	H. Beaumont	:26 3/5	:35 3/5	1:02 1/5
77	Stearns	46.0	5⅜ x 5⅞	3,265	Fisk	Bosch	Stearns	B. Howard*	:25 2/5	:37 2/5	1:02 4/5
75	Locomobile	40.0	5 x 6	2,770	Continental	Locomobile	Locomobile	H. N. Scott*	:30 4/5	:39 3/5	1:10 2/5
81	Marion	28.9	4¼ x 4½	1,920	Michelin	Splitdorf	Schebler	A. Monsen	:31 2/5	:39 3/5	1:11
76	Chalmers-Detroit	40.0	5 x 4¾	2,470	Diamond	Bosch	Mayer	D. Scbenetz	:33	Did not finish.	

CLASS F—DIVISION 1: DISPLACEMENT NOT EXCEEDING 390 CUBIC INCHES

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
72	Stoddard-Dayton	36.1	4¾ x 5	....	Goodrich	Bosch	Stromberg	B. Miller	:24 1/5	:32 1/5	:56 2/5
64	Buick	32.4	4½ x 5	2,155	Michelin	Remy	Schebler	R. Burman	:24 2/5	:32 1/5	:56 3/5
68	Knox	40.0	5 x 4¾	2,550	Fisk	Bosch	Stromberg	A. Denison	:25 2/5	:33	:58 2/5
70	National	36.1	4¾ x 4¾	2,140	Diamond & Michelin	Bosch	Schebler	J. Kincaid	:26 4/5	:33 2/5	1:00 1/5
67	Corbin	32.4	4½ x 4½	2,070	Michelin & Firestone	Bosch	Schebler	W. G. Bird	:28 2/5	:35 1/5	1:03 3/5
71	Marion	28.9	4¼ x 4½	2,098	Micbelin	Splitdorf	Schebler	A. Monsen	:28 1/5	:37 3/5	1:05 4/5
73	Kisselkar	38.0	4⅞ x 4¾	2,415	Goodyear	Remy	Stromberg	G. Schoeneck	:29	:38 1/5	1:07 1/5
63	Buick	32.4	4½ x 5	2,155	Michelin	Remy	Stromberg	A. Greiner*	:30 2/5	:37	1:07 3/5
65	Marion	28.9	4¼ x 4½	1,840	G. & J.	Splitdorf	Schebler	H. Stutz	Did not start.	:39 1/5	....

CLASS F—DIVISION 2: DISPLACEMENT NOT EXCEEDING 202 CUBIC INCHES

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
60	Velie	25.6	4 x 4	1,685	Fisk	Splitdorf	Kingston	J. Stickney	:25 1/5	:43 4/5	1:09
61	Mason	20.0	5 x 5	1,650	Diamond	Splitdorf	Schebler	F. Duesenberg	:30 4/5	:38 1/5	1:09

CLASS B—DIVISION 1: DISPLACEMENT, 451 TO 600 CUBIC INCHES; MINIMUM WEIGHT, 2,400 POUNDS

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
58	Knox	48.4	5½ x 5½	2,530	Fisk	Bosch	Stromberg	A. Denison	:23 2/5	:30 1/5	:53 3/5
57	Stoddard-Dayton	44.1	5¼ x 5¾	2,575	Michelin	Bosch	Stromberg	C. Englebeck	:24 3/5	:31 1/5	:55 4/5
59	Stoddard-Dayton	44.1	5¼ x 5¾	2,645	Micbelin	Boscb	Stromberg	B. Miller	:24 3/5	:31 3/5	:56 1/5
54	Stearns	46.0	5⅜ x 5⅞	3,230	Fisk	Boscb	Stearns	H. Beaumoot*	:27	:35	1:02
56	Stearns	46.0	5⅜ x 5⅞	3,265	Fisk	Bosch	Stearns	B. Howard*	:27 2/5	:38	1:05 2/5
55	Locomobile	40.0	5 x 6	2,770	Continental	Locomobile	Locomobile	H. Scott*	:31	:40	1:11

CLASS B—DIVISION 2: DISPLACEMENT 301 TO 450 CUBIC INCHES; MINIMUM WEIGHT, 2,100 POUNDS

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
63	Buick	32.4	4½ x 5	2,155	Micbelin	Remy	Scbebler	R. Burman	:24 1/5	:32 2/5	:56 3/5
49	Stoddard-Dayton	36.1	4¾ x 5	2,285	Goodricb	Bosch	Stromberg	B. Miller	:25 3/5	:33	:58 3/5
47	Knox	40.0	5 x 4¾	2,550	Fisk	Bosch	Stromberg	A. Denison	:25 4/5	:33 1/5	:59
50	National	36.1	4¾ x 4¾	2,140	Diamond & Micbelin	Boscb	Sehebler	J. Kincaid	:26 1/5	:33 1/5	:59 2/5
51	Kisselkar	38.0	4⅞ x 4¾	2,415	Goodyear	Remy	Stromberg	G. Scboeneck	:29	:41	1:10
48	Moline	32.4	4½ x 5	2.060	Goodrich	Splitdorf	Schebler	O. E. Thorne	:30 4/5	:44	1:14 4/5

CLASS B—DIVISION 3: DISPLACEMENT, 231 TO 300 CUBIC INCHES; MINIMUM WEIGHT, 1,800 POUNDS

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
40	Corbin	32.4	4½ x 4¼	2,070	Michelin & Firestone	Bosch	Schebler	W. G. Bird	:28 1/5	:35 3/5	1:03 4/5
42	Moon	33.0	4 9/16 x 4½	2,170	Diamond	Bosch	Stromberg	P. Wells	:27 2/5	:37	1:04 2/5
41	Falcar	28.9	4¼ x 4½	1,930	Goodyear & Goodrich	Remy	Kalamazoo	W. H. Pearce	:30 1/5	:38 2/5	1:08 3/5
43	Columbia	28.9	4¼ x 4½	2,175	Hartford	Columbia	Columbia	W. Lotley	:29 2/5	:40 3/5	1:10
44	Marion	28.9	4¼ x 4½	1,920	Michelin	Splitdorf	Schebeler	A. Monsen	:33 1/5	:40 4/5	1:14
45	Buick	30.6	4[illegible] x 5	2,195	Michelin	Remy	Schebler	R. Burman	:43 2/5	:45 3/5	1:29
39	Marion	28.9	4¼ x 4½	1,840	G. & J.	Splitdorf	Schebler	C. E. Stutz	Did not start	:36 4/5	....

CLASS B—DIVISION 4: DISPLACEMENT, 161 TO 230 CUBIC INCHES; MINIMUM WEIGHT, 1,600 POUNDS

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
34	Velie	25.6	4 x 4	1,685	Fisk	Splitdorf	Kingston	J. Stickney	:27 1/5	:36 3/5	1:03 4/5
36	Chalmers-Detroit	25.6	4 x 4½	1,805	Diamond	Boscb	Kingston	W. Knipper	:30 1/5	:36	1:06 1/5
37	Mason	20.0	5 x 5	1,650	Diamond	Splitdorf	Schebler	F. Deusenberg	:28 2/5	:38 2/5	1:06 4/5
33	Moline	25.6	4 x 4½	1,790	Goodrich	Simms-Boscb	Schebler	F. Salisbury	:28 2/5	....	....

CLASS B—DIVISION 5: DISPLACEMENT, 160 CUBIC INCHES AND UNDER; MINIMUM WEIGHT, 1,200 POUNDS

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
30	Buick	20.3	3⅝ x 3⅝	1,490	Michelin	Remy	Schebler	R. Burman	:38	:47 3/5	1:25 3/5
32	Monitor	20.0	5 x 4	1,440	Hartford	None	Schebler	W. Rabenold	:54 4/5	1:15 2/5	2:10 1/5
31	Maxwell	25.6	4 x 4	1,225	Ajax	Splitdorf	Maxwell	T. Marshall	1:01 3/5	1:22	2:23 3/5

CLASS G—MOTOR BUGGIES

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
28	Holsman	21.0	5⅛ x 2½	1,290	Diamond	None	Breeze	J. Kenegar	:42	1:12 2/5	1:44 2/5
25	Holsman	21.0	5⅛ x 2½	1,110	Diamond	None	Breeze	J. Kenegar	:47	1:19 4/5	2:06 4/5
27	Schacht	18.0	4¾ x 4	1,410	Goodricb	Nooe	Scbebler	J. Bohrle	:59	1:33 3/5	2:32 3/5

CLASS G—ELECTRICS

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
24	Babcock	....	....	2,250	Goodyear	None	None	F. G. Peck	:34 1/5	:47	1:21 1/5
22	Columbus	....	....	1,740	Palmer-Webb	None	None	R. S. Fend	:36 2/5	:59 1/5	1:35 3/5

CLASS A—DIVISION 1: $4,000 AND OVER

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
21	Thomas Six	48.4	5½ x 5½	4,154	Micbelin	Bosch	Mayer	A. W. Greiner*	:33	:42 2/5	1:15 2/5

CLASS A—DIVISION 2: $3,001 TO $4,000

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
19	Stoddard-Dayton	44.1	5¼ x 5¾	2,994	Michelin	Bosch	Stromberg	C. Englebeck	:25 3/5	:33 2/5	:59
20	Stoddard-Dayton	44.1	5¼ x 5¾	2,994	Michelin	Bosch	Stromberg	B. Miller	:25 4/5	:34 2/5	1:00 1/5

CLASS A—DIVISION 3: $2,001 TO $3,000

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
15	Knox	40.0	5 x 4¾	2,550	Fisk	Bosch	Stromberg	A. Denison	:24 3/5	:39	1:03 3/5
18	Kisselkar	36.1	4¾ x 4¾	3,300	Goodyear	Remy	Stromberg	G. Schoeneck	:29 2/5	:39 1/5	1:08 3/5
17	Grout	32.4	4½ x 5	2,870	Diamond & Firestone	Remy	Stromberg	H. E. Halbert	:32 1/5	:44 4/5	1:17

CLASS A—DIVISION 4: $1,251 TO $2,000

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
9	Oakland	32.4	4½ x 5	2,450	Goodyear	Splitdorf	Oakland	H. Bauer	:31 4/5	:39 4/5	1:11 3/5
8	Velie	25.6	4 x 4	2,110	Fisk	Splitdorf	Kingston	J. Stickney	:36	:40 2/5	1:16 2/5
6	Oakland	32.4	4½ x 5	2.425	Goodyear	Splitdorf	Oakland	A. G. Harling	:36 3/5	:41 1/5	1:17 4/5
10	Kisselkar	28.9	4¼ x 4¼	2,400	Goodyear	Remy	Stromberg	G. Schoeneck	:34 1/5	:47 3/5	1:21 4/5
7	Petrel	30.6	4⅜ x 4¾	2,260	Michelin	U. & H.	Stromberg	F. Schwader	:34	:50	1:24
11	Marion	28.9	4¼ x 4½	2,350	Michelin	Splitdorf	Schebler	A Monsen	:45 1/5	:50 4/5	1:36
14	Buick	32.4	4½ x 5	2,684	Michelin	Remy	Stromberg	A. Greiner*	Stalled motor	:37 1/5	....

CLASS A—DIVISION 5: $851 TO $1,250

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
5	Mason	20.0	5 x 5	1,840	Diamood	Splitdorf	Schebler	F. Duesenberg	:38 4/5	:41 1/5	1:20
4	Maxwell	22.5	3¾ x 4	1,610	Ajax	Splitdorf	Maxwell	J. Illingsworth	:36 1/5	:57	1:33 1/5
3	Buick	....	....	.....	Michelin	Remy	Schebler	B. Burman	:38 4/5	:57	1:35 4/5

CLASS A—DIVISION 6: $850 AND UNDER

No.	Car	H.P.	Bore and Stroke	Weight	Tires	Magneto	Carburete	Driver	A.M. Time	P.M. Time	Total Time
1	Maxwell	22.5	3¾ x 4	1,760	Ajax	None	Maxwell	E. J. Smith	:42 3/5	1:04 3/5	1:47 1/5
2	Hupmobile	16.9	3¼ x 3⅜	1,220	G. & J.	Bosch	Breeze	E. A. Hearne	:46 3/5	1:15	2:01 3/5

*Amateur.

This year's was the fourth annual Algonquin hill-climb, and was in charge of the Contest Committee of the Chicago Motor Club, consisting of Charles P. Root, chairman; Frank H. Trego, secretary; C. A. Tilt, Bick Edwards, Frank H. Martin, H. P. Branstetter, J. B. Diebler and Oliver G. Temme. The officials were F. C. Donald, referee; David Beecroft, chairman; F. E. Edwards and Berne Nadall, judges and technical committee; Oliver G. Temme, starter; Frank H. Martin, clerk of course, and Walter F. Zimmer, his assistant; Frank H. Trego, chief timer, and Bick Edwards and A. Adams, assistants; Frank E. Sparks, chief observer; Thomas J. Hay, marshal; L. H. Jackman, announcer, and C. G. Sinsabaugh, in charge of the publicity. Many names well known in automobile sporting circles will be recognized in the list. Their efficiency received the best possible endorsement in the smoothness which distinguished the trials.

BLUE GRASS MEET

LEXINGTON, KY., Aug. 9—At the opening of the Blue Grass Fair in this city to-day James B. Ryall, John Aitken, and Louis Strang furnished some of the best automobile racing ever seen upon the fast Fair Grounds track. A number of track records were lowered, among them being the mile held by Barney Oldfield. Aitken, driving a 60-horsepower National, clipped one-fifth of a second from the old mark, setting the record at 58 3-5 seconds. He also won the 50-mile race against Strang, the time being 53:28 3-5. Tom Kinkead, driving another National, won the 10-mile handicap, with one minute allowance, Aitken being second and C. C. Merz in a four-cylinder National third. Ryall drove a Buick, and won the five-mile event in 4:52 1-5.

CANADIANS TOUR

FARGO, N. D., Aug. 9—Preparations are being made to give the members of the Winnipeg Automobile Club a hearty welcome when they arrive here on their tour. It is said that 150 cars are being made ready. Their tour will last three weeks, during which they will cover about 500 miles. They will pass through Moose Jaw, Saskatchewan, then southward to Devil's Lake, N. D., and Fargo, with a side trip to Minneapolis, Minn.

Greiner Handled the Big Thomas in a Sensational Manner

Aitken's Driving of the National Six Called for Favorable Comment

Miller's Piloting of the Stoddard-Dayton Attracted Usual Attention

Corbin Excelled in Its Class with a Good Margin

Some Incidents of the Big A.A.A. Tour

Premier Which Carried the Napoleonic Chairman

Messrs Stevens and Glidden and their bonnets.

A Kansas Town, This One being St Mary's.

For Tires would puncture!

The Caravan Crossing Colorado's Plains

Howard Marmon Believed in Preparation

Henry Hass [illegible]

[illegible] Tr[illegible] [illegible] Climbed Pikes Peak

WHAT OF THE BIG ENDURANCE TOUR FOR 1910?

NEW YORK, Aug. 9—While the gathering at Indianapolis next week of the general rules committee of the Manufacturers' Contest Association may result in some discussion of the conditions for the 1910 annual endurance tour of the A. A. A., it is not anticipated that anything definite will be reached at this particular time. Even those who are firm in their belief that an event of this character is a good asset for the industry are divided among themselves as to what should be done another year, and many are not yet sure in their own minds as to definite revisions of the 1909 rules, which left much to be desired in various directions.

There is a growing impression that in the effort to obtain prize-winners, the penalizing business is being carried to an extreme; in other words, this insistent demand for possessors of the trophies has led to the punishment of cars in such manner as to give the general public a very false impression.

One well-known New Yorker representing a car which has been in the tour several times, summed up the situation in this vein:

"Supposing the excessive vibration over roads undeserving of the name should loosen a mudguard, or perhaps shake off a tail lamp. Is that any reason why the running qualities of a car should be subjected to penalization? For it is almost an utter impossibility to make clear to the general public the relations which different forms of penalization bear to the quality of the car itself. The average man simply knows that a car didn't win a trophy and that it was penalized a certain number of points. While every man is not influenced in his buying of a car by results obtained in competition, it is, nevertheless, a fact that many a man is influenced against buying a car because it may have met with penalization in some form or other in a big contest. Until the rules are made more explicit and sensibly applicable than was the case this year, there will not be in 1910 any large field of participants."

It is not likely that a meeting of the contest board of the A. A. A. will take place until early next month, which means that the protests filed by H. O. Smith, of the Premier Motor Car Company, and W. H. Van Der Voort, of the Moline Motor Company, will remain unanswered for the present. It will be remembered that these two protests were leveled against Pierce cars Nos. 9 and 108 for failure to finish with tail lamps.

There is some discussion among automobilists generally, as to the chairmanship of next year's tour, and while Frank B. Hower stated that this year was the last one for him, it is said that his friends will urge him to seek a continuance in office. Whoever tackles the job is certain to know that there is some work connected with it. To satisfy all participants is impossible.

A MAKER'S IDEA OF THE GLIDDEN TOUR

Editor THE AUTOMOBILE:

Now that the Glidden Tour is over and the manufacturers and contestants have had an opportunity to view the event from a commercial as well as a sporting standpoint, they cannot help but arrive at two conclusions.

First, that the tour was a great success in the development of the business in the section of the country through which it passed; and second, that for the coming season the rules should be more strictly and scientifically drawn than they were this year.

For instance, in this year's run, cars which experienced considerable difficulty could still make a perfect score, as there were no penalizations for adjustment of carbureters, ignition troubles, oiling or adjustment of brakes, and cars were allowed to be towed. Had the rules taken these matters into consideration there would have been a very different ranking of the cars at the end of the run. We believe that ignition trouble to the average automobilist is one of the most serious difficulties he experiences, and is the cause of more troubles and stoppage than any other one thing. The oiling system is undoubtedly of the utmost importance to the life of a car, and should be put to the most severe test. Dependable brakes are a necessity, and it does not seem that cars should be allowed to make repeated adjustments to them without penalization.

We wish to call attention to the fact that the Maxwell cars made the entire run without adjustment of carbureter, ignition or oiling system, and were not towed up any hills. Their tire troubles were a minimum—but two punctures—and the same casings were used through the entire trip.

We trust that next year you will use your influence to make the run even more strenuous than it was this year, and to have the rules made up in a way that would give the low-priced cars equal footing with the high-priced ones. We believe that the most suitable route would be from the Atlantic to the Pacific.

MAXWELL BRISCOE MOTOR COMPANY,
Tarrytown, N. Y. C. W. Kelsey.

NORTHWEST TO HAVE "LITTLE GLIDDEN"

MINNEAPOLIS, MINN., Aug. 9—A "Little Glidden" tour under the auspices of the Minnesota State Automobile Association has been arranged for August 27-September 1, the course to be between Minneapolis and St. Paul and Fargo, N. D. The distance is a little over 600 miles. Each car will carry an observer, and Glidden rules will hold, with the exception of the technical examination at the end of the run. Three trophies have been put up for the owners of the cars, and the Minneapolis *Tribune* has offered an additional one for the county commissioner of the county which has the best roads on the course. Since the announcement of this trophy a *Tribune* car carrying members of the state highway commission has been going over the course holding meetings with the county officials and the commercial clubs and other civic organizations. The route lies through St. Cloud, Alexandria, Fergus Falls and Pelican Rapids to Fargo, and return via Wahpeton, Wheaton, Benson and Litchfield.

AUTOISTS TO MANAGE HORSE SHOW

CHICAGO, Aug. 9—A most peculiar situation has arisen in regard to the horse show held annually by the Oak Park Horse Show Association. This is a fashionable suburban event of importance among western horsemen, but this year it will be conducted by a body of directors, each one of whom owns from one to five automobiles, but no horses.

PULLMANS LATEST TO ENTER MUNSEY TOUR

WASHINGTON, D. C., Aug. 9—While the Frank A. Munsey reliability tour project from Washington to Boston and return is just a month old, it has "caught on" in great shape. Several hundred columns of matter have been published about the tour in papers all over the country. During the first month fourteen entries were secured, the two latest being Pullmans, which were entered by the York Motor Car Company of York, Pa.

The work of blazing the route is well under way. All along the route the pathfinders have been received with the greatest enthusiasm, the automobile clubs in the various cities vying with each other in entertaining the Munsey scouts.

MINNEAPOLIS AWAITS A.A.A. SANCTION

MINNEAPOLIS, MINN., Aug. 9—Everything is in readiness for the annual reliability run conducted by the *Tribune* except the A. A. A. sanction, which Chairman Hower has not yet issued. The date is but a week off—August 17-18—and meanwhile the rules and entry blanks are held up. The route chosen this year by the officers of the Minneapolis Automobile Club takes the cars to Duluth and return, 186 miles each way, in two days. The roads afford all sorts of going, from good dirt to clay hills, deep sand and corduroy. The Minneapolis dealers are preparing for a strenuous test.

Interesting Summer Session of the S·A·E·

President Hess Led in an American Locomotive

A Studebaker Contingent.

Winton Six Had a Load

Among Those Present

CHICAGO, Aug. 7—The Summer convention of the Society of Automobile Engineers concluded at two o'clock this afternoon after a two-day session particularly valuable because of the nature of the papers read and the discussions which followed their reading. It was impossible to reach the paper on the testing of a 20-horsepower Franklin air-cooled motor, and this has been held over until the next meeting, as was also a paper by President Henry Hess.

Thursday morning the fifty-odd members soon adjourned and made the 51-mile trip to the Algonquin hill-climb, the engineers being among the most interested spectators of the event.

Friday morning the real convention opened, President Hess reading an invitation from John O. Heinze, inviting the society to Lowell, Mass., during the stock chassis races.

The first paper considered was entitled "Commercial Test of a Pierce Water-Cooled Motor," and was read by Prof. R. C. Carpenter, of Cornell University, though prepared by J. A. Luhrnan and J. G. Woodworth, of Cornell, under the supervision of the professor. The reading was prefaced by a series of screen views showing the construction of the Pierce six-cylinder motor, and was followed by an illustration of the manograph and a brief description of its advantages and shortcomings.

An equally interesting paper was "Some Points in the Operation and Care of Vehicle Batteries," by H. M. Beck; this paper included information about the ampere-hour meter which has been introduced during the present season and is meeting with much favor as an adjunct to the meters on an electric vehicle. The focal point of the paper consisted chiefly in the attention that should be given to a battery before it finally collapses, which is of paramount importance in that it is difficult to detect the ills of a battery because of its apparent simplicity. The discussion on the paper was particularly interesting, Frederick J. Neuman of the Woods Company, Chicago, taking the view that the testing of storage cells by the hydrometer is more reliable than that of the ampere-hour meter. Mr. Neuman, while recognizing the benefits of the ampere-hour meter, was afraid it might be too generally depended upon to the damage of the battery. Mr. Beck, in reply, took the stand that the ampere-hour meter was not looked upon as a cure-all for storage battery conditions, but served a useful purpose in that it is a quick method of knowing the exact charged or discharged condition of the battery.

Frank H. Lloyd read a short paper on "Lubricating Oils," in which attention was drawn to the vast varieties of oil. He compared the crudes of the different states and drew attention to the different qualities possessed by each one.

Secretary Alex Churchward's paper on "Energy and Consumption of Commercial Vehicles," consisted of a vast amount of invaluable data on the loss of power due to tires, transmission losses, road resistances, wind resistance, grades, springs, using direct gear ratios, stops made during the day and the methods of acceleration. Secretary Churchward also read a paper prepared by H. S. Baldwin on the "Electric Cradle Dynanometer" used for testing gasoline engines.

During the stay of the engineers in this city they were entertained by F. J. Neuman, of the Woods Vehicle Company. The majority of the members made their headquarters at the Illinois Athletic Club, where the Friday morning session was held. In the afternoon upwards of a score accepted the invitation of the Pullman Palace Car Company to visit the factories at Pullman, Ill. Saturday morning the sessions took place at the South Shore Country Club in Jackson Park, one of the show places of the city. After the adjournment at this afternoon a luncheon was served at the club by the Woods Company.

OPERATION AND CARE OF VEHICLE BATTERIES*

By H. M. BECK

WITH the rapid increase in the number of electric vehicles, the question of the proper operation and care of the storage battery becomes one of increased importance, as the best vehicle will not run if the battery goes wrong. While under normal conditions, the care of a battery is a comparatively simple matter, it must not on this account be entirely overlooked, and unfortunately, there has been some tendency recently, to minimize the actual attention required. This policy is not new, having been tried in other lines of battery work and, if continued, is sure to result disastrously. Why not rather admit that a certain amount of attention is required and insist on it? The best battery can be ruined in a comparatively few charges or discharges, where it would have given a long life with proper treatment!

The instruction books furnished by the manufacturers go into the operation and care of vehicle batteries very completely, and as they have been revised from time to time, one of them now being in its sixteenth edition, they are up to date. It will not be necessary, therefore, to go into many of the details of operation, but there are certain points which are either frequently misunderstood, or else on which it would be well to lay special emphasis, as their importance has apparently not been appreciated.

A storage battery is chemical in its nature, rather than mechanical, and must not, therefore, be confused with mechanical apparatus. The latter gives much more marked warning when it requires attention, and the fact that a battery may be apparently operating perfectly when it requires attention, is responsible for a great deal of battery trouble. When a battery finally breaks down, permanent injury has been done, and while it can generally be doctored back into shape, it cannot be made to give the life it should have given. In probably no line of technical work is prevention rather than cure of so vital importance.

Unfortunately the chemical theory of the storage battery has never been definitely settled, but an approximate idea of what goes on during charge and discharge can be easily stated.

A storage battery from an elementary standpoint consists of two or more plates, positive and negative, insulated from each other and submerged in a jar of dilute sulphuric acid. The plates consist of finely divided lead known as the active material held in grids which serve both as supports and as conductors for the active material. The active material being finely divided, offers an enormous surface to the electrolyte and thus electro-chemical action can take place easily and quickly. Two plates such as described, would have no potential difference, the active material of each being the same. If, however, current from an outside source is passed between them, one, the positive, will become oxidized, while the other remains as before, pure lead. This combination will be found to have a potential difference of about two volts, and if connected through an external circuit, current will flow. During discharge, the oxidized plate loses its oxygen and both plates will become sulphated until, if the discharge is carried far enough, both plates will again become chemically alike, the active material consisting of lead sulphate. On again charging, the sulphate is driven out of both plates and the positive plate oxidized. This cycle can be repeated as often as desired until the plates are worn out. Thus charging and discharging simply results in a chemical change in the active material and electrolyte, and the potential difference between the plates and capacity is due to this change.

In taking care of a storage battery, there are four points which are of the first importance:

1st—The battery must be charged properly.

2d—The battery must not be overdischarged.

3d—Short circuits between the plates or from sediment under them, must be prevented.

4th—The plates must be kept covered with electrolyte and only water of the proper purity used for replacing evaporation.

While as already stated, it is impossible to give an accurate formula for the chemical changes which take place in a storage battery during charge and discharge, certain facts dependent upon these are well established and are used as a basis for operation. These are the following:

Voltage—During charge, the voltage of a battery gradually increases until the cells are fully charged, but it will then come to a standstill and will not rise any higher, no matter how long the charge is continued. The maximum voltage thus reached is not a fixed point, varying widely at different times, depending upon the age of the battery, the temperature, the strength of the electrolyte and the charging rate.

During discharge the voltage falls, and if the discharge were carried far enough, it would reach zero, but experience has shown that this point is much too low for safety, resulting in the rapid destruction of the plates.

Specific Gravity—Due to the fact that during discharge the active material of both plates becomes sulphated, the specific gravity of the electrolyte falls. During charge the reverse process goes on, the sulphate is driven out. and the specific gravity of the electrolyte rises. As with the voltage, the gravity will rise gradually during charge until all the sulphate is driven out of the plates, but will then show no further increase, no matter how long the charge is continued. The maximum gravity thus obtained is also a variable figure, depending upon the temperature of the electrolyte as well as upon the actual amount of acid and water present in the cell.

The fall in gravity is almost proportional to the ampere hours discharge. In other words, specific gravity readings can be used as an ampere hour meter, but unfortunately, gravity readings are difficult or disagreeable to obtain in the case of vehicle batteries, so that this check on the discharge is not frequently used.

Gassing—Until nearly charged, the plates in a storage battery should absorb the energy put into them with little or no gassing. When they are nearly charged, the energy instead of being stored, shows itself in the form of more or less gassing, the amount depending upon the rate of charge. During discharge a cell should never gas. If it does so, it is an indication that it has been run down much too low and needs immediate attention.

Of the above indications, the first two, voltage and gravity, are those most commonly employed in operating. Gassing, while of great assistance as a guide or warning, cannot be depended upon for accurate results, and is only used when nothing but the most crude methods of operation are practical.

Either voltage or gravity readings alone could be used, but as both have advantages in certain cases, and disadvantages in others, it is advisable to use each for the purpose for which it is best fitted, the one serving as a check on the other.

Voltage has the great disadvantage in that it is dependent upon the rate of current flowing. Open circuit readings are of no value, as a cell reads almost the same discharged as it does charged. On the other hand, a voltmeter is a very easy instrument to read and may be located wherever desirable.

Specific gravity readings are almost independent of the current flowing, but the hydrometer is difficult to read, not very sensitive and the readings must be taken directly at the cells.

Charge—In the case of the pasted type of plates used almost entirely in vehicle service, experience has shown that the manner of charging has much to do with the life of the plates, and on this account it is sometimes stated that the life of a vehicle cell is proportional to the number of charges, rather than the number of discharges. On this account, it is wise to charge the cells as moderately as practical. On the other hand, it has been found that if the plates are to be kept in good condition, it is necessary to occasionally charge them to a maximum,

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thus reducing all the sulphate. Also, the different cells of a battery work as independent units, and while their efficiencies are approximately the same, there is generally some slight variation, which, if the cells are charged on a very efficient basis, will sooner or later cause irregularity, the cells with the lowest efficiency dropping behind. It is necessary, therefore, occasionally to even them up or the low cells will get in trouble. To meet these conditions, charges are divided into two classes—regular charges which should be as efficient as possible, and overcharges given at stated intervals, which are carried to a maximum voltage and gravity, and intended to reduce all the sulphate in plates and even up any irregularity in the cells.

Initial Charge—New batteries are usually received in a charged condition, but when this is not the case, the plates being shipped dry, or where the battery has been taken out of commission, it requires an initial charge before it is ready for service. This charge is not a complicated matter, but requires considerable time, frequently over 100 hours, and there is a very general tendency to cut it short. When the initial charge is not complete, the plates will not be properly formed, a certain amount of sulphate will remain in them which will produce local action and the capacity and life of the cells will be materially reduced.

In regular operation it is well to charge at the lowest possible rate. A large part of the wear on the plates is caused by the gassing, and the amount of gassing is reduced by a lower rate of current. Since the gassing occurs almost entirely near the end of the charge, it is especially important that the charging rate be low at this point, so that when the available time is limited, the necessary number of ampere hours can be gotten into the battery with the least possible wear by having the current rate high at the beginning of the charge and low at the end.

There is one point in connection with the charge which should be especially emphasized, namely, that the final voltage corresponding to a full charge is not a fixed figure, but varies widely, depending upon the charging rate, the temperature, the strength of the electrolyte, and age of the battery. For this reason, charging to a fixed voltage is unreliable and likely to result disastrously. The charge should be continued until the voltage or gravity cease rising, no matter what actual figures are reached. Old cells at high temperatures may not go above 2.4 volts per cell, whereas if very cold they have been known to run up to three volts.

The points to be especially emphasized in connection with the charge are:

First—On regular charges keep the rates as low as practical and cut off the current promptly. It is preferable to cut off a little too soon rather than to run too long where there is any question.

Second—Overcharges must be given at stated intervals and continued to a complete maximum. They should be cut off at the proper point, but when in doubt it is safer to run too long rather than to cut off too soon.

Third—Do not limit the charge by fixed voltage.

Fourth—Keep the temperature within safe limits.

Discharge—The discharge largely takes care of itself, except that a battery should not be run down below its voltage limit. The rate of current has very little effect upon the life of the plates, provided the discharge is not carried down too far. Where a battery is completely discharged, it should be charged as soon as possible, and if it has been run down too low, the charge should be continued to a maximum similar to the overcharge.

Ampere-Hour Meter—Many attempts have been made to develop apparatus which would automatically show the charge and discharge of a storage battery, but these have either been based on the wrong principles, or else the instruments would not stand the wear and team to which they were subjected, and they have therefore not proved satisfactory. Within the last year or so, however, a mercury type ampere-hour meter has been placed on the market, designed especially for battery use, and so far the results obtained have been very promising. This meter is equipped with a large dial and a pointer which can be set by hand to any point desired. This pointer revolves in one direction during charge and in the opposite direction during discharge, and registers directly the ampere-hour output or input to the battery. The mercury in which the armature disk is submerged acts as a dash-pot, and seems to be very effective in damping the vibrations and jolts which such a meter has to stand.

During discharge the meter shows directly what capacity has been taken out, so that it is a simple matter to determine what is left in the battery. For charging the procedure is somewhat more complicated, although not seriously so. It is necessary to charge a battery for from 15 to 20 per cent. more ampere hours than are discharged in order to make up for the losses in the battery. The method used to accomplish this is to move the pointer ahead the proper number of ampere hours just before charging, then charge until the pointer comes back to zero. The meters are equipped with an electrical contact at the zero point, which can be made to automatically open the circuit if desired. As will be seen, this considerably simplifies the handling of the charge, but there is one point which must not be overlooked, and which should be strongly emphasized, namely, that the efficiency of a battery varies with the amount of work it does, being much lower for light work than heavy. In fact, as long as in commission, the battery needs regular charges, even if it does no work at all; in other words, its efficiency would then be zero. This condition can be handled in several ways. Under average conditions, it is probably safe to charge by the ampere-hour meter for a set period, say two weeks, provided at the end of this period the battery is given a regular overcharge. An alternative method is to give an additional charge once a week by the meter of whatever number of ampere hours is found necessary to keep the battery up. The regular bi-weekly overcharge will probably be found to be the safer method, especially in private service where the conditions are so variable, but whatever method is used, too much emphasis cannot be laid upon the fact that if a battery is to be kept in good condition, in addition to the ordinary charges with the ampere-hour meter, regular overcharges must be given. The meter certainly gives promise of reducing the amount of attention a battery requires, but the danger is that it will, therefore, be assumed that it will eliminate all of it.

Short Circuits—Short circuits between plates are largely eliminated through the use of the wood separator. This point, therefore, does not need any special attention beyond that of seeing that the separators are in good condition when installed. With the sediment under the plates, however, the case is different. It is a natural tendency to wish to run a battery as long as possible before putting it out of commission for overhauling. The result is that very generally the sediment is allowed to get up to the plates before the battery is washed. When the sediment reaches the plates, there is a discharge of wasted current through it, which in turn necessitates that the cell be given more charge in order to hold it up, and the extra charging again throws down still more sediment. Further, the sediment become sulphated and, by local action with the active material of th plates in contact with it, causes the active material to become sul phated, which again increases the tendency to washing out The result is that the plates begin to lose their active materia rapidly if the sediment is allowed to collect until it reaches them and it is, therefore, evident that if a battery is to give its norma life, it is absolutely essential that the sediment be cleaned out before, and not after, it reaches the plates. The rate at which th sediment collects, depends largely upon the way a battery i handled, and it is, therefore, necessary to determine this rate fo each individual case. A cell should be cut out after, say, fift charges, the depth of sediment measured and the rate so ob tained used to determine the time when the battery will nee cleaning. As there is apt to be some variation in the amount c sediment in different cells, and as the sediment is thrown dow more rapidly during the latter part of a period than at the h ginning, it is always advisable to allow at least ¼-inch clearance. If the ribs in the bottom of the jars are 1¾ inches high, figure on cleaning when the sediment reaches a depth of 1½ inches.

Before dismantling a battery for "washing," if practical, have it fully charged. Otherwise, if the plates are badly sulphated, they are likely to throw down considerable sediment on the charge after the cleaning is completed.

There have been a great many complaints of lack of capacity from batteries after washing. Almost without exception this is found to be due to lack of a complete charge following the cleaning. The plates are frequently in a sulphated condition when dismantled and in any case are exposed to the air during the cleaning process, and thus lose more or less of their charge. When reassembled, they consequently need a very complete charge. and in some cases the equivalent of the initial charge. and unless this charge is given the cells will not show capacity and will soon give trouble again. This charge should be as complete as that described elsewhere in connection with the initial charge.

"Flushing," or replacing evaporation in cells with electrolyte instead of water, is a most common mistake. The plates of a storage battery must always be kept covered with electrolyte, but the evaporation must be replaced with pure water only. There seems to be more or less general tendency to confuse the electrolyte of a storage battery with that of a primary cell. The latter becomes weakened as the cell discharges and eventually requires renewal. With the storage battery, however, this is not the case, at least to anything like the same degree and unless acid is actually lost through slopping or a broken jar, it should not be necessary to add anything but water to the cells between cleanings. Acid goes into the plates during discharge. but with proper charging it will all be driven out again so that there will be practically no loss in the specific gravity readings, or at least one so slight that it does not require adjustment between cleanings. Thus, unless some of the electrolyte has actually been lost, if the specific gravity readings are low, it is an indication that something is wrong, but the trouble is not that the readings are low, but that something is causing them to be low, and the proper thing to do is to remove the cause and not try to cover it up by doctoring the indicator. The acid is in the cells and if it does not show in the readings, it must be in the form of sulphate, and the proper thing to do is to remove the cause of the sulphation, if there is one, and then with proper charging drive the acid out of the plates and the specific gravity readings will then come back to the proper point. The too-frequent practice in such cases is to add electrolyte to the cells in order to bring up the readings. which, as already explained, are only the indication of the trouble. and this further aggravates the condition. until finally the plates become so sulphated that lack of capacity causes a complaint. This practice of adding electrolyte to cells instead of water seems to be becoming more and more common. In general, it is much the safer course to assume that the electrolyte is all right, and look for trouble elsewhere, than to attempt to doctor it by the addition of more acid, and a great deal of trouble today is the result of a misunderstanding of this one point.

The treatment required for bringing a low cell or battery back into shape, while quite simple, is one of the most misunderstood parts of battery operation. The causes of low cells may be very varied, but the results produced and consequently the treatment required, are not so varied. The general procedure is as follows:

First—Restore the cell mechanically.

Second—Renew the electrolyte if there is any question as to its purity.

Third—Restore the cell electrically by charging.

Before dismantling a cell, if practical, have it fully charged: the mechanical restoration then simply covers the operation of examining the cell and putting it as nearly as possible back into its original condition. This should not be difficult for anyone who is familiar with the assembly of the elements.

Where there is any question as to its purity, the electrolyte should be renewed, as the expense is not great in the case of the small cells used in vehicle service, and it would hardly pay to have an analysis made. Where any considerable amount of electrolyte is under suspicion, the manufacturers will gladly analyze the same. It is well to always have the water used for replacing evaporation and new electrolyte, unless furnished by the battery manufacturers, tested.

The most marked effect of an impurity is to cause the plates to become a bad color, the cells to become inefficient electrically and, in extreme cases, the plates may be ruined.

When the electrolyte is renewed, the jar and plates should be thoroughly washed and the new electrolyte should be of about the same strength as that renewed, in order to allow for any acid which may be in the plates.

The electrical restoration has been probably the greatest stumbling block, and largely through lack of understanding, as this operation consists in simply charging the cell until a maximum voltage and gravity are reached. The common mistake is to cut off the charge before it is complete, in which case, the plates, being still sulphated, will not show capacity and are likely through local action to soon get into bad condition again.

With the possible exception of trouble due to an impurity, it can be generally stated that chemically the final condition requiring treatment is abnormal sulphating, and even where an impurity is present in the electrolyte, its action is assisted by sulphating. It should be understood that sulphating is a normal as well as an abnormal process in the charge and discharge of storage batteries, and the difference is in the degree, not the process. The abnormal condition is that ordinarily referred to by the term. In normal service, sulphating does not reach the point where it is difficult to reduce, but if carried too far the condition becomes so complete that it is difficult to reduce, and injury results. A very crude method of illustrating the different degrees of sulphating is to consider it as beginning in individual particles uniformly distributed throughout the active material. Each particle of sulphate is then entirely surrounded by active material. The sulphate itself is a non-conductor, but being surrounded by active material the current can reach it from all sides and it is easily reduced. This is normal sulphate. As the action goes further, the particles of sulphate become larger and join together and their outside conducting surface is greatly reduced in comparison with their volume, so that it becomes increasingly difficult to reduce them and we have abnormal sulphate.

The general cure for sulphating is charging, so that a cell having been mechanically restored the electrical restoration consists simply in the proper charging. Sulphate reduces slowly and on this account it is a good plan to use a rather low current rate. High rates cause excessive gassing, heating and do not hasten the process appreciably, so that it is the safer as well as the more efficient plan to go slowly. A good rate is about one-fifth normal. The length of charge will depend upon the degree of sulphating. In one actual case it required three months' charging night and day to complete the operation, but this was, of course, an exceptional one. The aim should be to continue until careful voltage and gravity readings show no further increase for at least ten hours and an absolute maximum has been reached. In serious cases it may be advisable to even exceed this time in order to make absolutely sure that all sulphate is reduced, and where there is any question it is much safer to charge too long, rather than to risk cutting off too soon. A partial charge is only a temporary expedient: the cell, being sulphated, will drop again.

Since the specific gravity readings are affected not only by the charge, but also by the evaporation and changes in temperature, it is advisable, where an absolute maximum is to be reached, to eliminate these. The evaporation should be replaced with sufficient frequency to keep the electrolyte accurately at a fixed height above the plates. In this way water is added so frequently that very little has to be added at any one time, and the effect on the specific gravity readings is negligible. The temperature variations are eliminated by reading the temperature of the electrolyte, when specific gravity readings are taken, and correcting the latter to some standard temperature, such as 70° F

This correction is made by adding one point (.001 specific gravity) for every three degrees above 70° F. and subtracting one point for every three degrees below 70° F.

When the charge is complete the specific gravity of the electrolyte should be adjusted to the proper point and the cell is ready for service. Where there is time, and the facilities are at hand, it is a good plan to take a test discharge in order to make sure that everything is all right.

Failure in the restoration of low cells is probably more often due to cutting off the charge too soon than to any other cause, and from the troubles which are being reported this point evidently needs to be brought out more strongly.

In closing, a word or two about the vehicles themselves. As manufacturers, we wish to admit without argument that the battery is the most important part of the vehicle, but, on the other hand, we would like to protest against the frequent practice of blaming the battery for everything that goes wrong. The battery is rated in ampere hours, not mileage, and when the mileage of a vehicle falls short, trouble should be looked for in the vehicle as well as in the battery. Batteries are regularly rated at their four-hour discharge rate, this being about an average running rate for vehicles. The capacity, however, varies widely with different discharge rates, decreasing as the rates increase, so that anything which causes the vehicle to consume more current will more than proportionately reduce its mileage. For example, suppose that, due to inefficient tires, poor bearings or binding brakes, a normal current of 20 amperes is increased to 30 amperes. If the ampere-hour capacity were still the same, and there were no other losses, the mileage would be reduced about one-third. This increases in current, however, reduces the actual capacity of the battery by about 10 per cent. The average discharge voltage is also reduced and the drop in wiring of the vehicle is increased, so that the watts delivered to the motor are still further reduced, and finally the motor itself is somewhat less efficient at the higher rate, so that the net result is that the mileage of the vehicle, instead of being reduced by one-third, is actually cut down by about one-half. It is thus evident how important it is that the vehicle be kept in the best of condition.

As has already been stated, no attempt has been made to cover many of the details of battery operation, but rather to emphasize and explain some of the most common errors found in the handling of the vehicle batteries of to-day, and of these probably that which should be brought out most forcibly is the matter of flushing cells with electrolyte instead of water. Keep the plates covered with electrolyte, but use only pure water, not acid, for replacing the evaporation.

ON LUBRICATING OILS AND THEIR CHARACTERISTICS*

By FRANK H. FLOYD.

IMPORTANT POINTS respecting the use of oils are as follows:

That your cars are all carefully tested before placing them in the hands of the purchaser, and are in first-class working shape.

That it is well to exercise careful judgment in purchasing oils, for their lubrication, that the wear and tear may be prevented.

That oils are usually sold under brands, and mean nothing.

That it is the property tests of an oil that determines its value as a lubricant.

That in analyzing numerous brands of oil on the American market the writer finds that they are strictly hydrocarbon oils, fractional distillates of crude petroleum, but of various specifications.

Fractional distillates are the different portions that are evaporated from crude petroleum by the refiner.

Gasoline, from 68 to 87 gravity, naphtha 58 to 60 gravity, kerosene, 46 to 48 gravity; miners' oils 38 to 49 gravity, light lubricating 33 to 35, medium heavy 22 to 31, heavy oils, 18 to 27 gravity, are fractions. True, oils are treated, filtered, etc., but in the rough they are parts of the crude.

That crude petroleum from different states, different wells, produces lubricating oil of entirely different properties under the same methods of refining. There is a choice.

That hydrocarbon oils employed in gas engine lubrication, are by nature composed of hydrogen and carbon.

That the weight of oil is controlled largely by the amount of carbon in composition. That in practice the heat generated in gas engine cylinders is sufficient to cause all oils to evaporate and burn to a greater or less extent.

That in evaporating, and burning, the hydrogen is driven off by the heat, leaving the carbon to precipitate or pass off with the exhaust.

That there are no oils that will not deposit carbon when they burn, and no oils that will stand the high temperature at the point of explosion without burning.

That water and air cooling keeps the temperature of the metals down to a practical lubricating basis.

That oils of light weight (high gravity) contain less carbon in composition than oils of low gravity (heavy weight) and will deposit less when they burn.

That the evaporative or flash test, and the burn test of an oil is important to consider in conjunction with gravity.

That high, evaporative test and light-weight oils, will be less affected by the cylinder heat and will deposit less carbon when they burn. The desideratum.

That the viscosity or body test of an oil should be considered in transmission and in lubricating journals and shafting in the crank case, but in cylinder lubrication it is impossible to refine high gravity, high evaporative test oils with little body.

If both are high, the body test will take care of itself.

That high-grade gas engine oils are filtered to lessen the carbon and the gravity is raised, and the weight reduced as well as the viscosity, but the fire test is not affected.

That the various colors of oil are due to the bleaching effect of the filtering medium.

That color alone is not an index in determining a good gas engine oil.

That the cold or fluid test is important to consider at low temperatures.

That manufacturers will do well to regulate the temperature of oil in the receiver to get a uniform flow in all seasons, and not necessitate a change in the specifications of the oil.

That finally, a good gas engine oil is one of high gravity (light weight) with a maximum high evaporative test, and a fluid oil at low temperatures.

That there are limitations in refining oils from high-grade crude.

That you should consider all of the property tests of an oil in purchasing and not pick out one as an index.

*Paper read at the semi-annual meeting of the Society of Automobile Engineers, Chicago, Aug. 5-7.

SPECIFIC WEIGHT AND BOILING POINT

It has been established that the specific weight of all samples of gasoline, as used in automobile motors, is not the same, on a basis of the boiling point of the respective products. If the boiling point is the same for two separate specimens, and the specific weight is different, herein lies proof of the futility of the use of hydrometers for the purpose of determining the real characteristics of the fuel. If all the products had the same specific heat, boiling point, specific weight and latent heat of evaporation, it would be easy enough to establish values of the relative evaporation, or with knowledge of the differences in the magnitudes, it would be possible to approximate the ends.

ENERGY CONSUMPTION OF COMMERCIAL VEHICLE*

By ALEX. CHURCHWARD

WHEN studying the performance of the motor vehicle, one of the most important items is the energy required per ton mile. We can rely upon the engine to give a certain horsepower output at a predetermined speed. Therefore, knowing the maximum horsepower output of the engine, we can readily determine what service the vehicle is capable of performing.

The horsepower required by a vehicle, however, is influenced by a number of factors, the principal ones being:

First: Tires—Ordinarily the standard vehicles are equipped with either pneumatic or solid tires, pneumatic on the lighter vehicles, such as runabouts, coupés and broughams. Solid tires on some runabouts and cabs, and nearly always on commercial vehicles.

The tractive effort of pneumatic tires on hard level asphalt varies from 15 pounds per ton for special tires designed for electric runabouts up to 35 pounds per ton for the standard type used on gasoline touring cars.

The tractive effort of pneumatic tires is also greatly affected by the air pressure, increasing rapidly as the air pressure is reduced.

The tractive effort of solid tires on hard level asphalt varies from 18 pounds to 26 pounds per ton, depending upon:

(1) The diameter of driving wheels.
(2) Revolutions per minute.
(3) Load in pounds, per square inch or pounds per inch width.
(4) Composition of the compound used.
(5) Method of attaching tire to wheel rim.

Second: Controlling Apparatus—The efficiency depends a great deal upon the type of drive used, such for instance as:

(1st) The sliding gear with direct drive on the high through a bevel on live rear axle.

(2d) Sliding gear with direct drive on high through countershaft and chains to dead rear axle.

(3d) Sliding gear, not direct on high, and through countershaft and chains to dead rear axle.

(4th) Planetary with direct on high by means of bevel or chain to live rear axle.

(5th) Planetary to countershaft through chains to dead rear axle.

(6th) Friction gear to live rear axle through bevel or chains.

(7th) Friction gear to dead rear axle through chains.

(8th) Worm drive direct on high to live rear axle.

Some form of independent clutch being used on the 1st, 2d, 3d, and 8th.

Third: Transmission Losses—These include gearing or chain losses, and all bearing losses throughout the vehicle. Most vehicles to-day are built with anti-friction bearings throughout. Ball bearings should always be used in the countershafts; ball or roller bearings in the wheels. Personally, I prefer ball bearings throughout, and my experience has shown that ball bearings in the wheels are perfectly reliable when properly selected and correctly installed.

From countershaft to wheels the roller chain has proven itself satisfactory, but care must be taken in the selection of the make of chain, also the right pitch and number of teeth in the sprockets.

Fourth: Alignment of Axles and Driving Mechanism—Unless the alignment is perfect under all conditions of maximum stress, the energy consumption will be high. An axle sprung beyond the elastic limit by overloading may increase the energy consumption 10 per cent. to 15 per cent.

A vehicle that coasts freely may require too much power when the driving stresses are applied. Therefore, all parts must be in perfect alignment under all conditions to be met with in service.

Fifth: Correct Gear Ratio—Unless the gear ratio is correct for the average service the vehicle is called on to perform, the motor will either run at too high an average speed or the change gears will have to be used very frequently, which will tend to increase the maintenance of the vehicle when placed in the hands of a careless driver.

Sixth: Wheel Diameter—Small wheels will increase the energy consumption materially on the average roadbed, because, the smaller the wheel diameter the greater the vehicle vibration when going over an obstacle of a given height.

Seventh: Springs—The springs of a vehicle must be correctly proportioned and of suitable material; otherwise, there will be considerable movement of the vehicle body when going over uneven roads; this, of course, means energy consumed which cannot be restored.

Eighth: Road Resistance—The tractive effort of a vehicle will vary with the road surface as per table, taking the tractive effort of a vehicle on hard level asphalt as unity.

(1)	Level asphalt (hard)	1.00
(2)	Wood pavement	1.15
(3)	Level macadam	1.15 to 3
(4)	Plank road	.9
	Cobble stones	1.75
(5)	Good dirt road	1.10 to 2
(6)	Ordinary country road (dirt)	.2
(7)	Sand	.20

Ninth: Grades—The tractive effort due to grades must be added to the tractive effort for a given road surface. Example: 5 per cent. grade on hard level asphalt. Hard level asphalt 25 pounds per ton. 5 per cent. grade = 100 pounds per ton, due to grade alone. $100 + 25 =$ total tractive effort $= 125$ pounds per ton, total.

Tenth: Wind Resistance—Below 12 miles per hour the additional tractive effort necessary to overcome the wind resistance on heavy vehicles is comparatively small. But on the light high-speed vehicles, when running at speeds above 12 miles per hour, the wind resistance becomes quite a large factor.

Eleventh: Economic Speed—Taking everything into consideration, that is to say, life of engine, transmission, tires and maintenance of vehicle as a whole, experience shows that the following table is approximately correct:

Gross Weight.	Type of Tires.	Speed in M.P.H.
1,500 lbs.	Pneumatic.	20
2,000 "	"	20
3,000 "	"	18
4,000 "	"	16
2,000 "	Solid.	16
3,000 "	"	15
4,000 "	"	13
5,000 "	"	11
7,000 "	"	9
10,000 "	"	8
15,000 "	"	7
20,000 "	"	6

Twelfth: Stops—The number of stops per mile will have a considerable influence on the energy consumption of a given vehicle.

Thirteenth: Acceleration—It should never be too rapid; if it is, there is danger of damaging the engine or snapping a chain or gear. It can be seen from the preceding items that there are a great many factors which influence the energy consumption and, therefore, the performance of a commercial vehicle.

*Paper read at the semi-annual meeting of the Society of Automobile Engineers, Chicago, Aug. 5-7, 1909.

SOME COMMON KNOCKS AND SQUEAKS IN THE MOTOR

By STILLMAN TAYLOR

PERCHANCE the reader will smile at the above caption and incline to the belief that the following text is penned in jocund vein. This is not the case, however, the above heading merely expressing a common annoyance which is likely to happen to any motor-car. By "knocks and squeaks" is meant any unusual noises which may at any time develop in the engine, transmission, or running gear. Troubles of this kind vary greatly as to cause and location, but the effect is presented to the driver's notice in a more or less regular or irregular noise, heard above the vibration of the car. The usual purring vibration of a well-oiled and smooth-running motor is a sound with which every autoist soon becomes accustomed and if much driving is done, the ear becomes quite sensitive to other occasional and unusual noise of operation. Indeed, any unusual noise may be taken as an indication of trouble, and should be located without delay. To neglect this may result in serious injury to the car.

Knocking is a common occurrence and may be caused by several things, the sound being in the nature of a regular distinct rapping within the cylinder. Knocking may be due to too early ignition and will occur when the spark is advanced beyond the balanced center or working point. This will frequently be the case when the motor is running slowly, the early firing of the charge resulting in a back fire and knock, familiar to all autoists. If this is the seat of the trouble, the knock should cease when the spark is retarded to the normal point. A "rich mixture" will often produce a knocking noise almost identical with that produced by too early sparking. This is caused by the mixture burning too rapidly or too slowly. The remedy is quite as simple (if the supposition be correct), the mixture should be throttled or the tension of the auxiliary air-valve spring released to admit more air. Other causes of knocking within the cylinder are frequently traced to faulty lubrication or accumulation of carbonized oil. Sufficient cylinder oil is, of course, essential for proper lubrication, but if used excessively, the piston, cylinder walls and valves will quickly become coated with soot. Improper ignition or timing will also produce a popping noise, due in this case to the ignition taking place during the suction or exhausting strokes.

Not infrequently the knocking or pounding noise will, upon investigation, be found outside of the cylinder itself and the nature of the noise will indicate the probable cause. For instance, a heavy knock or pound is generally caused by pre-ignition, but may also be attributed to a loose main bearing, loose connecting-rod bearing, broken piston pin, or in less frequent instances, to a flywheel working loose on its shaft. A connecting-rod will sometimes work out of alignment with its crank-pin, and although not often sufficient to stop the motor, the matter should be attended to as soon as discovered.

Clicking in the Cylinders Is a Sure Source of Trouble—A continuous clicking, wheezing, or squeaking noise in the cylinder should be investigated, as it is a pretty sure sign of loose or worn piston rings. It is important to attend to this at once, as neglect may result in scoring the cylinder walls.

A puffing or cracking noise indicates that the compressed gas is escaping into the air and the leakage may be generally found to be caused by a leaky compression or pet cock or spark plug. If valve grinding has not been attended to, the leak may be in the valves which have become warped or pitted, and do not properly seat themselves.

Squeaking, grating, and rattling may be located by the character of the noise. A continuous squeaking or grating may be generally traced to a small bearing surface, while the occasional squeak is often found in larger surfaces, as cardan joints, lever connections, brakes and springs. If an investigation fails to locate the squeak in the transmission gear, the clutch collar should be examined. It should be noted, however, that a squeaking or other unusual noise is not always of a serious nature and may be frequently due to some little spring or other small part likely to be overlooked.

An instance of this kind occurred to the writer but a few days ago, when a squeak suddenly developed while returning from a short trip to the shore. We were running along on high gear when the squeak was first heard; not a loud noise, but an insistent squeak sufficiently loud to be heard above the purr of the motor and the subdued roar of the gears. We stopped the car and after looking over the important parts first, located the noise in an exhaust-valve spring, which had broken down just enough to work out of line and bear upon the valve-stem guide. A few drops of oil at once effected a cure.

The brakes are often a source of trouble and while it should be perfectly obvious to every driver and owner that these vital parts of a car should be frequently examined, that they may be properly adjusted and lubricated, it is not uncommon to find the brakes, of an otherwise well running and cared for car, in a bad state of neglect. If a squeak develops in the brakes, the trouble should be looked for in the drums which may need re-adjusting or a drop or two of oil.

INDIANA ADVANCING IN AUTOMOBILE PRODUCTION

INDIANAPOLIS, IND., Aug. 9—Indiana is rapidly coming to the front as an automobile-producing State, and although there is no immediate prospect of displacing Michigan from the front rank, still no mean number of cars will be built. Indianapolis alone expects to put out fully 10,000, and the record for the State no doubt will reach 25,000.

The organization of the Parry Automobile Company has been completed and the company has been incorporated with an authorized capitalization of $1,000,000. David M. Parry, the president of the company, has closed a three-year lease of the buildings of the Standard Wheel Company. These buildings are being equipped with the necessary machinery, and it is expected that the first Parry automobile will be finished about August 20. Other members of the Parry Company are Warren D. Oakes, William C. Teasdale, Jr., and Maxwell O. and Addison J. Parry.

In anticipation of increasing its output, the Overland Automobile Company is making extensive improvements and erecting new buildings that will cost $40,000. An assembling and upholstering department is now nearly finished and an enameling plant and a power plant will follow as rapidly as they can be built and occupied.

Much attention is also being given to extending the retail side of the industry. The Studebaker Automobile Company of South Bend, Ind., has organized a branch in this city, and for its occupancy is building a six-story garage and salesroom that will be finished about October 1. The building will cost approximately $100,000. Frank Staley will be manager. The Buick will also be taken care of by a branch house in the future. R. H. Losey, formerly president of the agent company, has been appointed manager. The Rider Lewis Automobile Company, which is moving from Muncie to a new and up-to-date plant located at Anderson, expects to turn out 3,500 cars next season, and has already received large orders. The new plant, with its improved facilities, would seem to allow of an output of this size or larger.

Helical Springs as Applied to Valves

Chapter VIII

POPPET VALVES are of two classes, one of which is automatic and the other positive, so called. In the automatic type of valve a spring is used exclusively and suction of the motor opens the valve against the pressure exerted by the spring. In positive (mechanical) valves the spring is used to close and a cam, in conjunction with a lift, is employed to open the valve against the pressure exerted by the spring.

Springs for automatic valves must necessarily be very delicate and so nicely poised that they will positively close the valve without at the same time requiring much suction pressure in opening. If a valve has an area of, say, 7.2 inches, and the suction pressure required to open it is limited to 1 pound per square inch the spring must not exert a pressure about 7.2 pounds. Since the pressure the spring will resist in opening must be very low if the motor is to deliver a fair measure of power it follows that the same spring will have but a limited ability to be displayed in closing the valve.

It is because of this limit, coupled with the uncertainties attending the use of springs, under the conditions governing motor work, that resort is had to the other plan in almost all motors, for if the valve is opened by means of a cam motion the strength of the sring may be very great relatively and in closing the valve the stronger spring will do the work in a shorter interval of time and with far greater certainty.

When automatic spring valves are used the valves are made as light as possible in order that a relatively weak spring will be efficient for the purpose. The same rule holds in the other system, for if the spring is over strong, which it will have to be if the valve is very heavy, the pressure on the cam face will be more than long life would seem to dictate.

In mechanical valve systems the limitations are not so close and the advantage of positive opening at a fixed relative time are very great, although it is of the greatest importance to so time the opening of the valve that the functions will be normal, and in the minds of some designers it is a question if positive opening even approximates the perfection which is theoretically true of the automatic type. As for holding valves open, surely the cam face may be made of the desired arc, and that the opening may be that due to the required lift is but a matter of conforming the cam to suit, remembering that the greater the lift the greater will be the travel, which is a matter to be considered when the spring is required to close the valve within a limited travel.

The best condition of closing will follow when the valve is light—lifts but little—with a stout "live" spring. Disregarding the design of the spring for the time being, the work it will have to do may be stated as follows:

Let

S = speed of the camshaft in revolutions per second.
W = weight of valve in pounds.
P = pressure of spring in pounds.
l = lift of valve in inches.
K = a constant = 30.
θ = face angle of cam, representing the angular movement.
y = another constant = 0.67 of the cam to induce a full lift of the valve.

When,

$$P = \frac{l(S \times k)^2 W}{y\theta^2}$$

Extract from Vol. I., Part II., Chapter VIII., of a set of books, in preparation, by Thos. J. Fay, covering all phases of automobiling, from the point of view of designers, constructors, and in actual service.

The angle through which the camshaft will rotate during the closing of the valve, which is the important matter, will by transposing the above formula be indicated as follows:

$$\theta = \left(\frac{l(Sk)^2 W}{yP}\right)^{1/2}$$

The difficulty attending the closing of valves under the conditions as above depicted are directly proportional to the weight and lift, but, unfortunately, as the square of the speed of the camshaft. That the valve should close quickly is an absolute necessity, and in order to do so it is proper to use a spring capable of accomplishing the task. Since springs do not remain always in the same state, due to the effect of work, heat, etc., as they are placed to serve, it is necessary to start out with a spring somewhat stronger than necessity would seem to indicate.

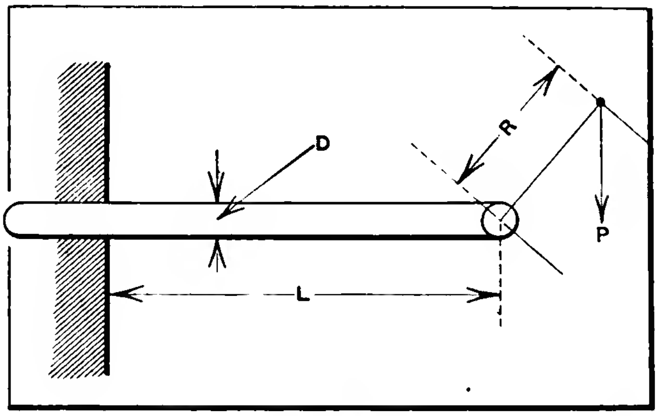


Fig. 1—Simple torsional member used in conjunction with the rational formula

Since, as the formula shows, the spring pressure required will reduce in proportion to the square of the angle of rotation of the camshaft during the act of closing, it follows that the difficulty will increase enormously as the angle is reduced. If, for illustration, a 10-pound spring will close a valve weighing 1 pound, lifting 1-10 of an inch within 40 degrees rotation, according to the formula, it will take a 40-pound spring to do the work within a 20-degree rotation of the camshaft. In practice springs used for this purpose on motors of moderate size, say, 30-40 horsepower, are usually capable of exerting from 35 to 45 pounds.

Theory and Design of Springs—For the convenience of practitioners a table has been compiled and is offered in which will be found most the sizes of springs which will be of use in automobile work. For the better understanding the rational formulæ of helical springs are given as follows:

Let

L = length of torsional member in inches.
D = diameter of the same in inches.
R = radius of the lever arm in inches.
J = polar moment of inertia.
P = pull in pounds on the arm at the end.
t = ultimate shearing strain in pounds per square inch.
e = distance in inches of the remotest fiber from the axis.

When,

$$P \times R = \frac{Jt}{e}$$

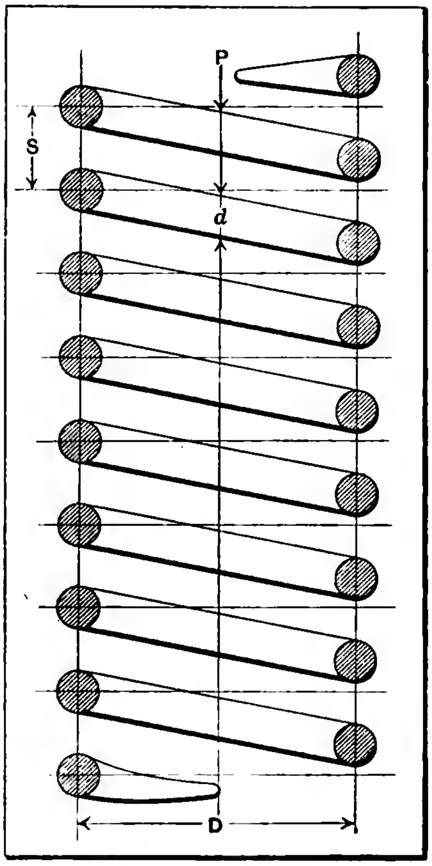


Fig. 2—Conventional spring as used in connection with poppet valves

This demonstration takes for its basis a straight round section, as illustrated in Fig. 1, represents diagrammatically the way in which torsional strains are set up in a member and it is true of springs as well as in other members which are not of such intricate shapes.

Torsional strains t will be due to the pull in pounds P at the radius in inches R at the end of the lever-arm and the resistance to this torsion will be offered by the shaft as measured in inches D, the length of which L represents the distance between the anchorage and the point of application to the lever-arm.

Since it is necessary to determine the extreme fiber strain due to torsion in order to be able to select a suitable grade of material and determine the diameter D, the exploration will involve considerations as follows:

(A) Find the maximum carrying capacity for a given diameter D.

(B) Ascertain the deflection due to the maximum load in view of the material to be used.

(C) Solve for the stiffness and deduct a coefficient of the same.

(D) In spring shapes, of the helical type, as well as in the straight member shown in Fig. 1.

Considering a helical spring, as illustrated in Fig. 2, all the turns are of the same diameter D and since the diameter of the wire is the same throughout, the several turns will be of the same strength. Fig. 3, on the other hand, is of the conical-helical type, and the ability of the respective turns will differ from each other, requiring that each turn, differing in dimensions, be considered and the mean found.

For the helical spring, in which all the turns are of the same diameter, the mode of application of the rational formulæ will be as follows:

Let,

D = diameter in inches measuring from center to center of the wrap.

d = diameter in inches of the round wire used.

P = weight in pounds either in compression or tension.

R, J, t and e as before taken.

When,

$$J = \frac{2\pi d^4}{64} = \frac{\pi}{32} \times d^4; \qquad e = \frac{d}{2} \text{ and } R = \frac{D}{2}$$

hence,

$$P = \frac{\pi}{8} \times \frac{d^3}{D} \times t$$

t = 64,000 (which is a fair average value for the ultimate shearing strain or torsional strain as in this case, when figured in pounds).

In a straight member, as depicted in Fig. 1, the torsional angle, α (alpha), depends upon the pull P; at the radius R, considering a given size and length of the member, which may be ascertained as follows:

$$\alpha = \frac{PR}{GJ} \times L$$

when,

α = alpha = angle of torsion.

G = modulus of elasticity for shearing = 10,660,000.

J = as before.

In applying this principle to the helical spring, instead of to a straight round member, proceed thus:

$$\alpha = \frac{2\pi R^2 N}{GJ}$$

The deflection of the spring will be due to P, and in magnitude is as follows:

$$q = R\alpha = \frac{2\pi R^3 N}{GJ} \times P$$

when,

$$J = \frac{\pi d^4}{32} \text{ and } R = \frac{D}{2}$$

extending,

$$q = \frac{8 D^3}{G d^4} \times P N$$

Involving the modulus of elasticity,

$$q = \frac{8 D^3}{10{,}660{,}000\, d^4} \times P N$$

simplified,

$$q = \frac{D^3}{1{,}332{,}500\, d^4} PN$$

Hence the value of P (maximum) substituting for q will be:

$$P = \frac{25{,}120}{1{,}332{,}500} \times \frac{D^3}{d} \times N \qquad e = \frac{D^3 N}{53\, d}$$

The table of springs is compiled on a basis of 10 coils to the spring in each case, hence the (maximum) deflection allowable will be:

$$q = \frac{D^3}{5.3\, d}$$

Since, in many cases it is desired to have more or less than ten coils to the spring, it will be necessary to proportion the deflection allowable to suit the number of coils to be used; this is a simple thing to do since the value of q will be in direct proportion to the number of coils in the spring.

In the table a coefficient of stiffness is given for each spring; this coefficient is calculated as follows:

$$q = \frac{PN}{32c}$$

whence,

$$32c = 1{,}332{,}500 \frac{d^4}{D^3}$$

and,

$$c = 41{,}641 \frac{d^4}{D^3} = \text{coefficient of stiffness.}$$

Since the value of the coefficient of stiffness is dependent upon the diameter of the wire and the diameter of the coil, it gives a true measure of the stiffness of the spring for a given number of coils and a given load in pounds. It is also true that the deflection is in the inverse ratio of the coefficient of stiffness.

In comparing different springs with each other, proceed thus:

$$q = \frac{1}{32} \text{ and as } q : \frac{PN}{32c} :: c : P$$

In this way the weight in pounds, necessary to deflect each coil 1-32 of an inch, is determined.

The values given for P are maximum, and if the work is incessant at the maximum, it is well to use a spring of greater ability in order to assure long life. In the application of springs to cylinders it is of the greatest importance to protect them from undue heat in order that the temper will not be drawn, and since every spring will "set" shortly after it is put to work, if the service is near the value of P maximum an allowance for set should be made.

TABLE OF DIMENSIONS AND ABILITY OF HELICAL SPRINGS

[illegible]	Diameter of Steel Wire — d.																			
	1/16"		1/8"		3/16"		1/4"		5/16"		3/8"		7/16"		1/2"		9/16"		5/8"	
3/4"	[illegible] / 1.5	1.7"	65.4 / 24	.85	221 / 122	.57"														
7/8"	7 / .95	2.3"	56.1 / 15.8	1.05"	189 / 76.8	.77"														
1"	6.1 / .64	3"	49.1 / 10.8	1.5"	166 / 51.5	1"	392 / 162.7	.75"												
1 1/8"	5.6 / .45	3.8"	43.6 / 7.6	1.9"	147 / 34.4	1.27	349 / 114.2	.95"												
1 1/4"	4.9 / .33	4.7"	39.2 / 5.2	2.15"	132 / 26.4	1.57	314 / 83.3	1.18"	613 / 203	.94"										
1 3/8"			35.7 / 3.9	2.65	120 / 19.8	1.9"	285 / 62.6	1.43"	557 / 153	1.14"										
1 1/2"			32.7 / 3	3.4"	110 / 15.1	2.26	262 / 48.2	1.7"	511 / 118	1.36"	683 / 244	1.13"								
1 5/8"			30.2 / 2.4	4"	102 / 12	[illegible]	241 / 37.9	2"	472 / 93	1.59"	815 / 192	1.35"								
1 3/4"			28 / 1.9	4.6"	95 / 9.7	3.1"	224 / 30.4	2.3"	438 / 74	1.85"	757 / 154	1.54"	1202 / 285	1.32"						
1 7/8"			26.2 / 1.5	5.3"	88 / 7.8	3.54"	209 / 24.7	2.65	409 / 60	2.12"	707 / 125	1.77"	1122 / 231	1.51"						
2"			24.5 / 1.3	6"	83 / 6.9	4"	196 / 20.1	3"	383 / 50	2.42"	662 / 103	2"	1052 / 191	1.75"	1570 / 325	1.61"				
2 1/8"					78 / 5.4	4.34"	185 / 17	3.41"	361 / 41	2.73"	623 / 86	2.27	990 / 159	1.95"	1478 / 273	1.7"				
2 1/4"					74 / 4.5	5.1"	174 / 14.1	3.82	341 / 35	3.05"	588 / 72	2.55	935 / 134	2.18	1396 / 229	1.91"	1987 / 366	1.7"		
2 3/8"					70 / 3.8	5.7"	165 / 12.1	4.26"	323 / 30	3.41"	558 / 62	2.84	886 / 114	2.43"	1322 / 194	2.13"	1882 / 311	1.89"		
2 1/2"					66 / [illegible]	6.3"	157 / 10.4	4.72	307 / 25	3.77"	530 / 53	3.14"	841 / 98	2."	1256 / 167	2.36"	1788 / 267	2.1"	2453 / 407	1.99"

$$\frac{A}{C} \quad B$$

A = rated capacity in pounds.
B = deflection in inches with 10 coils.
C = the deflection of a spring with any number of coils will be:

$$x = \frac{PN}{32\,C}$$

when N = number of coils, and C represents the coefficient as given in the table.

Much Depends Upon Proper Selection of Springs—Glancing at the table it will be to note that several selections of springs may be made considering a given rating in pounds. All that is necessary is to alter the number of turns in such a way that the rating of the spring, so altered, will be the same as another spring having ten turns. That the result will be so good is a matter to be contested. In general the best spring will be the one which responds quickest, and to afford this result it is necessary to select a size of wire offering this property. In practice it is the custom to select a size of wire ranging between 1-8 and 3-16 inch, and it is not uncommon to note center to center diameters of even 2 1-4 inches. The number of turns are then regulated to afford the requisite rating of the spring holding the torsional stresses to a point at least as low as the allowance in the table, remembering that is on a basis of ten turns of wire.

A 1-8x2-inch round wire, according to the tabular values, will have an ability of 24.5 pounds. This spring would scarcely be strong enough for the average motor considering the effect of service, although from calculations it would seem to be amply strong for the purpose if the valve weighs less than 1 pound and if the lift is within 3-16 inch.

If a spring of 2-inch coil with ten turns is made of 3-16 wire it will have an ability of 83 pounds, which will be double the strength usually found in motors, and some size of wire for a given diameter and number of turns ranging between 1-8 and 3-16 inch would have to be used, thus requiring the use of formula in the careful determination of the size. True, it would be possible to use the 1-8-inch diameter wire, holding to 2 inches diameter of the coil, and the stiffness would be increased by reducing the number of turns of the coil. This would lead to dangers, since the stresses in the extreme fiber of the wire would increase and the spring would also be less "smart" in the performance of its proper functions.

It is not always possible to employ ten turns of wire since in some designs of motors head-room is at a premium. In such cases it is possible, as a rule, to make the diameter of the coil greater and use a larger diameter wire with a less number of turns and in this way afford adequate spring action and keep within safe limits of the extreme fiber strain.

Danger in the direction of a sluggish spring lies in the use of a large size of wire of a small diameter of the coil, limiting the number of turns. This same effect will come if the material is inferior for the purpose and if heat from the cylinder draws the temper of the spring.

When a spring is made, the pitch of the turns is such that the amount of pressure it is safe for the same to withstand, if compressed (or elongated), the distance as fixed in the table, for the given sizes, so that in depicting the spring it is necessary to show the "free" length of the given number of turns and state the compressed position and the load the spring must sustain under when it is compressed the given distance. An allowance must be made for the lift of the valve, which will compress the spring to a further extent if the same is in compression, which is common practice.

A spring will do just the same amount of work in tension as it will in compression within the elastic limit and the difference lies in the pitch of the turns. If the spring is to work in tension it is customary to fix the pitch with but a slight clearance, whereas, if the same is to be in compression the pitch is established on a basis of slight clearance between turns when the spring is compressed to its maximum safe limit. By thus limiting the clearance of the turns the spring is afforded a measure of safety since it will not be possible to compress it beyond the safe limit; in tension it will not be possible to introduce an automatic safety feature by adjusting the pitch.

If the material of which a spring is composed is not up to a certain standard it will not perform in accordance with the conditions established by the formulæ as offered in this work, and since the formulæ is agreeable to materials which do abound in plenty, the proper course in such an event is to select suitable materials. Even if the material is suitable the method of winding the springs will affect the results since it is possible to take the life out of the steel, and in heat treatment in the absence of skill anything but good results may follow. Spring steel, high in carbon, is prone to deteriorate; since the high carbon is necessary, the manipulator must be capable.

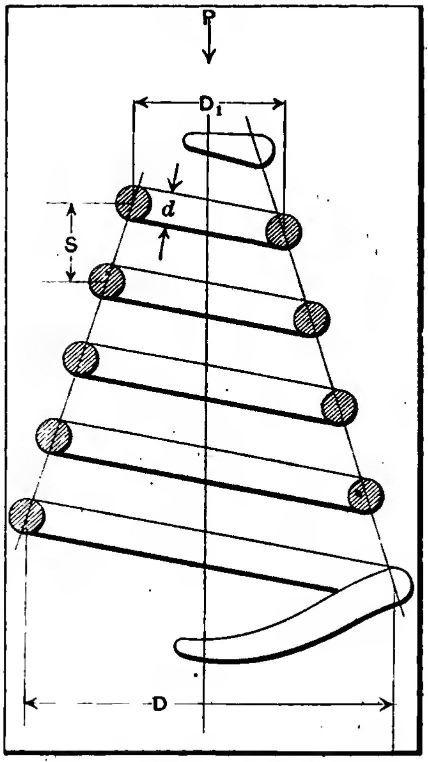


Fig. 3—Short (conical) helical spring for use in restricted space

LETTERS INTERESTING AND INSTRUCTIVE

USE OF GRAPHITE

Editor THE AUTOMOBILE:

[1,973]—Will you please give me some idea of the way to use graphite on an automobile engine. Should it be put into the lubricator or into the crankcase direct, or should it be used in some other way? A. B. SEE.

Bensonhurst, L. I.

Graphite should be mixed with the oil to go into the crankcase or splash system, and should never be put into the lubricator. The reason for this is that it (the graphite) seems to clog up not only the pipes leading to the bearings, but the moving parts of the pump as well. An excellent way to use it is to clean out the crankcase and then, when putting the oil back in or putting in fresh oil, use the graphite-oil mixture. To make this, add a teaspoonful of the purest, finest graphite obtainable to a gallon of oil. This sounds like a very small quantity, but it is a fact that a very small quantity is necessary. After mixing this very thoroughly (take plenty of time to mix it, as it is time well spent) pour it into the case. In actual running the graphite will reach the main bearings, which are the places where it does the most good, and then seems to give them a sort of very thin coating, which is glazed and which acts to protect the pins. A smaller quantity of the oil with graphite in it should be used than the ordinary clear oil. So, too, if the lubricator or pump is of such a construction that the graphite could be put into it with safety, the feeds can be reduced to about one-half of the amount usually used. That is, the addition of graphite to the oil allows of cutting the oil consumption in half, or of reducing the amount of oil used very materially. This, too, with very little graphite.

INSTRUCTION BOOKS

Editor THE AUTOMOBILE:

[1,974]—I am a new owner of a car and wish to familiarize myself with the component parts of an automobile, not alone the make I now have but other and different makes as well. So I would ask you where I can get descriptions of the parts, or more particularly, the repair and care of the parts of the other cars. F. H. GETMAN.

Brookville, N. J.

The very best way to get acquainted with the difference between the various makes of cars is to read—or, better, study—the car descriptions as they appear from week to week in the columns of THE AUTOMOBILE. This would insure your being up to date; that is, you would familiarize yourself with the cars as now built.

If, however, you did not care for this, and would just as soon learn the mechanism and the care of the same for old model cars, the plan will be to write to the companies issuing instruction books. These are usually illustrated with cuts of parts of the car, and tell in detail how to care for, and in some cases how to repair, the various parts. The following companies have issued instruction books of this sort: Pierce-Arrow Motor Car Company, Buffalo; Packard Motor Car Company, Detroit, Mich.; Peerless Motor Car Company, Cleveland, O.; Knox Automobile Company, Springfield, Mass.; Pope Manufacturing Company, Hartford, Conn., and Thomas B. Jeffery Company, Kenosha, Wis.

FIERCE CLUTCH REMEDY

Editor THE AUTOMOBILE:

[1,975]—Will you please tell me how to remedy the action of my clutch, which takes hold with a jerk when let into engagement, and seems to grab at all times. I have been told by friends that this is what is called a "fierce" clutch, but none of them suggested a remedy. PEARSOL SARGEANT.

New Rochelle, N. Y.

If you have described all of the sources of trouble the whole matter lies in the tension of the spring, this being adjusted up too tight. In other words, the spring is too strong for the work it has to do, and should be weakened by slacking off on the adjustment. This may or may not be done easily, but in any case should be done gradually, slacking off a very little each time, until you ultimately get it just right. Moreover, if, as your letter seems to indicate, you are not very familiar with the parts of the car, this will be an excellent opportunity to get acquainted.

If, on the other hand, there are other matters entering into the trouble that you have not told about, this method of fixing it may be all wrong. Thus, if the clutch acts fierce from oil on the leather, the way to fix that is to take it out and clean it thoroughly before returning it to place. Part of your trouble may be due to harsh leather, which is remedied by lubricating it thoroughly with castor oil. The symptoms of the first are noticed in slipping when the clutch is let in; that is, it does not take hold at once, and when it does the grip is not certain, so that a hard pull through sand or the like is liable to make it slip again. In any clutch trouble it is always well to look to the rivets which hold the leather to the clutch spider. If these project too far they are liable to catch in the metal of the female cone, scratching it and preventing the clutch from taking hold properly. After once well scratched the clutch never will engage properly until this surface is machined over again. On the other hand, it is well to know the material of which the rivets are composed, since copper and other soft metal rivets are easy to take out and replace, thus making a replacement of the clutch leather a comparatively easy job. If hard metal, such as steel or iron, be used for the rivets, changing leathers means a very hard job.

VARIOUS QUERIES

Editor THE AUTOMOBILE:

[1,976]—In the July 15 issue of "The Automobile" a description of the new Maxwell car is given in which a four-cylinder engine of 3 3-4-inch bore and 4-inch stroke is given as developing 22-horsepower at 900 revolutions. Now, the Ford of 3 3-4 diameter and 4-inch stroke is only rated by the makers at 16-horsepower at 1,400 revolutions. Can you give me any explanation of this?

Also, in the rating of the automobiles on the present Kansas City-Detroit races, the horsepower of the automobiles is given. What is the standard number of revolutions and how fast can a motor be run with safety and economy? Does this rate vary with different makes, and why?

I have a four-cylinder Ford Model N and it seems to give quite a little trouble in climbing hills, pounding if opened up, either spark advanced or throttle being opened. Can you explain the trouble? Would a too rich mixture cause pounding? Please explain the philosophy of pounding.

Now, in the combustion of gasoline, carbon and hydroben, how many units or atoms of oxygen are used in the consumption of each? Do they burn together or does the hydrogen burn first? In the combustion of a given number of atoms of oxygen with hydrogen, and also carbon in a given amount, which gives the greater number of heat units? Similarly, in the combustion of given amount of gasoline, say an ounce, how much oxygen in the form of air is needed, and how many heat units are produced?

As regards carbureters, can you give me a description of the various makes on the market and used on standard cars; manufacturers, with points of merit claimed by them and whose claims have been substantiated by actual tests, given in detail.

Are gasoline engines expressly made for a special number of revolutions; that is, is each engine adapted to a particular number of turns per minute so as to give the best results at that rate, and what is the reason that these conditions are produced?

Nichols, Conn. W. T. K.

The statement as to the ability of the Maxwell engine was furnished us by the manufacturers. As to the Ford rating, your figures are in error, for the latest Ford catalogue rates the 3¾ by 4-inch engine at 20 horsepower. The generally accepted formula for rating engines is that advanced several years ago by the Royal Automobile Club of Great Britain, and adopted about a year ago by the A. L. A. M., from which it has now come to be called the A. L. A. M. formula. This is: Bore of cylinder squared, times the number of cylinders, divided by 2.5; or, simplified for a four-cylinder engine, bore squared times 1.6. This gives for the size of cylinder used on both Maxwell and Ford cars the rating 22½ horsepower, so that both makers are well within the power rating.

While this formula apparently does not consider the stroke or speed, it actually is based on an average piston speed of 1,000 feet per minute. Now, since the revolutions per minute times two equals the number of strokes per minute, and this times the stroke in feet equals the piston speed per minute, this may be put in the form:

$$\frac{\text{Feet per minute}}{2 \times \text{stroke in feet}} = \text{r. p. m.}$$

So, by substituting for the item feet per minute 1,000, and for stroke the length of stroke of the engine in question, the rating revolutions are obtained. Doing this for the 3¼ by 4 engine in question, 1,500 revolutions per minute is obtained, at which speed a 3¼ by 4 four-cylinder engine should give 22½. With a five-inch stroke this would decrease to 1,200 r.p.m.

Without going into pounding too far, it is caused by one of the following troubles: too early spark, cylinder or piston overheated, carbon in the cylinders, uncertain ignition, compression leakage, connecting rods loose, main shaft bearings loose, loose flywheel, or moving parts striking. The latter two can readily be determined, the first is easy to overcome, and the others may be run down one after the other.

As to the chemical theory of burning gases, you will find in the August 5 issue of THE AUTOMOBILE an article on page 226, under the heading "Incomplete Combustion Is Wasteful," which seems to answer all of the questions you have asked.

When it comes to carbureters, you had best write to the manufacturers for their literature and analyze the devices yourself. On page 209 of the issue just mentioned you will find a table of the equipment used on the cars in the Glidden tour, in which will be noted seven or eight makes of carbureters. Taking these as standard, write to their makers for literature, and from this decide for yourself which is best.

The answer to your last question is yes, if you mean special engines, and no, if you mean regular touring cars. By so proportioning valves, ports and passages, together with valve timing, it is possible to produce an engine that simply will not run at low speeds. Such a machine actually would not deliver any power worth mentioning at, say, 600 revolutions, but could be speeded up to 2,800 or even 3,000 revolutions, if desired, in which case it would be developing its maximum power. In the Arrol-Johnson engine, built for the Four-Inch Race, and consequently having a four-inch bore and a very long stroke, the power at 600 was about 12 horsepower. But it was possible to accelerate the speed up to 2,400 revolutions, at which the output was 71 horsepower. Doubtless at higher speeds more power even than this could have been obtained. In a table given for another purpose, on page 606 of the October 29, 1908, issue of THE AUTOMOBILE, the speed of a number of French automobile engines is given. From this we note the following: Sizaire et Naudin, 1,700; Unic, 1,650; Renault, 1,600; Sultan, 1,600; Vinot-Deguingand. 1,500, etc.

These engines were all intended to run at high speeds, and the valve construction, port proportions, pipe sizes, and other influencing points in the design were so laid down as to give this excessive speed. Many of these cars, in fact, are suitable for racing purposes with very slight and immaterial changes, which are confined mostly to the chassis and running gear.

These engines have a pronounced power curve. which rises slowly and continues to rise at the highest speed obtainable.

HOT JACKET INFLUENCE

Editor THE AUTOMOBILE:

[1,977]—I have heard a great deal of discussion of the influence of hot water jackets upon the power and economy of the automobile engine and would ask you to tell me definitely just how this matter of difference in water jacket temperatures can exert any influence upon or change the power of an engine. SAM MANNHEIM.
Albany, N. Y.

In principle, the hotter the jackets the greater should be the efficiency of the fuel, and, therefore, the greater the power and efficiency of the engine. In actual practice, however, the water-cooled engine is limited to a point which will keep the water in the form of water; that is, to a temperature below that at which water boils. This, then, limits the temperature of the water jackets to about 200, or perhaps 205 degrees. The air-cooled engine, on the other hand, is not restricted in any way other than the temperature at which the oil will remain in the form of oil and not burn. This allows any temperature up to about 400 deg. No very complete tests on this interesting subject have ever been made and published, so that we are obliged to refer to those which were made, whether satisfactory or not.

Laying aside all argument on the subject, the test made by S. F. Edge, at London, Eng., with a six-cylinder Napier engine, are good enough to be worth mentioning. In these tests several points stood out very sharply, as, for instance, it was found that the temperature giving the greatest power did not give the lowest fuel consumption, and, of course, vice versa, the fuel consumption did not progress regularly downward with ascending power. Below you will find the series of test arranged in the order of ascending power output:

	Water Jacket Temperature	Brake Horse Power
1	56.0 deg.	6.60 per cent less than highest.
2	115.7 deg.	3.64 per cent less than highest.
3	212.0 deg.	1.00 per cent less than highest.
4	186.0 deg.	0.66 per cent less than highest.
5	149.0 deg.	Highest.

This table shows that, granting the above figures are wholly reliable, the power increase with temperature rise may be plotted as a curve, in which case the above figures show it to have a somewhat parabolic form, with the peak at or just above 149 deg., since at 186 deg. it has already ceased to increase and shows a slight decrease, which, continuing to 212 deg., is nearly doubled.

As stated before, the fuel consumption varies from the power output, this being, in this instance, apparently highest at the same point as before, but none of the other points agreeing. Thus, arranging the results in the order of increasing economy:

	Water Jacket Temperature	Gasoline Consumption
1	56.0 deg.	11.6 per cent more than lowest.
2	115:7 deg.	4.8 per cent more than lowest.
3	186.0 deg.	1.38 per cent more than lowest.
4	212.0 deg.	0.55 per cent more than lowest.
5	149.0 deg.	Lowest.

These figures, too, would seem to admit of plotting as a curve, in which case they would also appear as a parabola with the peak at or just above 149 deg., since again the next higher temperature shows a falling off and the highest shows a greater decrease. The two curves, if plotted, would not agree, as the economy seems to improve more slowly than the power, and falls off much more rapidly, the final figure being nearly 50 per cent. greater, relatively, than in the case of the power curve.

MAGNETO TROUBLE

Editor THE AUTOMOBILE:

[1,978]—Will you please tell me, if you can, what is the trouble with my magneto. I have been having a whole lot of trouble and have finally located it in the magneto. This is a German make and of the low-tension type. The motor is started by means of a battery auxiliary system and runs fine for a short time after starting. When switched over to the magneto it soon begins to miss and slows down, picking up again as soon as the battery is thrown in. The battery was used so much that it became weak, and then I discovered that the engine would run fine on the magneto when run very slowly.
New York City. A. B. BRUSH.

On dismantling the magneto you will find that the casing in which the contact brush is located is full or partly full of oil or water, or possibly both. When the motor is run very fast this is agitated so that it flies all over the interior of the case and soon covers the contact brush and the end of the shaft with which it contacts, so that a short circuit results. Look for a weak spring back of the contact point, too. The trouble will be particularly noticeable if there is a mixture of oil and water in the case, far worse than either one alone. Finding the above to be the case, the remedy is to clean out the case and dry it thoroughly. Then the exact amount of clean, fresh oil recommended by the makers should be put back in. Care must be used at all times in using oil for ignition apparatus, both in the quality and quantity.

AIR PUMP CAPACITY

Editor THE AUTOMOBILE:

[1,979]—Will you please tell me how to figure the capacity of an air pump. I wish to use one but do not know what size to get because I do not know how to figure the capacity. F. L. HUGON.
Alfalfa, Nev.

The usual method of figuring the capacity of air pumps or air compressors is according to the amount of free air which they will pump in a given time, usually a minute or an hour. By free air is meant air at the usual or "free" pressure.

The area of the bore of your pump times the length of the stroke will give the cubic capacity of air drawn in to the cylinder, and if it is assumed that there is no clearance this capacity times the number of revolutions per minute will be the capacity of the pump.

Thus, if your pump was of 3-inch bore by 5-inch stroke, the area of the cylinder would be 7.07 sq. in. This times 5 gives the capacity per stroke as 35.35 cu. in. If, now, the pump is run at 200 revolutions per minute, the capacity per minute will be 7,070 cu. in., or 4.09 cu. ft. per minute, or 245 cu. ft. of free air per hour.

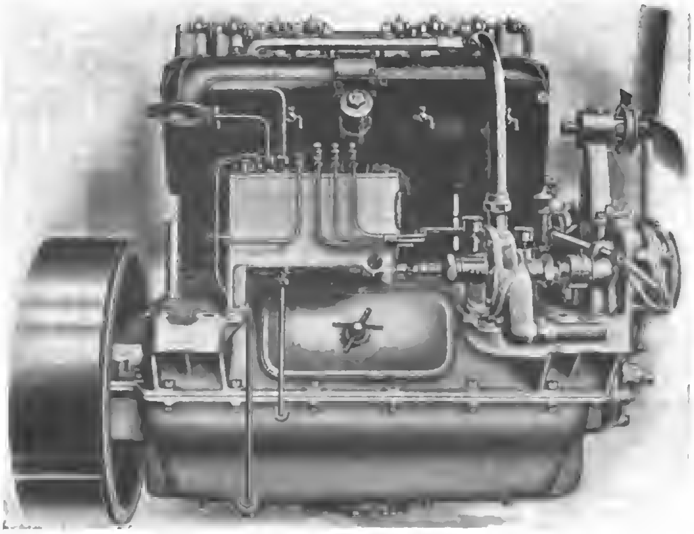
WITH all of the strength and all of the resources afforded by the immense plant at Hartford, Conn., and the greater part of the plant at Westfield, Mass., the rejuvenated Pope Manufacturing Company will endeavor to retain the fame and prestige which has always attached to the name of Pope. The company stands free and clear, the proper officers are in charge, and not a dolllar of indebtedness hangs over them. With wisdom and forethought, it has been decided to concentrate upon a single model which will be built in the conservative number of 1,000 for the season.

This will bear the name of Model T, is a four-cylinder, 40 horsepower car, and may be had, at the purchaser's option, in six different and up-to-date body types. These are: roadster, seating two, three or four as no rumble, single or double rumble is used; pony tonneau, seating four or five; close-coupled body, seating five; seven-passenger, the name of which indicates its seating capacity; and two enclosed bodies, a limousine and a landaulet.

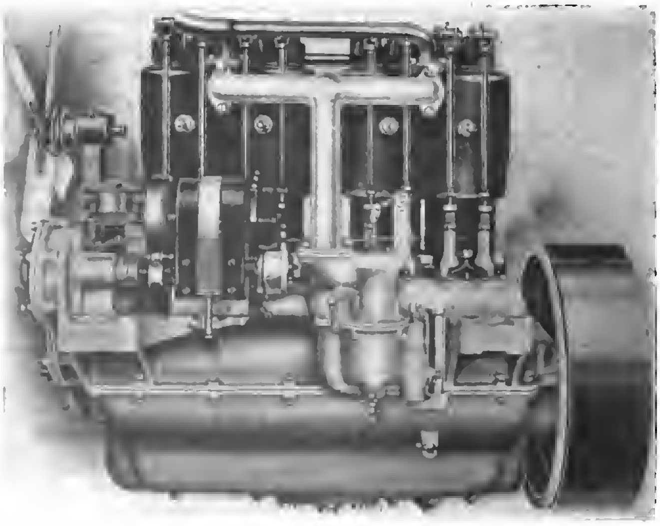
Few Alterations in Design—The changes which have been made since the details of last season's model were announced are few and far between. In the main, they constitute refinements, not changes. Thus, the longer wheelbase allows of a longer, more roomy and, consequently, more comfortable body. The greater length of body calls for slightly different lines, to conform with which the fenders and radiators were altered. The modern tendency to larger wheels is followed, and this year all sizes are 36 inches. The changes which include some actual difference in the design are: the lubricating system; new torque and radius rods; changes in the crankshaft and bearings; new clutch and clutch coupling. Of the latter, however, none of the details are available now.

Doubtless the motor is worthy of the most attention, and this attention will not be wasted, for it possesses many meritorious points. Of the four-cylinder type, with cylinders cast in pairs, heads and water jackets are made integral. The cylinder castings are machined close to size and then ground to an accurate interior surface. Valves are located in the head, in cages which are readily removable and interchangeable. All valves are mechanically operated from the single camshaft on the left side by means of vertical pushrods and overhead levers. The valves are of large diameter, work on a 30-degree taper seat, and are ground to size. The valve springs are enclosed in a neat housing.

Improvements in Lubrication System—Over previous years, the lubrication is much improved; the mechanical oiler has been increased in size, moved slightly forward, an overflow from the oiler back to the oil pocket placed in the bottom of the crankcase, and a suction pump located in the case, which keeps the oiler body full. The oil pocket is cast on the bottom of the case, and is an integral part of it, although separated by a wall. The complete system is such as to lubricate the whole engine very efficiently. Besides the engine, the oiling of other parts is the subject of much consideration. The rear axle is oiled by splash, a large pocket in the bottom of the differential case being filled with oil for this purpose. The transmission is also splash lubricated, a mixture of oil and heavy grease being placed in the case before it is closed. After closing, it is then self-lubricating. All



Exhaust Side of Engine Showing Oiler and Pump



Inlet Side Carries the High Tension Magneto over the car grease and oil cups are freely used, being placed where they are needed or will do the most good.

Clutch Changed and Improved—A clutch of entirely new design is used, this being leather lined, with cork inserts for easy and gradual engagement. It is so located as to be very accessible and thus may be readily adjusted. With this is used a new coupling of entirely new design, which is adjustable for wear.

The three-speed transmission is very compact and is located in the center of the frame, at the rear end of the sub-frame used to support the engine and transmission. The transmission is enclosed in a case, so made that the cover plate is readily removable and is as large as the whole top of the gearbox. To permit of filling the latter with grease or for quick inspection, a circular handhole is placed in the center of the cover plate. It can be opened by turning a single thumb-screw. The gearcase is supported from three points, two in front and one at the rear. At the rear, also, is found the main shaft brake drum. This is of large diameter, of pressed steel, and the brake used on it is an external contracting one, working on the outside.

The transmission gears and shafts are of chrome-nickel steel with the engaging ends of the gear teeth beveled off by an entirely new and different process. Except for the hand levers, the whole gear changing mechanism is completely enclosed.

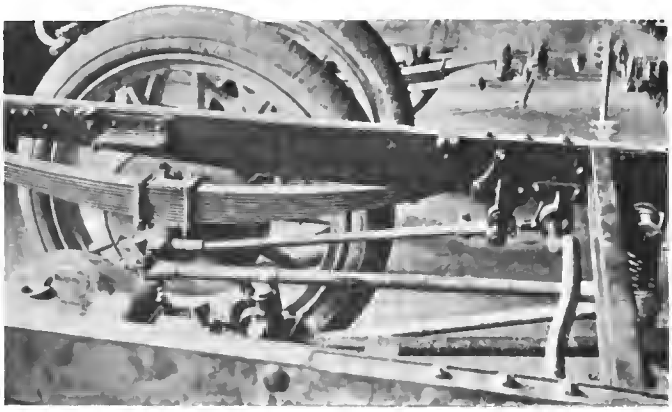

Rear Brake Drum and Brake

I-beam is the section of the front axle, the unit being a solid drop-forging of special steel, made right in the Hartford shops. The drop of the center of the axle bed is very slight, which adds to the road clearance, this usually being the lowest point on the car. Spring seats are forged integral with the axle bed. The axle is of the Elliott type, and the steering arm is below the axle and knuckle. The cross rod, on the other hand, is placed behind the axle, where it is fully protected from road shocks.

Full Floating Rear Axle Details—Clutch type or full floating describes the rear axle, which is made with six integral jaw clutches at the ends. These engage with six corresponding jaws on the outer end of the wheel hubs. The clutches on the shafts and those in the wheels are held into engagement by means of the hub caps, which are locked to the axle. This construction allows of the removal of the shafts with the wheels standing on the ground and without disturbing anything else. The differential is equally easy to remove, when the shafts have been drawn out, and, similarly, no other part need be disturbed.

Both wheels are of 36-inch diameter, fitted with 4-inch tires front and rear. The tires are standard Hartford, but any make will be supplied on special order. The wheels rotate on Timken roller bearings, both front and rear.

Very flat semi-elliptic springs are fitted both front and rear, but there is a difference in the method of hanging them. The front ones are fixed in the front spring hanger, but shackled at the rear, while the rears are shackled at both ends. These are so hung as to be in tension, the rear one from the extended gooseneck and the front from the main frame. This is of armored wood, with a sub-frame of pressed steel. In the construction of the frame the steel strip is placed on the inside, while the wood is outside. This form of frame, a combination of the strength of steel with the springy, flexible qualities of wood, gives to the passenger in the car the best riding qualities obtainable, absorbing the vibrations due to rough roads with facility.

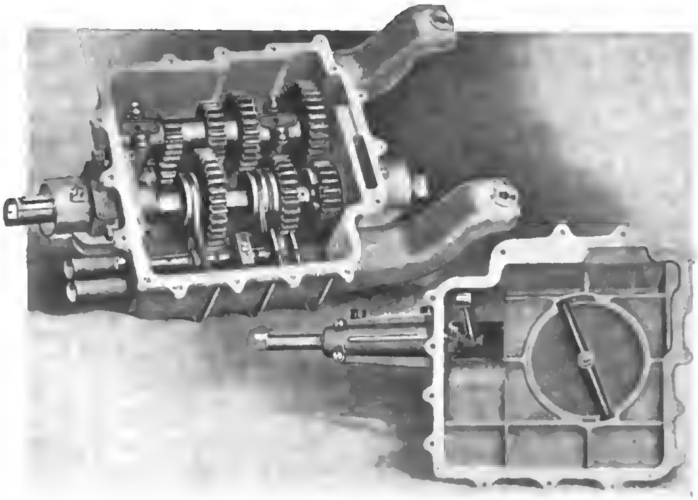

New Radius and Torsion Rods in Place on Chassis

Combined with the very flexible frame, easy riding springs, and the large wheels and tires, the only other thing necessary for practically perfect riding qualities is a long wheelbase, and the new cars have that, too. The wheelbase, which is the same for all bodies, is 118 inches.

Torsion and Radius Rods Relieve Springs—A new style torque rod has been adopted which takes all strain off of the springs. It is of trussed tubular construction, its rear end being pivoted to the rear axle casing, and the front end being fitted with spring buffers, both above and below. These are attached to a special cross member of the frame. The rear end is the double or open end of the triangular form. The rear spring seats swivel on the axle, and the drive is taken by a pair of radius rods, which are attached at the front end by means of an adjustable ball and socket joint to a special bracket located on the main frame. The rear ends of these radius rods are set over the axle tubing loosely so that they may swivel when necessity arises. This is the construction which permits of shackeling the rear springs at both front and rear ends.

There are two complete sets of brakes, the shaft brake previously described and a pair of internal expanding bands on the rear wheels. The latter are of large diameter, work through the hubs, not through the flanges, and are faced with a non-burnable and easily renewable lining. The rear brakes are enclosed. The latter are controlled, or better operated, by the outer of the two hand levers at the driver's right. This operates on a ratchet quadrant, which allows of setting the brake at any desired tension and leaving it there.

Touring car, in standard equipment and finish, lists at $2,750, as do also the roadster, pony tonneau, and close-coupled car. The limousine and landaulet both list at $3,750 alone, but may be had with an additional interchangeable touring body for five at $4,050, and a seven-passenger touring body extra at $4,300. With both of the latter an extra set of rear springs are furnished, as well as an extra set of fenders.


Transmission Displays Gears of Liberal Faces

LATE INFORMATION FOR THOSE WHO TOUR

ROADS BETWEEN SOUTHERN CAPITALS

ATLANTA, GA., Aug. 9—Thirty-odd counties in Georgia, the Carolinas and Virginia are co-operating in the construction of a continuous sand-clay and gravel highway, 750 miles long, linking the capitals and Winter resorts of those States with New York and Washington. When completed this will offer the finest route in the country for Winter touring, as from Richmond southward snow rarely falls. As the surfacing material of the road will not freeze, its condition will be as good in February and March as in the Summer and Fall months.

The route will be known as the "capital highway," because it will connect the State capitals, Richmond, Raleigh, Columbia and Atlanta. From Atlanta there will probably be an extension down to the Florida resorts, and another via Montgomery and Mobile to New Orleans.

At present sixty per cent. of the mileage between Richmond and Atlanta has been improved, and work is steadily progressing on the remainder. The undertaking is being directed by the Capital Highway Association, a body of local men who are interested in the development of the region. Leonard Tufts, of Pinehurst and Boston, is president. Many of the counties using convict labor are claying their roads for $300 a mile. One township in Moore county, N. C., is actually having a section improved by contract at $200 a mile. The contractor does not expect to make any money at that price, but hopes to split even. It is a good road, too, clayed, crowned and ditched. In parts of Virginia the route misses the sand-clay district and runs through a gravel deposit. Dinwiddie and Greensville counties, Va., are paying from $1,000 to $1,700 a mile for gravel roads.

Frank Weldon, secretary of the association, has just returned from a six weeks' pathfinding trip. He says that for the great part of the way the route follows the high land. There will not be a ferry or ford between Philadelphia and Atlanta; every stream will be bridged. At present tourists have the choice of two routes between Atlanta and Augusta, two between Raleigh and Richmond, and three between Richmond and Washington. The State of Maryland is building a macadam road from Washington to Baltimore and one from Baltimore to Elkton. When that is finished it will be adopted as the official route, but meanwhile the best place to cross the Susquehanna is at Havre de Grace, where a bridge will be opened by November. South of Washington good hotel accommodations may be found at many points not over 125 miles apart.

OILED ROADS FAVORED IN BALTIMORE

BALTIMORE, Aug. 9—Oil treatment of roads in Baltimore county has proved quite successful. The people of Green Spring Valley, Roland Park and Park Heights, among whom are many automobilists, are responsible for the introduction in this vicinity of oil for road improvement, and they, together with residents of other sections of the county, will petition the commissioners to use oil on all the heavily traveled roads. Moreover, they express their willingness to bear a portion of the expense. The first experiment was made on the main roadway of Roland Park, with an application of asphaltum; in consequence the roadway has become smooth and hard and all dust has disappeared. On roads where such treatment is not used the surface is continually cut up and requires many repairs.

EDUCATING LOCAL ROADS OFFICIALS

SHAMOKIN, PA., Aug. 9—The recently organized Motor Club of Shamokin held its first run last week, and has as its guests the County Judges and Commissioners and the Roads Commissioners of the seven adjoining townships. The latter afterward met to consider the best way to improve road conditions.

EX-CH'M'N THOMPSON TOURING EUROPE

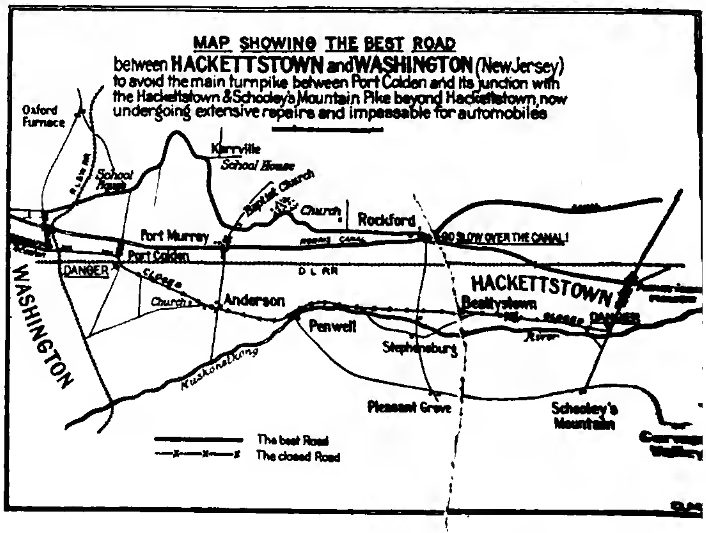
PARIS, Aug. 7—Jefferson deMont Thompson, ex-chairman of the Vanderbilt cup commission and A. A. A. racing board, and Mrs. Thompson recently left Paris in a 65-horsepower Delaunay-Belleville for a tour of Holland and Germany. Mr. Thompson will attend the aeronautic convention at Frankfort-on-the-Main, and later will join Cortlandt Field Bishop, president of the Aero Club of America, at Rheims, for the aeroplane demonstrations at that place.

MICHIGAN CLUBS POSTING SIGNBOARDS

GRAND RAPIDS, MICH., Aug. 9—So much complaint has been made by automobilists in Michigan on account of the lack of signboards on roads throughout the State, that the Michigan association has decided to begin systematically the work of posting all the important cross-roads of the State. The first road to be marked will be the Grand Rapids-Detroit road and the Detroit to Chicago route, via Kalamazoo. To make the work effective it is to be divided among the local clubs. The Grand Rapids club is to take care of the roads from this city to Muskegon, Lansing and other cities. It is expected that many new automobile clubs will be organized in this State during the summer and fall.

TO AVOID AN IMPASSABLE JERSEY ROAD

Owing to extensive repairs, the road from Schooley's Mountain and Hackettstown to Washington, N. J., via Beattystown, Stephensburg, Anderson and Port Colden is impassable for automobiles, and will remain so for several weeks. Tourists going west from German Valley should go to the American House in Hackettstown and turn to the left up Grand avenue, follow that about a mile out of town, then pass under the D. L. & W. R. R. tracks and go straight to Rockport. Cross the canal to the right (go slow); thence straight to the crossroads just beyond to Port Murray Baptist Church—the first church on the right after passing through the woods. Here go straight over the hill to Karrville schoolhouse; pass schoolhouse on the right, and turn to left, following main road—somewhat crooked—three miles. Pass under D. L. & W. R. R. tracks, and turn to the left at first crossroads, into Belvidere avenue, Washington. If going to Easton, Pa., run down Belvidere avenue to Washington avenue; turn to the right, and go straight to Easton, thirteen miles, solid level turnpike road all the way.



Through The ITALIAN LAKES

BY FRANCIS MILTOUN

AUTOMOBILISTS generally enter or leave Italy via the region of the Italian lakes. This is right enough, for without question it is the most romantically disposed of all the varied Italian landscape, and these northern Italian roads are the best in Italy—where they are good; where they are bad (as around Lecco and between Como and Milan) they are as bad as can be, and bad weather makes them worse, so let the automobilist be on his guard.

We had had a delightful run westward from Mestre, opposite Venice, where we had garaged our machine while we did the conventional in the City of The Lagoons. We had made good progress via Padua, Vicenza and Verona, and had dined and slept well at the latter place, at the Albergo Accademia, though there was absolutely no garage, simply an open courtyard in which one might leave his automobile, for which, wonder of wonders, he was charged nothing.

After Verona we skirted the Lake of Garda, through Desenzano and Peschiera, and nearly came to grief while threading our way through its narrow, twisting and half-barricaded streets of the latter place. Peschiera is one of Italy's famous frontier fortresses, where you pass over a drawbridge to get in and another to get out. Most Italian towns have a way around, but here the military authorities have straddled the main road with their great bastions, and travelers in these parts pay the penalty by disaster if they don't watch out.

The Lake of Garda is the largest of the Italian lakes, and to circle it the automobilist will have to pass on to Austrian territory, which is hardly worth while unless one is leaving the country by this gateway. It were better that he should garage his automobile at Desenza and make the lake trip by steamer, over the most translucent blue one could possibly imagine, with a snow-capped mountain background which is delightful.

The Austrian town of Riva at the head of the lake is a more pretentious place than either of the small towns on Italian soil. It possesses a palatial hotel—and some others, and here one finds all the comforts of an exacting twentieth century. Leading to Riva, in case one does make the journey en auto, is one of the best roads of the Austrian Tyrol, the celebrated Ponalstrasse, skirting the eastern shore of the lake. For a matter of seventy-five kilometers this magnificent road shares with the Axenstrasse, near Brunnen, the reputation of being the best in the Tyrol. In case this excursion into Austria is taken arrangements as to custom formalities should be made at Verona, though the Austrian customs house is at Borghetto, forty kilometers away.

The region around the Lake of Garda has one of the most remarkable climates in Europe. The temperature is free from sudden changes, with mild winters and pleasant summers. The midwinter temperature only differs by two degrees, Centigrade, from that of the Riviera, whilst in summer the heat is pleasantly moderate, owing to the south breeze and the shade of the overhanging mountains. The vegetation and flora are identical with those of the Riviera, and palms, camellias and rhododendrons flourish in the open air. No month of the year is devoid of growing flowers.

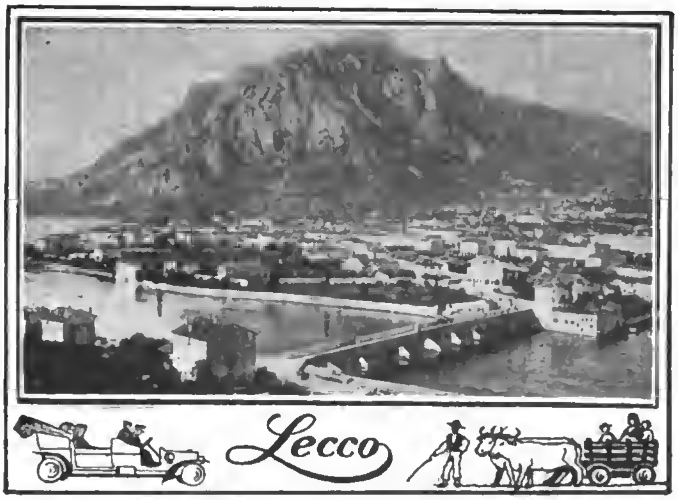
From Desenza to Bresica is thirty kilometers of practically flat and excellent roadway, which continues another twenty kilometers to Coccaglio, and so on to Milan, via Villa Fornaci and Monza, in all ninety kilometers.

From Monza to Milan the Strada Militaire runs parallel with the railway, finally joining up with the Bergamo road and entering Milan by the Porto Orientale. The post road enters the city by the Porto Nuova. For the traveler by road there is no choice between them; they are both "good roads." Roadbuilders in America and England could learn something from the serious contemplation of these two bits of excellent Italian roadway.

All this is encouraging, but if the autoist keeps on from Brescia to Como via Bergamo he sees the other side of the medal. Here is a great trunk line highway, which, a dozen kilometers before Lecco is reached, descends into a slough of the most despicable description.

We had passed the night at the Capello d'Oro at Bergamo and fared, as we had mostly fared in Italy, none too well. We paid relatively high prices for all we got, and two francs more for leaving the automobile in the open courtyard and sheltering a brood of chickens, which otherwise might have got their feet wet. We set out in a hard rain to roll off the sixty-five kilometers between Bergamo and Como as speedily as possible. All went well until within ten kilometers of Lecco. The road then suddenly descended into a slimy mass of mud in six-inch deep ruts. This used up two hours' time exactly. At this rate one would want six months in which to make the Italian tour. Cement and what not, hauled always in the same rut, by great, lumbering, narrow-tired carts is what did the business.

After Lecco we had a climb up from the lake level of a half a dozen kilometers of as fine a boulevard-like roadway as one ever saw. If the rise can be kept in such a good condition surely the descent might be too; somebody had blundered or didn't care—and we suffered.


Lecco

From Lecco, directly north via Chiavenna, runs the international road over the Splugen pass into Switzerland, not open to automobilists unless you happen to catch the officials nodding and rush it. The dogana or customs house is at the twenty-seventh kilometer stone beyond Chiavenna, at an elevation of 1,902 meters.

The descent to the level of Lake Como is dangerously twisting and turning, but fortunately the road improves, and even in wet weather it is firm and wide.

The hotels of Como which care for the automobilist are of all ranks. The Plinius, the Volta and the Suisse rank in the order named. All are of the tourist order, the first named being the hotel de luxe, with a garage for automobile boats as well as land automobiles; give it time and it will probably have a "hangar" for aeroplanes. All are bunched together on the quai just where the boats set out for the upper lake.

Como is a tourist place from every point of view, and visitors are more or less exploited at every turn. The garage charges you a franc more than it ought to for charging your accumulateur, and the wine is strictly non-compris at table d'hote. Still Como is delightful, and is the point de départ for Cernobbio, Bellagic and Cadennabia, at one or the other of which most tourists in these parts stay over a few days and moon about "the perfumed lights from alabaster lamps" in the true fashion of Claude Melnotte and his Pauline. To idle away on the terrace of a villa on Lake Como is to many a more idyllic existance than that to be had beneath a spreading rose tree with a jug of wine, a loaf of bread and—All things to all men! Chacun son gout!

As a stopping-off place for the automobilist en tour Cernobbio, on the Lake of Como, is getting to be the rival of Aix-les-Bains in France. It is what the French themselves would call a *"rendezvous mondain et international."* All the corners of earth are represented on Cernobbio's hotel registers, e'en Stornoway, Esquimault, Brooklyn and Brixton. The Grand Hotel villa d'Est sounds good, is good, and is the rendezvous of the Italian aristocracy in the Spring and Autumn months. Besides being a de luxe hotel of superior attractions it is a historic shrine as well, for the unhappy Queen Caroline, chased in sbame from England's court, once made the villa her home and spent some considerable sums in embellishing it in the early years of the nineteenth century. Napoleon, too, would have made it a place of sojourn during his Italian campaign, and it was actually put in order for his reception, but his plans went awry and he sojourned alone an exile on Elba's Isle instead, his conquest of Europe arrested for the time being.

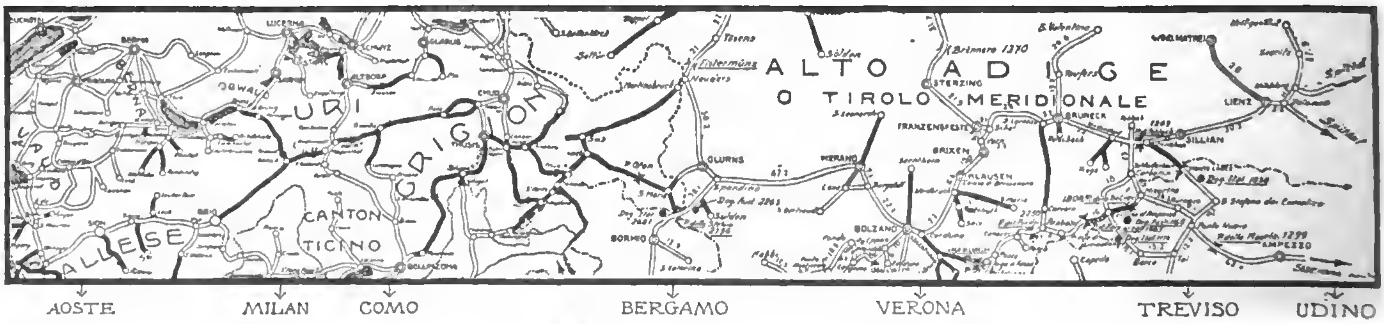
Cadennabia, more than any other place on Lake Como, is mild and sheltered, as is proven by its flora, which blooms continually. Actually in point of climate that of Lake Como resembles that of Touraine. One must make allowances, of course. Sometimes it is delightful at Chinon in Touraine, even in January, and sometimes it is villainous in May. The same is often true of the French Riviera, and the Italian lake region.

To Lugano from Como, and to Bellinzona one passes from Italian to Swiss soil at Chiasso. If one has his Italian-Swiss triptych the passing to and fro is a simple formality, otherwise he had best omit Lugano until he has passed out of Italy for good, via Pallanza, to enter Switzerland by the Simplon Pass.

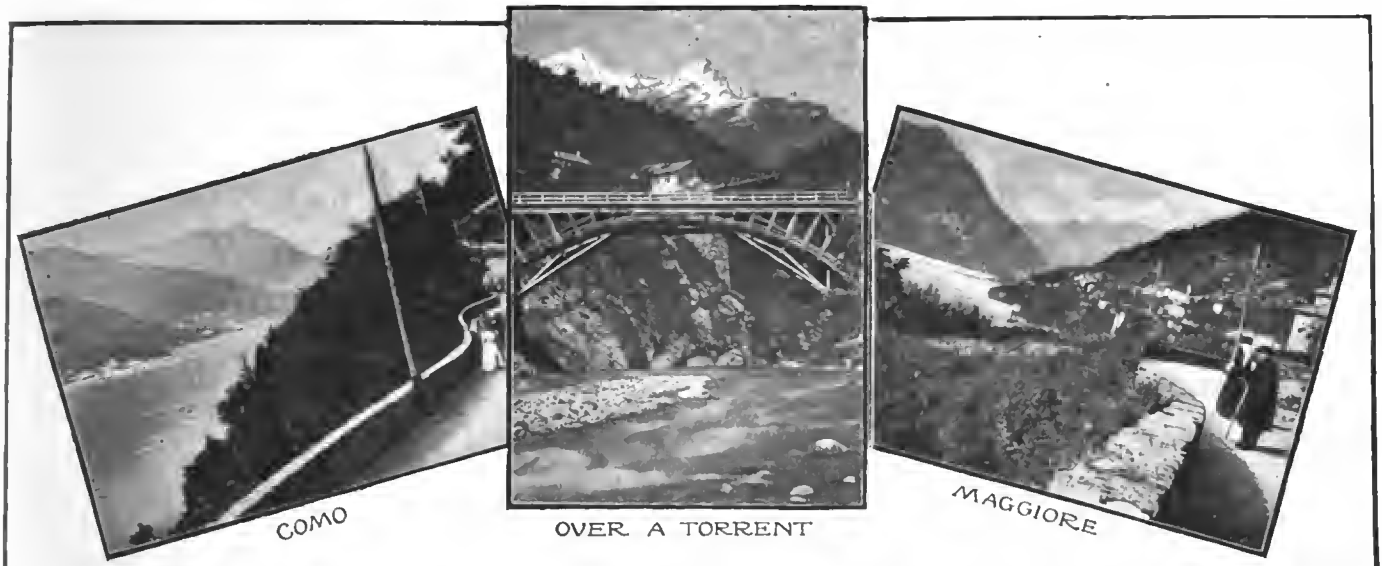
Lugano's Lake has not the charm of Como or Maggiore, but is all around more delightful than any of the Swiss lakes proper. It is in fact a panorama of endless delights, but properly belongs to the Swiss tour, though it groups readily with the Italian lakes in spite of the fact that it lies within Swiss territory.

From Como to Stresa or Pallanza, the centers for Lago di Maggiore, one has to make his way around by a circuitous route via Arona. It took us all of another rainy day to do approximately the hundred kilometers separating the two points, though the roads are of the best. It is indeed true that the road surfaces around Lago di Maggiore are the best in all Italy. They are composed of a cement-like surface, which beds itself perfectly smooth and drains itself readily in wet weather, and does not afterwards break up into a smothering dust. They come very near being the ideal roads of Europe, these roads of Lake Maggiore, but they are not of vast extent, so they do not save Italy from the disapprobation which is justly heaped upon its roads.

Maggiore is the most important, and perhaps the most romantically entrancing, of the world's lakes. One remarks the smooth surface of the waters, the blue sky overhead, magnificent heights bordering the shores, the air fresh but pleasantly comfortable at all but the Midwinter season. One realizes here that he has entered into a new phase of existence, and understands why it is that a more vivid and lasting impression should be made upon him by these Italian lakes than any other similar bodies of water elsewhere. There are higher mountains in Switzerland, and greater lakes in America, but the Italian lakes and mountains captivate us more than all others. People with a certain degree of hardihood have compared lakes and mountains elsewhere with those of Switzerland, but no sane person will venture such a comparison with those of Italy. Without being the grandest or the greatest, they possess indescribable powers of fascination which compel the visitor to admit that they are unequaled, take them all in all.



Italian Austrian & Swiss Mountain Passes
ROADS MARKED in BLACK EXCLUDE AUTOS



COMO OVER A TORRENT MAGGIORE

The Roads of ITALIAN LAKELAND

Surroundings, romantic associations, climate, the colorings of sky, water and mountainside, vegetation, simple churches, the red-roofed houses and the utter absence of smugness are just a few of the reasons which suggest themselves to justify the charm of the Italian lakes.

From Stresa (Hotel d'Italia) or Pallanza (Hotel Metropole) one makes his expected visit to the Borromean Islands. He must do this thing, there would be no reason for coming here otherwise. The magnificent gardens of Isola Bella, the castle of Carlo Borromeo, the Isola dei Pescatori are all classic memories, and one has only to recall Napoleon's stay here as the guest of the Borromean Count, just after he had entered Italy, to realize what an inspiration it was to the ambitious warrior. He dreamed away a night here and set out on the morrow to conquer the Austrians, to push on, if chance favored, to Constantinople, to Moscow, to India or to England. But His march of conquest was never completed as he planned. And what plans they were that Napoleon dreamed that night on Isola Bella!

The automobilist at Stresa or Pallanza, who has come up through Italy, thinks of the morrow, too, ere he goes to sleep for the night, for, unless he proposes leaving Italy via Aoste or Susa and enters Savoie in France, he most likely leaves by way of the famous Simplon Pass.

There are formalities to be fulfilled and they had best be looked out the night before at Pallanza. You may only cross the Simplon between certain daylight hours (eight a. m. to four p. m.) and there are the customs formalities to be gone through at Iselle, where your triptych must be stamped as having left Italian territory, and at Gondo where you enter Swiss control.

At Gravellona, eleven kilometers from Pallanza, one strikes the international highroad which for seventy kilometers climbs up and up to the Ospizio del Sampione at an altitude of 2,008 meters above sea-level. The descent on the Swiss side, to Brieg, is about three times as steep. In twenty kilometers it falls 1,400 meters. Speed is limited officially to twenty kilometers an hour, but the pass has been "rushed" before now to the disaster of many. Look out! or better yet Stop! Look! Listen! at each turning.

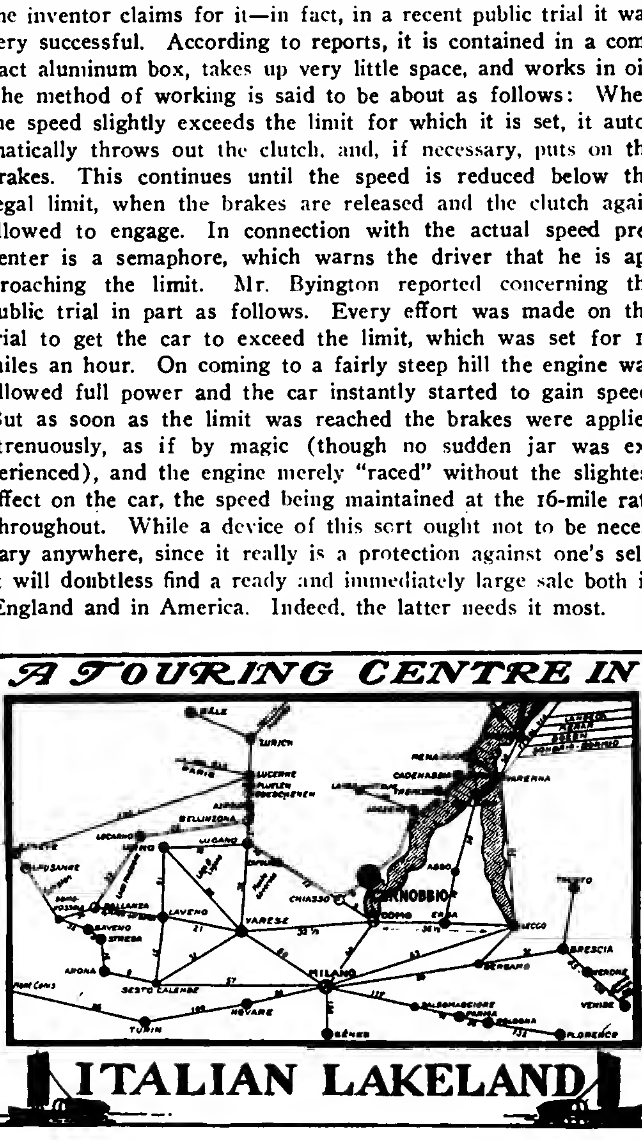
This Simplon gateway to Italy is the most magnificent of all the mountain entrances. *"Domodossola! l'Italie commence ici!"* wrote Edmond de Goncourt as he made his entry by this wonderful mountain road some generations ago.

Domodossola! Good-bye Italy! we say as we turn the prow of our automobile toward the very heart of the snow-capped mountains which mark the boundary between the smiling plains of Lombardy and Piedmont and the stern high valleys of the Bernese Oberland.

INVENTION TO PREVENT SPEED EXCESS

Bristol, Eng., Aug. 3—Through the American vice-consul at Bristol, H. M. Byington, comes a report of a new British invention which is intended to automatically prevent violation of speed laws. Trials have proved that the device will do all that the inventor claims for it—in fact, in a recent public trial it was very successful. According to reports, it is contained in a compact aluminum box, takes up very little space, and works in oil. The method of working is said to be about as follows: When the speed slightly exceeds the limit for which it is set, it automatically throws out the clutch, and, if necessary, puts on the brakes. This continues until the speed is reduced below the legal limit, when the brakes are released and the clutch again allowed to engage. In connection with the actual speed preventer is a semaphore, which warns the driver that he is approaching the limit. Mr. Byington reported concerning the public trial in part as follows. Every effort was made on the trial to get the car to exceed the limit, which was set for 16 miles an hour. On coming to a fairly steep hill the engine was allowed full power and the car instantly started to gain speed. But as soon as the limit was reached the brakes were applied strenuously, as if by magic (though no sudden jar was experienced), and the engine merely "raced" without the slightest effect on the car, the speed being maintained at the 16-mile rate throughout. While a device of this sort ought not to be necessary anywhere, since it really is a protection against one's self, it will doubtless find a ready and immediately large sale both in England and in America. Indeed, the latter needs it most.

A TOURING CENTRE IN



ITALIAN LAKELAND

NEW BOOKS FOR AUTOMOBILISTS

Automobil-Technisches Handbuch—For automobilists who can safely navigate the mazes of technical German this little book offers much interesting information, and will amply repay an hour's labor with a dictionary. It contains good chapters on trigonometry, calculus, statics and mechanics, very useful to the engineer who is a little rusty on these subjects; other chapters treat of the different component parts of the automobile, with examples from current practice illustrated by makers' drawings of the sort that are not often found in print. Then follow detailed descriptions of a number of complete cars, and the fact that these are mostly of French or German origin will not lessen their interest to the designer. Steam and electric cars, motorboats and motorcycles all are included, and there is also a chapter on flying machines. In fact, it is really an encyclopedia of Continental automobile engineering practice. The volume is printed on thin paper and contains nearly 800 pages of fine print. The publisher is M. Krayn, Kurfuerstenstrasse 11, Berlin.

"The Missing Spark"—This is published semi-occasionally by H. L. Humphreys, the automobile editor of the New York *Evening Post*, who tells the "whyfor" of its appearance in these words: "The design of this paper is to diffuse among the toilers in the vineyard a fraternal spirit of good cheer; to inculcate a just appreciation of the great industry, and to cultivate a desire for more business." It would appear from a perusal of the most recent issue that the "Major" has neglected no one who is part and parcel of the metropolitan automobile trade, for all the notables, as well as the lesser lights, obtain some sort of recognition from the versatile Humphreys, whose *Evening Post* automobile department has a patronage commensurate with its high-grade dignity.

"The Sales Booster"—This publication is "issued for the benefit of the live ones who sell the Winton Six," which means that Charles W. Mears, the advertising manager, is more or less responsible for its contents. Of course, the newsy little four-sheeter—it will probably increase in size—contains interesting and timely material concerning the Winton Six and those who assist in its distribution throughout the country, which, according to the "Sales Booster,' 'is done through 11 branch houses and some 99 dealers.

FOR "GOOD ROADS DAYS" AT OHIO FAIRS

Columbus, O., Aug. 9—M. M. Maxwell, secretary of the Ohio Good Roads Federation, is busy arranging for the "Good Roads Day" at the Ohio State Fair, and also for special days at about 60 of the county fairs of the State. The purpose is to work up sentiment among the people in favor of the building of good roads. Tuesday, August 31, has been set aside as the "Good Roads Day" at the State fair. The program for the day will include talks by a number of men prominent in this work, among them Charles H. Hoyt, superintendent of the department of public roads, Washington, D. C. In addition there will be a parade of all road-building apparatus. One of the features will be the building of a stretch of good road to illustrate construction and the necessity of constant care in its maintenance.

Many Steamer-Auto Lines Now Formed—Since the success of the plant outlined last year by the Cunard Company, and recently brought to the attention of tourists on the Continent by the French line, of having automobiles meet their steamers, a number of lines have decided to follow suit. The White Star Company announces that its ships will be met at Queenstown, Plymouth, Cherbourg, or Southampton by reliable touring cars, and drivers, if ordered by wireless. The Cunard Company will continue its method of having cars to run to London or other points from Liverpool.

THE AUTOMOBILE CALENDAR

Shows, Meetings, Etc.

Sept. 21-23.......Cleveland Good Roads Convention, American Automobile Association.
Nov. 6-13........Atlanta, Ga., Auditorium-Armory, National Automobile Show, auspices of National Association of Automobile Manufacturers, Samuel A. Miles and Alfred Reeves, General Managers, 7 East 42d Street, New York City.
Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.
Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.
Feb. 5-12........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.
Feb. 22-26.......Kansas City, Mo., Convention Hall, Fourth Annual Automobile Show.

Races, Hill Climbs, Etc.

Aug. 14..........Philadelphia, Point Breeze Track, Hugh McAnany, Manager.
Aug. 17..........Cheyenne, Wyo., Race Meet, Cheyenne Motor Club.
Aug. 19-21.......Indianapolis Motor Speedway, First Race Meet.
Aug. 26-27.......New York City, Brighton Beach, 24-Hour Race, Motor Racing Association.
Aug. 26-28.......Minneapolis, "Little Glidden Tour," Minnesota State Automobile Association.
Sept. 6-11........Lowell, Mass., Automobile Carnival, Lowell Automobile Club.
Sept. 10-11.......Baltimore, 24-Hour Race, Motor Car Racing Association of Maryland.
Sept. 15..........Denver, Col., Start of Flag to Flag Endurance Run to Mexico City.
Sept. 21..........Riverhead, L. I., Long Island Derby, Motor Contest Association.
Sept. 21-29.......Washington-Boston and Return, Munsey Reliability Run.
Oct. 7............Philadelphia, Second Annual Stock Chassis, 200-Mile Race, Fairmount Park, Quaker City M. C.
Oct. 16...........Denver, Col., Start of "Flag to Flag" Reliability Run, G. A. Wahlgreen, Manager.
Nov. 9...........Atlanta, Ga., Track Races, Atlanta Automobile Association.
Dec. 29-30........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

FOREIGN

Races, Hill Climbs, Etc.

Aug. 22-29.......France, Reims, Aeroplane Races and Grand Prix, Aero Club of France.
Aug. 24-29.......Belgium, Circuit des Ardennes, and Coupe de Liederkerke, Belgium, Automobile Club.
Sept. 5...........France, Mont Ventoux Hill Climb.
Sept. 19..........Austria, Semmering Hill Climb.
Sept. 22..........Austria, Coupe Rochet-Schneider.

AUTO PARADE IN ST. LOUIS CENTENNIAL

St. Louis, Aug. 9—The automobile organizations of St. Louis will co-operate in organizing a parade on October 9, during Centennial Week. There will be divisions for decorated pleasure cars, for those flying the pennant of the A. C. of St. Louis, for commercial vehicles, and for humorous and grotesque decorations. Many prizes will be awarded.

DELAWARE CLUB WILL FIGHT COURT ORDER

Wilmington, Del., Aug. 9—The Levy Court of New Castle County has adopted a resolution offering a reward of $15 to any person causing the arrest and conviction of an automobilist exceedings twenty miles an hour on the county roads. Members of the Delaware Automobile Association will oppose the order, as it opens the way for graft and the depredations of the country constable. The informers may have no means of telling how fast a machine is going, and conviction might result from the judgment of inexperienced persons.

Latest Doings of the Sky Pilots

Their Grandmothers Heard Mother Shipton's Prophecy, and They See the Reality in Bleriot's Flight

CHALONS, FRANCE, Aug. 7—Every true Frenchman is rejoicing in the exploit of Roger Sommer, who to-day wrested from Wilbur Wright the record for duration of flight in an aeroplane. Wright's record, made at Le Mans last December, is 2 hours 20 minutes and 57 seconds. Sommer remained in the air 2 hours 27 minutes and 15 seconds. It is said, however, that his flight will not be regarded as official.

Sommer and Farman, his teacher, have been staying at Mourmelon-le-Grand, a little village on the Chalons moors, secluded from the Parisian crowds. Sommer arose this morning at 2 o'clock and took an automobile out to the shed where his machine was housed. Farman remained in bed. "You will surely break the record," he said, "but I will hear about it in the morning." The moon was still shining brightly when the young aviator started at 3:14.

The machine at first flew low and sluggishly. Afterward Sommer said that as soon as he got in the air he found that the canvas on his lower plane had come loose and was bagging out with air so as to retard his progress. However, he kept on, and in about twenty minutes the propeller in some way struck the bag of air and cut it open. Immediately the aeroplane sprang forward, and the rest of the flight was made at fine speed. Sommer guided his machine round and round in a four-mile circle with the regularity of clockwork at a constant height of about fifteen yards.

When he had been up two hours there was a demonstration by the few spectators who had gathered. Soon he equaled the Wright record, but he made no move to descend until his superiority was beyond dispute. When at last the machine touched the ground at a quarter to six he was seized and carried off the field in triumph, stiff with cold and fatigue, but otherwise none the worse for his exploit.

Sommer is a pupil of Henry Farman, and uses a biplane of the Farman type, which differs from the Wright machine in that it has a box-shaped tail to the rear of the main planes, and but a single lifter-plane in front. He took his seat in an aeroplane for the first time on July 3. Since then he has been flying daily on the Chalons moors, gradually increasing his distance. He first came into prominence July 27, when he made a flight of 1 hour 23 minutes 30 seconds; this at once ranked him among the most prominent aviators. On August 2 he remained in the air 1 hour 50 minutes 30 seconds, and covered nine miles in 12 minutes. August 4, his thirty-second birthday, he celebrated with a flight of 2 hours and 10 seconds. The fact that a man who has been practising for but little over a month can accomplish such flights may well be regarded as a vindication of the practicability of the aeroplane. Sommer no doubt has an especial talent for aviation, and his progress could not be equaled by the average man, but Wilbur Wright was undoubtedly correct when he said that anyone with an automobile training could easily become a successful aviator.

Sommer's Aeroplane Is Wrecked

CHALONS, FRANCE, Aug. 8—Sommer made another short flight to-day in the machine with which he broke the world's record yesterday, but stopped the motor too soon and landed with such abruptness that the machine was smashed. Sommer was unhurt.

ZEPPELIN DIRIGIBLE FLIES TO COLOGNE

COLOGNE, GERMANY, Aug. 5—On its third attempt to reach this city from Frankfort the Zeppelin dirigible was successful, and arrived at 10:15, after having been delayed by unfavorable weather. The big airship left Frankfort at 4:40, cheered by a crowd of 50,000 people. Its progress was reported by telegraph as it sailed down the Rhine. At Limburg, Neuwied, Remagen and Bonn great throngs assembled to watch it. As it approached Cologne, however, it ran into a thick fog and went off its course some ten miles to the southwest. At Dueren it got its bearings again and headed straight for the city. After circling the tower of Cologne cathedral it made a safe landing at Bickendorf, a suburb. The distance between Frankfort and Cologne in a straight line is 110 miles, but the airship covered considerably more than this. Its average speed must have been about 25 miles an hour.

The Zeppelin airship flew from Friedrichshafen to Frankfort on July 31, a distance of 220 miles, with Count Zeppelin himself at the helm. On August 2 it made its first attempt to reach Cologne, but when within 30 miles of its destination was forced back by strong head winds. On August 3 the ship went but a short distance when two of its propeller blades came off.

Count Zeppelin Reported Dead

BERLIN, Aug. 10—It is rumored here that Count Zeppelin is dead, but no confirmation can be obtained. The famous aeronaut went to Constance last week to receive treatment for an abscess.

Military Dirigible Flies Fifteen Hours

BERLIN, Aug. 5—The military dirigible Gross II returned here at 3 o'clock this afternoon after a flight to Halle and return. The distance, 217 miles, was covered in 15 hours and 40 minutes.

CURTISS SAILS TO COMPETE IN EUROPE

Glenn H. Curtiss sailed from New York on the morning of August 5 to compete in the international aviation meet at Rheims, France, August 28. He is the only American entered. His new aeroplane was securely stowed in the hold of the *Savoie*, and with the aviator on deck were his mechanic, Tod Shriver, and Ward Fisher, a friend from Rochester, N. Y. Mr. Curtiss came in from Mineola early in the morning. He had hoped to be able to make a final flight in his old machine, now the property of the Aeronautic Society, and to give a lesson to Charles Willard, who will operate it in the future. The morning was rainy, however, with a stiff northwest breeze, and the attempt had to be given up.

Mr. Curtiss expressed himself optimistically on his chances of winning the big cup race. The conditions are fairly easy, as the circuit to be covered is only 20 kilometers (about 12 1-2 miles); probably half a dozen machines will complete the distance, and the winner will be determined by speed rather than by reliability. For this reason the most dangerous competitors are believed to be the monoplanes. So many entries were received in France that it will be necessary to have an elimination trial to determine the team of three. Entries have also been received from England, Italy and Austria, but none of these will be formidable, judging from past performances. The contest thus seems to be between Curtiss and the three Frenchmen still to be selected.

The aeroplane which Curtiss will use is of the biplane type, 30 feet across the wings and weighing about 400 pounds. It closely resembles the one in which he made his recent flights at Mineola, but will have an eight-cylinder motor of double the power.

Curtiss' Pupil Makes a Good Start

MINEOLA, L. I., Aug. 7—Charles Willard made five short but very encouraging flights this morning on the Curtiss biplane, now the property of the Aeronautic Society. The distances varied from seven-tenths to two miles. On the fourth flight Willard made the first turn he has ever attempted. He also made a flight of a quarter of a mile yesterday morning. Willard, it will be remembered, had his first lesson just before Alexander Williams, who wrecked the machine about two weeks ago. A crowd of 200 persons, among whom was W. K. Vanderbilt, Jr., turned out to witness the trials.

ORVILLE WRIGHT LEAVES FOR GERMANY

Orville Wright and his sister, Miss Katherine Wright, arrived in New York Monday afternoon and left Tuesday morning for Germany on the *Kronprinzessin Cecilie*. Mr. Wright was not accessible to the newspaper men till late in the evening. He was as unwilling as usual to volunteer information, but readily answered all questions. He said that he and his sister would stop off a day or two in England to visit Shell Beach, where a number of aeroplanes are under construction. He does not expect to make any flights there. After fulfilling his business engagements in England he will go to Berlin, and expects to stay there about two months. He will make flights there on the Tempelhoferfeld, under the auspices of the *Lokal Anzeiger*. A company capitalized at $150,000 has been formed in Germany to take over the Wright patents and manufacture aeroplanes. Among its backers are the Krupp Company, the Allgemeine Elektricitaets Gesellschaft and the Ludwig Loewe Company. Mr. Wright would not talk about the possibility of the German government acquiring his patents.

Of more interest to aeronautic enthusiasts in this country will be the news that the Wrights expect to take part in the Hudson-Fulton celebration at New York this fall. Overtures were made to them by W. J. Hammer, vice-president of the Aeronautic Society. The only difficulty is to get ready in time, as the brothers have a number of contracts with time limits to fulfill. Mr. Wright was very optimistic as to the commercial practicability of the aeroplane in the future.

AERONAUTICAL DOINGS IN GENERAL

Experts Define Aeronautical Terms—Dictionaries have not kept pace with the inventors of aeroplanes and the progress of the science, so the international aeronautic congress has taken up the matter of terms relating to aerial navigation. There has been considerable misunderstanding about the use of the words applicable. The congress has decided that "aeronef" is the proper one for heavier than air machines, that "aerostat" is a free or uncontrolled balloon; and that a dirigible, one which can be propelled and has rudders, is an "aeronat." An "aeroplane" consists of surfaces of aero curves with the propeller shafts set horizontally, while a "helicopter" has the propeller shafts set vertically, thus pulling the machine straight up from the ground. "Orthopters" have flapping wings. The navigator of the craft is an "aeronaut," unless licensed by the aero club, when he becomes a "pilot." "Aviator" is the form of the flying machine, not the navigator, and "aviation" is the art of flying. An "aerodrome" is listed as an "aerial track" and in this the congress takes issue with Dr. Bell and Dr. Langley who apply that term to their machines. A "monoplane" has one areo curve, and a "biplane" has two.

Texas Inventor Expects to Rival Wrights—Equipped with an automatic arrangement for balancing, four parachutes for use in case of accident, and built so that it can alight on either water or land, an aeroplane has been built by J. W. Oman, of San Antonia, Tex., with which he expects to rival the Wright brothers. Mr. Oman has included a number of new features in his machine and models have been successful in flight. A company has been formed and full-sized fliers will be constructed this spring. It is claimed that no track is necessary in starting and that only a short run is required, propelled by two 36 horsepower engines, either one of which can drive the aeroplane if necessary.

Bird-like Machine with Magnets Furnishing Power—Victor L. Ochoa, of Arlington, N. J., is working upon a bird-like aeroplane in which propulsion is designed to be secured through the action of aluminum wings. These are operated by large magnets which, the inventor claims, have a power of attracting or repelling two tons. He has been working lately, however, upon a machine of the more conventional type, mounted upon two bicycles, between which is installed a six horsepower engine, and weighing 250 pounds in all. Over a framework canvas is stretched, with a rear rudder similar to the tail of a bird, the total length being 26 feet and width six.

Jupiter, a Horse, Flies in a Balloon—It is more than a press agent description which lends color to the latest performance of the educated horse. In the Barnum & Bailey circus there is a beautiful white Arabian horse, named Jupiter, which is ridden into the ring by a woman, steps upon a basket platform underneath a large balloon, and is slowly raised to the roof of the big arena solely by the inherent power of the gas bag. The picture calls to mind the mythological tales of Germany's war heros. Fireworks are set off to show that the horse is not nervous, but it is not said whether the animal pulls the cord which releases the gas to cause a descent.

Fears Smuggling by Balloons—New problems in aerial navigation are continually arising, and one of the latest is that of the possibility of smuggling across the borders. Chinese and merchandise seem to be the loads generally considered as giving handsome profits. Another question which arose in the minds of some long distance fliers was that of duty, when a balloon or airship arises from the United States or Canada and alights in the other country. Customs officials state, however, that this objection can be easily obviated. If the balloon is made in one of these countries it may be returned to the other after a flight, by simply filling out certain papers.

Aero Club in the Thousand Islands—Dr. J. M. Gibbons, with several other enthusiasts, is organizing an aero club among the members of the various boat clubs in the Thousand Islands. Dr. Gibbons is constructing an aeroplane.

INDIANAPOLIS NEXT WEEK WILL OPEN ITS SPEEDWAY

INDIANAPOLIS, IND., Aug. 9—From a commercial point of view the new Indianapolis Motor Speedway is one of the most daring enterprises ever projected. Ordinarily, when a large amusement production, such as a circus or a ball park, is to be put before the public, it is thought necessary to insure that a great many performances be given in order to bring in any return on the investment. A circus that would perform but fifteen times a year would undoubtedly be a dismal failure. Yet the promoters of the speedway are putting a third of a million into a track, which from its nature cannot be used oftener than once a month, and expect to make the venture a commercial success.

Messrs. Wheeler and Schebler and Their $5,000 Trophy

The cost of the speedway was at first estimated at $350,000, but according to later reports this is being exceeded. One feature that was not included in this reckoning is the laying of a rock-surfaced track. In addition to this outlay, $25,000 will be expended in advertising and promoting the first two meets, and the prizes to be given will total close to $25,000 more. It is evident that the promoters, in making this expenditure, must have counted on an enthusiastic backing by the public, and at present it seems as if they had reason.

The location of the speedway is very convenient. Automobilists may reach it over a well-oiled road, but three miles from the center of the city. The hotel accommodations are ample, and it will not be necessary to drive all night or camp out in the fields. The parking of automobiles will be free, with no extra charge at the gates. For the less fortunate spectators there will be frequent trolley service. The program will begin each day at 12 noon, and will last for six or eight hours.

The opening meet is scheduled for August 19, 20 and 21, and includes altogether 18 events, at distances of from one kilometer to 300 miles. The closing feature of the first day will be the 250-mile race for the $1,500 Prest-O-Lite trophy, open to cars of 301-450 inches piston displacement. The great event of the second day will be a 100-mile race for cars of 231-300 inches displacement, for the $1,000 Motor Speedway trophy. The grand climax will be a 300-mile contest for the $5,000 Wheeler-Schebler trophy, open to cars up to 600 inches displacement. This trophy is over six feet high and weighs 500 pounds troy.

Thirty-four entries have already been received for the various events. The cars named include Stoddard-Dayton, National, Knox, Chalmers-Detroit, Apperson, Marmon, Marion, Lozier, Fiat, Benz and Christie, and the drivers Lytle, Oldfield, Bourque, Denison, Mulford and Hanshue.

During the races the general rules committee of the Manufaturers' Contest Association will meet in Indianapolis to consider the rules for 1910. Practically every manufacturer in the country interested in competition will be represented.

The management has promised that the track will be of a construction that will permit the highest speeds to be attained. The surface will be free from dust and the curves will be of long radius and properly banked. The spectators in the grand stand and in the parking spaces on the inside of the track will have a clear and obstructed view of the course and will be able to follow every movement of the cars. The grand stand will be covered as a protection from the sun, and every convenience will be provided. One of the features will be a timing device built by the Warner Instrument Company, which it is claimed will record the time to the hundredth of a second. A tower 60 feet high will show on three dials, the times of the first three cars in each event. The management believes that the public is interested in clean and fast automobile racing, and will endeavor to supply the kind of sport that will make the enterprise a success.

HOOSIERS FORM ANOTHER AUTO CLUB

PERU, IND., Aug. 9—A number of automobilists and good roads enthusiasts of this city have organized the Miami County Automobile Club. E. Mack Morris is president; Milton Kraus, vice-president; William E. Carson, secretary, and A. H. Kalbfleisch, treasurer. The club will devote particular attention to the promotion of good roads and the enforcement of the laws.

AUTO REPLACES BRONCHO AT CHEYENNE

CHEYENNE, WYO., Aug. 9—The Cheyenne Motor Club will hold a race meet here, August 17, on a four-mile special course, which is just being completed. The track runs around Sloan Lake and is in the shape of a letter D, with only one sharp turn. A grand stand, with a capacity of 7,000, has been erected, from which a view of the entire course may be had. The meet will be under the sanction of the A. A. A. The big event will be a 200-mile race, for which a prize of $750 has been hung up. A 25-mile race will be run as a curtain-raiser.

CONNECTICUT'S LAW NOT YET SIGNED

HARTFORD, CONN., Aug. 9—Speculation is rife as to the probable action of Governor Weeks in regard to the automobile bill now before him. So many rumors have gained foundation to the effect that the bill as passed by the Legislature will be vetoed that some attention has been paid to them. There has been an impression that if the veto is placed upon the act it may be allowed to be forgotten, keeping the present statute in force. This would please the automobilists. Secretary of State Rogers has stated that if the new law goes into effect, setting the date of change of licenses at January 1, those whose licenses expire previous to that time may operate under the old number. New licenses for the Fall will be sold at a pro rata fee.

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FREE-FOR-ALLS ARE TOO FREE

It is a natural sequence that if competition in race-meets and hill-climbs is to have any value whatever, the contestants must be on as nearly equal footing as possible. 'Tis possible the most useful and enjoyable form of automobile competition at present may be found flourishing in scores of country towns as yet innocent of press-agents and promoters, when the members of the local club come together on the county race-track. No records are broken, save those of the club; no dare-devil drivers dash at death-defying speed; no word of it ever reaches the metropolitan journals. Yet these rural meets provide the best and cleanest kind of sport. They show the relative ability of the different makes of cars represented; they make the owners study their machines and find how to get the best performance from them; and, above all, they interest other people and make the automobile a familiar feature of every-day life.

But it is difficult to keep the sport in this natural and healthy condition. Sooner or later the townsmen grow ambitious; they call in a professional promoter, and hire a barnstorming driver with a three-year-old racing car to attack the mile track record. Perhaps a local celebrity will offer himself as a sacrifice in a match race. For a few days there is great excitement and enthusiasm. But the owners who formerly provided the sport are overshadowed and discouraged, and when the visiting driver leaves, automobile racing in that county has paralysis.

In a slightly different form this often occurs in better known contests. Here the principal contestants may be manufacturers' cars handled by professional drivers, but still stock cars in the usual meaning of the term. Such cars are capable of sufficient speed to excite the crowd, and are sufficiently well matched to provide good sport. But here, too, the special racing car intrudes. It cannot compete in the classified events, but the free-for-all gives it the necessary opportunity. It breaks the record for that particular hill or track, is headlined in the newspaper accounts, and in general is the particular star of the meet.

Of course a free-for-all, theoretically, should be open to everyone desirous of competing; but its proper function is to give a good small car a chance to see if it can beat a car in the next larger class, and get the proper credit if it does so. Perhaps it would be advisable to limit free-for-alls to those who have competed in the classified events. At any rate something should be done to suppress the special racers. If they could be induced to compete among themselves it would not be so bad, but it is noticeable that most of the self-styled "dare-devils" do not care to enter against others of their own class. They prefer to shine in solitary glory.

IN THE SEEKING OF A WINNER

When the general rules committee of the Manufacturers' Contest Association holds its forthcoming session at Indianapolis, it might stop and question if the search for prize-winners in contests is not bringing about a condition of affars detrimental rather than beneficial to those participating. It is a generally understood fact that the prime object of contests is to demonstrate reliability and durability, but not to the extent of unnecessarily blackening a car's running abilities.

Microscopic examination is all very well when it concerns the running qualities of a car, though when it also includes accessories or the manner of their retention it would seem that the search for a winner is leading into byways of small moment in determining the sturdiness and consistency of an automobile. The public naturally wants to have winners evolve in contests, but at the same time there is no demand for carrying the rules to such an infinitesimal point as is being practiced even in events of considerable magnitude. A maximum of regularity can be proven without resort to trivialities that bear the most remote relation to the general excellence of a motor-driven vehicle.

NOW THE TOUR IS THE THING

More people are thoroughly enjoying their annual vacations this year than ever before. The simple explanation is that thousands are becoming intimately acquainted with their own country because of the automobile, which, though it has been stated innumerable times before, is at present giving plenteous proof of the fact that it is the greatest blessing that has been provided for mankind in centuries. Coincident with the abridging of distance, is the healthfulness and enjoyment of the thing itself. A fortnight daily in the open air, through the highways and byways, with kaleidoscopic scene-changing, is a good recipe sufficient for any tired man or woman.

LOWELL NATIONAL RACES TO BE RECORD-BREAKERS

LOWELL, MASS., Aug. 10—More high-class entries made for the Lowell racing carnival indicate the immense amount of interest being taken in the event by the manufacturers of both light and heavy cars. That the National Stock Chassis competition will equal any races run in the East during the past few years, there is no longer any doubt. Of the recent aspirants for laurels in the light-car sweepstakes, are two Stoddard-Daytons and the Rainier car, which scored second place in the recent 24-hour race at Brighton Beach. A new foreigner to enter the same sweepstakes is a 24-horsepower Benz.

That Lowell intends to make a general week of holiday during racing carnival, is evidenced in the plans of the local commercial interests to close down all the mills and factories, as well as smaller places of business, in order that the entire population may turn out and participate in the celebration. At a meeting of the Trades and Labor Council a few days ago, the question of holding the annual Labor Day parade was brought up and it was soon voted against, for it is obvious that Lowell's working men and women will take considerably more interest in a big speed battle than in a procession of toilers.

The novel plan for selling tickets for the races promises to work out most successfully. No less than 20,000 tickets have been turned over to a number of young women in the city, who will do their utmost to sell out. The ten young ladies who dispose of the greatest number of tickets will be rewarded with a delightful trip to Niagara Falls and return.

Entrants in the contest are making arrangements for establishing camps near the course; the first to select quarters being the Knox team. William Bourque of this star team of drivers, visited Lowell a few days ago and negotiated for headquarters on George W. Cummings' place on Dunbar avenue, at the eastern end of the course. A crew of ten men from the Knox factory will soon be in the camp and efforts are being made to give the drivers and mechanics "all the comforts of home" during their stay. Of course Fred J. Wagner is to start the races.

President Heinze, of the Lowell Automobile Club, states that everything is going along swimmingly as far as the road improvement and constructive work on the grand stands and the novel pontoon bridge across the Merrimac river are concerned. More men have been added to the working force of road builders, and Mr. Heinze is positive that the course will be in the finest shape possible, not only for the contests themselves, but also in time for the drivers to try their cars out properly, a week or ten days previously.

THE DEATH OF COLONEL ALBERT A. POPE

COLONEL ALBERT A. POPE, who died at his home in Cohasset, Mass., August 10, was not only a pioneer bicycle builder, but one of the first to become identified with the making of automobiles. Colonel Pope had been in very poor health for several months, so that the end was not unexpected. He was born in Boston, May 20, 1843, and came of a very old family. Serving in the Civil War, beginning as a captain, he rose successively to be lieutenant in the Thirty-first Massachusetts infantry, captain, major and lieutenant-colonel. Following the close of the war, he started the Pope Manufacturing Company in 1877. This firm, presided over by the colonel himself, took up the manufacture of bicycles in 1878. Later, when bicycle manufacturers became numerous, he played a prominent part in the amalgamation of the so-called bicycle trust, of which he became the active head. Beginning in 1897, the Pope-Hartford automobile was built and placed on the market, this being a single and two-cylinder car until 1902, when the first four-cylinder car was brought out. This was followed successively by the annual models up to those for 1910, described in this issue.

In 1898 the manufacture of electrics was commenced in Indianapolis under the name of Pope-Waverly, this business continuing very successful up to the time of its sale last Summer. In 1900 the Toledo plant was started, and in 1901 produced the first car under the name of Pope-Toledo, the name of the company being the Pope-Toledo Motor Car Company. This was retained until very recently, when it was sold to J. N. Willys.

The Pope-Hartford plant, at Hartford, Conn., for the manufacture of automobiles, and the Westfield, Mass., plant, for bicycles, are still in the hands of the Pope Manufacturing Company, recently reorganized, and at present presided over by Col. Albert L. Pope, oldest son of Col. Albert A. Pope. Col. George Pope is treasurer, and Harold L., youngest son of the deceased, was formerly assistant manager of the Toledo plant.

Like most men of capital and business ability, Colonel Pope was connected with at least a dozen corporations and banks as a director or officer. Outside of his business he had many interests, too. He was a member of the Massachusetts Society of the Sons of the Revolution, the Massachusetts Commandery of the Military Order of the Loyal Legion, of the Edward W. Kingsley Post, No. 113, G. A. R.; the Algonquin Club, Boston Athletic Association, Country Club, Art Club, Beacon Society, the Society of the Army of the Potomac, and a life member of the American Academy of Political Science, and of many other trade, social and educational and military organizations

INTEREST IN GOOD ROADS CONVENTION WIDELY EXTENDED

EVERY State in the Union is interested in good roads, and the amount of attention given is steadily increasing. To give each commonwealth an opportunity to benefit by the experience of the others, the national committee of the second annual good roads convention has invited the Governor of every State to send from five to ten delegates to the approaching meeting. Mayors of principal cities have also been asked to send official representatives, so that the discussions in Cleveland, September 21-23, will have an important bearing on the movement.

The committee is pushing its plans rapidly so that all preparations will be completed well in advance. It has been arranged to have President Lewis R. Spears, of the A. A. A., deliver the opening address in the Chamber of Commerce hall; Governor Harmon will welcome the delegates to Ohio, and Mayor Thomas L. Johnson will greet them from the city. The dust problem will be given extended attention, and Provost Hubbard, the chemist in the U. S. Office of Public Roads, will explain some of the difficulties in dealing with the subject. Logan W. Page, director of the government office, is preparing a paper comparing the situation in this country with those of foreign lands, and the farmers' interests are to be presented by Hon. T. C. Laylin, Master of the Ohio State Grange.

Affiliated with the A. A. A. in holding the convention are the National Garage, the U. S. Office of Public Roads, the American Road Makers' Association and the automobile bodies—the A. L. A. M., A. M. C. M. A. and N. A. A. M.

METROPOLITAN TRADE INTEREST CENTERS IN NEW MODELS

NEW YORK, Aug. 9—Automobiledom, locally, is in a state of expectancy during these Summer days, for there is an interval now existing between the completion of the business in the 1909 models and the arrival of the 1910 series. A number of the prominent houses have already received the new cars, some have been delivered, and a few have announced that hereafter the yearly alterations and the classification by the numerals will be discontinued. All along the row, however, from the Cordner Company, just above Times Square to the thriving settlement just above Seventy-second street, and scattered members still further towards Harlem, there is a decided optimism in regard to the business prospects of the season. It makes little difference whether the concerns handle the most expensive big cars, the medium-priced and sized ones, or the very popular small type, the opinions are the same, and branch managers and agency sales managers unite in fearing a shortage rather than an overproduction.

While the new models are en route a number of the agents have moved their quarters so that the changes along the row have been several. The A. Elliott Ranney Company, formerly selling the Elmore, has taken over the new Hudson from Detroit, and has moved to 1928 Broadway. The Hudson cars have been here some time and have been kept busy with demonstrations. The branch of the Speedwell Motor Car Company has moved from its location near Sixty-eighth street to 1657 Broadway. The Simplex Automobile Company has opened quarters at 1862 Broadway, just above Sixty-first street, and the winning car of the recent Brighton 24-hour race has been a center of interest. The Mercer Company has a branch on the corner of Sixty-first and Broadway, with K. H. Slocum as manager.

Of the 1910 cars nearly every concern knows just when the demonstrators will arrive, for the entire season has been advanced by the factories. Carl H. Page & Company has received the first of the new Chalmers-Detroit 30 models, the White Company has a sample of the gasoline touring cars, and the Packard has been on the streets for several weeks. The Harry S. Houpt Company is now looking forward to the arrival of the new Houpt cars in quantities. The first has already been delivered to be used in racing, and the machines for the sales department are well under way. Herreshoffs are leaving the factory at the rate of three a day, but only a few of these are sent to New York. With the new arrangement for selling E-M-F cars along with the Studebakers, the representation for the former will hereafter be handled by the Studebaker branch, and H. J. Koehler has taken the agency for the Hupmobile and Rider-Lewis in place of the E-M-F. The Atlantic Motor Car Company has received the first of the 1910 small Stoddard-Daytons, and demonstrators of the larger models are expected to arrive shortly.

Prospects for the 1910 Haynes as seen from the metropolitan branch are better than ever before, the new model seemingly having made a decided impression upon prospective purchasers. Manager E. W. Headington states that bona fide contracts have been taken through the local office which represent three-quarters of the entire output. The delivery of demonstrators will begin next week. Manager W. W. Burke, of the Mora branch, is awaiting his 1910 demonstrators, and expects to receive them within a few days. The regular deliveries will commence in September, and will give a much better chance than the past season in which the first cars began to arrive in March. Mercer cars are now represented in the local territory by an even half-dozen machines, but a shop order of about 40 machines is about completed at the Trenton factory and deliveries will follow.

Royal Tourists of 1909 have all been sold, and the 1910 cars of two types will soon be on their way. One is a successor of the present big car, with some changes which make it appear lighter, and then there will be a new model with some features that are expected to attract considerable attention. The car will sell for $2,500. Branch Manager Horace B. Hills will have both models as soon as they can be sent from Cleveland. These instances are examples of the condition among all of the agents; a few still have cars to sell and they are experiencing no difficulty in doing this, for it is generally known that changes will be few. Almost every day some newcomer arrives and this will be the order right up to the shows.

BUFFALO SEES RACES ON CANADIAN TRACK

BUFFALO, N. Y., Aug. 7—Old Fort Erie track, across the Niagara river, just in Canada, has been the scene of two days of spirited automobile racing yesterday and to-day. Inasmuch as the promoters were unable to secure a sanction for a meet on a Buffalo track they went abroad. Some stars of the racing firmament were in attendance, with cars of equal renown, and fast time was made in spite of the heavy course and loose sand. Barney Oldfield, Walter Christie, Louis Chevrolet, F. S. Lorimer and Joe Matson were among the pilots, and if they had had a faster circuit they would likely have set some new records.

Lorimer was the only one whom fate seemed inclined to tamper with, for this afternoon in the ninety-sixth mile of the 100-mile Canadian championship he went through the fence in a blinding cloud of dust. So thick was the pall, however, that his mishap was not noticed at first and when the surgeons reached him the autoist was unconscious and found pinned in his car. Serious injuries were at first supposed to have been incurred, but later examination showed only a scalp cut and bruises.

Yesterday was featured by the local appearance of the new 100-horsepower Christie racer, driven by its inventor and builder, and by its breaking of the Canadian track record. The new mark is 54 3-5 seconds. There were five contestants for this honor, their cars and times being: Christie, Christie, 54 3-5 seconds; Oldfield, Benz, 55 2-5; Chevrolet, Buick, 57 3-5; Chevrolet, small Buick, 1:04; Croker, Peerless, 1:07.

The short distance races, at three and five miles, were run in heats, and of the four Christie and Chevrolet each won two. The 50-mile Buffalo derby for stock chassis had two contestants, Lorimer in the Chalmers-Detroit and Chevrolet. The latter won in 52 minutes 10 1-5 seconds.

The program to-day was of much a similar character, with mile exhibition trials, heats at three and ten miles, and the 100-mile Canadian championship. It was in the last of these that Lorimer tore down several yards of heavy fence, while racing with Chevrolet. The Frenchman won in 1:44:32 1-5, a very high rate of speed for a track. One point which caused some gossip and speculation was the fact that Oldfield and Christie alternated their victories, the latter defeating the old Green Dragon man, now in a German car, yesterday, and to-day being himself defeated. It seemed that Oldfield gained time on the curves, while Christie was able to pull away from him on the straight stretches.

In the mile trials to-day Christie reduced his best record of yesterday to 54 seconds flat, and the times of the others were: Oldfield, :55; Chevrolet, :58; Croker, Peerless, 1:00 3-5, and Matson, Chalmers-Detroit 30, 1:06 3-5. In the short races Chevrolet captured two of the four, Christie and Oldfield taking one each. Chevrolet lowered the track record for the 50 miles during the 100-mile event, clipping the best previous time of 51 minutes and 22 seconds to 51:19. The rough course and high speed was hard on tires but no serious occurrences resulted.

HANDSOME ADDITIONS TO NEW YORK'S AUTO ROW

NEW YORK, Aug. 9—Illustrating the trend in the automobile industry towards the refinement of exterior where the interior is already nearly perfect, the factory representatives and dealers throughout the country have of late been giving greater attention to the conditions under which the retail trade progresses. In many cities the old homes of the agencies have been discarded for newer and finer ones, with all modern equipment, enabling the business to be carried on in locations in keeping with the material handled. In no city has this tendency been more marked than in New York, where new structures have been erected, large garages built, and some of the older houses entirely remodeled.

There has been particular activity around the corner of Fifty-seventh street and Broadway, where four concerns have been erecting structures that are solid proofs of the stability of the industry, both in its retail and factory departments. The B. F. Goodrich Company, the Atlantic Motor Car Company, the Peerless Motor Car Company and A. T. Demarest & Company are those which have made this section, just off Columbus Circle, one of the most substantial automobile business blocks of the country. One building 12 stories in height, two with nine floors each, and the fourth with eight, all fire-proof, with exterior and interior finishes that are models, and all for the trade in cars or equipment, form a condition not thought of a few years ago.

A few yards above Fifty-seventh street is the 12-story Goodrich building, constructed of iron, concrete and brick, with the brick used in the walls and front, set off with limestone trimmings and window frames. A particularly pleasing effect has been given to the entrances and the two lower floor fronts by using green marble trimmings, gray marble door frames and gold lettering. The Goodrich Company will use the first floor for its retail salesrooms and offices, the second for additional offices and for factory representatives, and other floors will be utilized for storage space and repair shops. This will leave an immense amount of space to be rented as an investment, and many accessory tradesmen have applied for offices.

The structure to be used by the Atlantic Motor Car Company, the distributor of Stoddard-Dayton cars, is on Fifty-seventh street, just off Broadway, and it is largely connected with the Goodrich building. The same contractors are erecting it, and it really is an L of the larger one, having the steam-heating plant for both in its basement, and the large elevator service is intended to serve both. It also is constructed of iron, concrete and brick, with limestone trimmings, and with its eight floors gives an area of 40,000 square feet. According to present plans the Atlantic Company will occupy the ground and top floors, the Dayton Motor Car Company will have the second, and the rest of the building will be sub-let, with the possible exception of the seventh floor, which the Atlantic Company may require. The second floor has been planned by the Stoddard-Dayton manufacturers as a repository for cars to be shown to the eastern dealers, so that they can see the full line of automobiles in New York as well as at the factory. Each floor will be equipped with a large washstand and other facilities for handling autos.

The Peerless and Demarest buildings have been erected beside each other with a view to harmony in exterior finish, and in keeping with the architecture of a church in the same block, on the Fifty-sixth street corner. They are both fireproof, built of iron and concrete, and the exterior is of white terra cotta. The Demarest Company occupies the corner and the entire building will be used as its factory for making automobile and carriage bodies, principally the former. Considerable space will be used by the general offices, the first floor by salesroom, and a fully equipped automobile repair shop will be maintained. The floor space is 63,000 square feet.

The Peerless branch will be in the middle of the block, also with the entire structure, the different floors being taken up by show rooms, offices, a repair shop, stock room, painting department and two floors for storage purposes. The officers of the branch expect to be fully installed within the month, and will start moving in a few days. This location and equipment will give the Peerless cars one of the finest homes in the country.

The Goodrich Building

Demarest Factory and Salesrooms—The Peerless Branch

Stoddard-Dayton's Home

Four New Buildings Which Indicate Firmness of the Automobile Trade in New York City

Where the Stearns Testers Report to Chief Frank Leland

1,000-lb. Load of Wet Sand Carried in Stearns Car Tests

HOW STEARNS CARS ARE TESTED

CLEVELAND, Aug. 9—The latest idea at the Stearns factory is to have chassis on its road test carry a load of half a ton of sand bags. Mr. Stearns originated the plan himself, believing that the cars should receive rougher treatment at the factory than they could ever be subjected to in an owner's hands. Frank Leland, who is in charge of the chassis testing, established a checking station at a farmhouse sixty miles out of Cleveland, which the testers make the turning point of their daily trips. On the road to and from this station each man is given a certain schedule to maintain, and afterward he gives Leland a full report on the work of his car. These results are carefully tabulated and credited to the chassis number of the car. The load of wet sand carried is more than equivalent to the maximum passenger capacity, for the reason that the sand is absolutely dead weight, and in no way relieves the car in taking the rough country roads and water breaks.

DETROIT TO COAST IN A COMMERCIAL CAR

In order to make an efficient test of the endurance power of the Grabowsky power wagon, and also with the idea of making demonstrations of the car at certain points along the route, the makers, the Grabowsky Power Wagon Company, of Detroit, on Wednesday of last week started one of its trucks westward from the Detroit factory to the Pacific Coast, in charge of J. V. Carr, accompanied by a chauffeur. The idea was originally entertained by entering this car in the Glidden tour, but it was given up on account of the fact that no opportunity would be allowed, during progress of the big event, of stopping at the several important points to display the truck to merchants who are interested in delivering goods by this method of transportation. The progress of the experiment will be awaited with interest by all users and intending users of the commercial car. It is claimed to be the first overland trip to be made by a commercial vehicle for so great a distance—about 3,000 miles.

Grabowsky Car Ready to Start on Its Long Overland Trip

BRETZ'S MAGNETO PREDICTION FOR 1910

"Regarding my recent prediction that the year 1910 will be a magneto year," said J. S. Bretz, of the firm that imports the U. & H. magneto, "I have this to say further concerning it, that even the low-priced cars of the coming year will fit a magneto as part of the regular equipment or as an option. The magneto is no longer a mechanical mystery, and hence many of the makers of this country are, as the great makers abroad have done for some time, fitting a magneto as the sole source of ignition on low-priced cars. It is simply superstition, or rather lack of confidence, that still causes American makers to fit a dual or double system of ignition on any car, and the only reason for their use is for self-starting purposes. As a matter of fact, the added cost and complications are not worth the added convenience. I saw a statement in THE AUTOMOBILE recently that out of a list of 264 American cars sold for over $1,500 in 1909, only 13 of them did not fit a magneto regularly or without an added charge. This is approximately 5 per cent. of the whole. As an evidence of the trend in 1910, I might mention that the $1,750 Inter-State car, an Indiana production which is now being shown in New York, uses the U. & H. magneto as a part of its regular equipment."

GENERAL MOTORS SEEKS RAPID CONTROL

PONTIAC, MICH., Aug. 9—It is probable that within a short time the Rapid Motor Vehicle Company of this city will be controlled by the General Motors Company. Recently when an additional issue of Rapid stock was made, W. C. Durant of the General Motors purchased $200,000 of it. Since then his representatives have been securing options on Rapid stock among its holders, running to November 1.

An addition to the plant has been started, the new building being three stories high, 100 by 640 feet in dimensions, and it is understood that the General Motors will begin another increase, 100 by 300 feet in size. It is expected that the factory will be made the largest commercial vehicle plant in the world. Harry G. Hamilton, the present general manager, will remain in charge.

ARE THERE 40,000 AUTOS IN OHIO?

COLUMBUS, O., Aug. 9—Both Secretary of State Thompson and State Registrar of Automobiles Caley deny the statements recently made by State Highway Commissioner Wonders that only about half the automobiles in Ohio are registered. They point out that the records show that 20,500 licenses have been issued, and if this is but half there must be 40,000 cars in use in the State altogether. This would mean that more than one-fifth of all the automobiles in the United States are owned in Ohio. Clerk McLaughlin of the Department of State also denies the report. In his recent trip over the State looking for violators of the Willis law he failed to see a single untagged car.

MILITARY ASSIGNMENT FOR NEW MITCHELL

Bearing army dispatches, with a definite schedule mapped and the object of visiting a number of government posts, the new Mitchell Ranger, the first of the 1910 Mitchells, will start a transcontinental trip on August 18. New York City to San Francisco will be the route, following much the same one as that taken by the New York to Paris racers two years ago, and the official dispatch will be from Major-General Leonard A. Wood, commanding the Department of the East, to Major-General John F. Weston, commanding the Department of California. The message bearer will also be a soldier, M. E. Parrott of Poughkeepsie, a private in the New York National Guard, and a graduate of a prominent military school.

The car has been completed at the Mitchell factory in Racine, Wis., under the personal supervision of Designer Bate, for it is the first of the new series, and it is stock in every particular. The body will be arranged to carry shelter tents, sleeping outfits and such baggage as may be necessary. Frank X. Zirbes, who drove the Mitchell in the 1908 24-hour race in Milwaukee and in other big contests, will be at the wheel of the transcontinental car all the way.

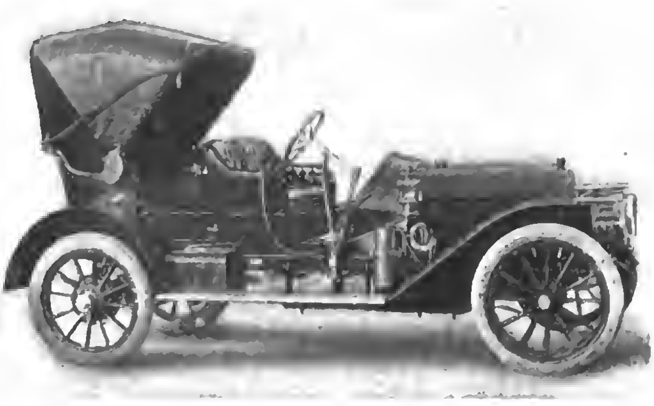
The party will start from Governor's Island in the metropolis and proceed up the Hudson to Albany, then turning westward. It is likely that a number of detours from a direct line will be necessary to reach the military posts.

SEPARATE FACTORY FOR FRANKLIN TRUCKS

SYRACUSE, N. Y., Aug. 9—For the building of commercial cars the H. H. Franklin Manufacturing Company has leased a new building near its present factory. This was done in order to keep the two lines of the business separate, and at the same time to provide space which could not be allotted in the factory a block away. Heretofore the commercial car work has been a part of the general work of the factory. Believing, however, that in the manufacture of trucks there is a rapidly widening field, the company has established this separate commercial car department, with Herbert Hess as manager and W. F. Kneip in charge of the engineering staff. Part of the additional building is made use of by the sales department.

Indianapolis, Ind.—The Meridian Place garage, at Twenty-second and Illinois streets, has just been opened by John S. Lazarus. Roy Lazarus will act as manager.

Utica, N. Y.—Wagoner's new fireproof garage is now open for business at 12 West street. It is an up-to-date building with a capacity for 20 cars.



Secretary of the Navy Meyer's Columbia Victoria

COLUMBIA CAR FOR NEW NAVY HEAD

Among the new and interesting cars just turned out by the Columbia Motor Car Company, Hartford, Conn., formerly the Electric Vehicle Company, none possesses more of interest than the one specially built for the new Secretary of the Navy, General Von L. Meyer, former Postmaster-General. This car, like all other Columbia cars, was built complete in the Hartford shops, even the tops being the company's own design and construction. The top on this particular car is different, just like all Columbia tops are different, in that it partakes of the nature of a victoria top, yet is used on a close-coupled body. The latter, too, was specially made for the Secretary, but the chassis is the regular model, rated at 29-horsepower, cylinders cast in pairs, make and brake ignition, three-speed selective transmission and other regular features. The body is of the four-passenger roadster type, of which the majority of the 500 output for 1910 will consist.

A PIONEER AUTOIST AND HIS CAR

Charles H. Ayars, of Salem, N. J., is one of the pioneer automobilists of that section, and is an active worker in every line in which his fellow enthusiasts are interested. The photograph shows Mr. Ayars and his wife in their new six-cylinder Austin Model 45, with a light touring body. In the background appear Mr. Ayar's home and his private garage. He took part in the automobile parade recently given in honor of Governor Fort of New Jersey when that official visited Salem, and his Austin was considered one of the most attractive cars in the line. Like most of the old timers, Mr. Ayars believes in taking care of the car himself.

Charles H. Ayars, of Salem, N. J., and His 45-Horsepower Austin Tourabout

A Garage of Picturesque Architecture at Troy, Ala.

The rapid development of the automobile business in the South has resulted in the rapid multiplication of garages. The picture was taken upon a recent delivery of Rambler cars at this point, the proprietor, Mr. Henderson, being the Rambler representative for that territory.

Lebanon, Pa.—The Lebanon Automobile and Garage Company, on Sixth street, just north of Cumberland, has opened its new building. This is 100 feet long and 27 wide, two stories in height, and constructed of brick. It has been made to accommodate 19 automobiles on the first floor, and 15 on the second, access to which is secured by a large electric elevator. There is a separate one-story building adjoining for the offices. One feature of the garage is the front, in which there are 10 big sliding doors, each wide enough to admit a car. As a part of the opening celebration a short run to Cornwall was made, in which 28 machines took part—21 were Fords, four Buicks, one Oldsmobile, one Chalmers-Detroit, and one Oakland. The proprietors of the establishment are John F. Allwein and Henry H. Hersberger.

San Antonio, Tex.—Increasing numbers of automobiles have made necessary the construction of additional garages, and through the efforts of the Publicity League it is understood that two will be erected within a short time. One will be located at the corner of Houston and Nacogdoches streets, one story high, of brick and concrete, with 5,000 square feet of floor space, and it will be modern in every respect. The owners are T. L. Conroy, H. B. Rice, and James Byrne. The second garage and salesroom will be built on East Houston street, between the post-office and Nacogdoches street, and it also will be constructed of brick and concrete, one story high, with 5,000 square feet of space.

Pensacola, Fla.—A company has been formed and will be incorporated to construct one of the finest garages in the South at 30 East Garden street. The building will be 60 by 190 feet in size, three stories high, and fireproof throughout, using only concrete, brick, and steel in its construction. It will be fully equipped with necessary machinery for repairing automobiles, and for repairing and vulcanizing tires. The business will be under the control of William Bloomfield, and the mechanical departments will be directed by L. F. Musach. The incorporators of the concern are: Whiting Hyer, William Bloomfield, Henry Hyer, George Turner, Felo Turner, Roy Packard, Hal Packard, James Leonard.

Waterloo, Ia.—The Corn Belt Auto Garage is making plans for erecting a new building at the corner of Water and Fifth streets. It will be one story high, except the main-office part, which will have two. On Fifth street the building will be 50 by 150 feet in size, and on Water street the dimensions will be 40 by 90 feet, for the ground secured is in the shape of an L. The Fifth street side will be used for displaying the cars handled, and the wing will be given over to the mechanical and storage departments. There will be 11,000 square feet of floor space in all.

Denver, Col.—Automobile Row in the Mile-High city has received a push in a new direction, away from its present confines on Broadway, between Sixteenth and Seventeenth avenues. George E. Hannan has purchased ground on Broadway near Twelfth avenue and a large garage will be started there at once, the plans calling for a building of two stories height, with offices on the second floor. The Fernald Automobile Company has also bought two lots between Eleventh and Twelfth avenues and will build in the near future. It is understood that two other firms are figuring on locations in the same vicinity.

Aberdeen, S. D.—The Motor Inn, the new garage of the Heaney Automobile Company is now completed. It is located on Lincoln street, just south of the Gottshalk theater, and is one of the finest structures in the city. It is 100 feet long and 50 wide, with walls of pressed and plain brick, floors of concrete, and large doors and windows. A handsome salesroom, completely equipped machine shop, and large garage are included in the establishment. The company has the agency for the Brush and Waverly, and is the distributor for Minnesota, North and South Dakota, of Halladay cars.

Carthage, Mo.—The garage firm of Bryant & Caffee, occupying the Gilmore building on West Fourth street, has secured 25 feet additional ground east of their quarters and will use it to enlarge the structure. The ground floor will be increased in size by that much and a second floor will be built over the entire place. When the alterations are completed the firm will have a total floor space of 150,000 square feet. A heavy-duty electric elevator will be installed. The agency for the Hudson has been added to that for the Chalmers-Detroit and Reo.

Detroit, Mich.—The Anderson Carriage Company has erected a 60 by 120 garage of brick and concrete construction, with a tile roof supported by a steel truss frame, to be used exclusively for the care and storage of electric cars. The location, on E. Grand boulevard, north of Jefferson avenue, is convenient for the great number of electric vehicles in use on the east side of the city. The garage is attractive in appearance, being somewhat of the Mission style of architecture.

Winchester, Va.—In order to stimulate touring through the Shenandoah valley region, and in the interest of better roads, the Shenandoah Valley Garage is offering free storage to all tourists. Under the management of N. A. Cooper, this establishment, located at the corner of Market and Piccadilly streets, is desirous of having the autoists of the large cities make the run through the famous section of the state, and gives the storage with its compliments.

Albany, N. Y.—Architects are at present engaged in preparing plans for the erection of a new establishment for J. A. P. Ketchum of Saratoga Springs, the agent in this part of the state for Packard automobiles, Mr. Ketchum has a large garage in Saratoga Springs and the one here will be equally as complete. It will include salesroom, repair department, and storage space for a large number of machines.

Louisville, Ky.—Plans have been made for the erection of an immense garage for the Brick Motor Works in this city. The building will be three stories high, and its dimensions will be 52 by 200 feet.

Long Beach, L. I.—A garage is in course of construction on Long Beach boulevard, just opposite the Old Inn. The building is 100 by 80 feet, and will be open for business by August 1.

St. Joseph, Mo.—The Eads brothers have moved into their new garage at Seventeenth street and Frederick avenue, where they have the agency for the Mitchell.

Cincinnati, O.—The Cincinnati Automobile Company is having a two-story addition built to its quarters on Race street between Ninth and Court streets.

Told in the Progress of the Industry

The Observations of an American—Among the recent homecomers over the Atlantic highway was "Jack" L. Straub, a member of the J. S. Bretz Company, who has been for the last three months in Europe in the interest of his concern. Mr. Straub said that while the automobile business in Germany was good and prosperous, production there was limited and that the German makers would not produce over 15,000 automobiles during 1910, which is a very small number indeed when compared to the estimated number of from 150,000 to 200,000 that would be produced in this country. He also saw the start and finish of the Prince Henry tour in Berlin and in Munich, and was impressed with the German method and results in conducting the tour, and thinks we might well appropriate some of their ideas. Mr. Straub says he saw Count Zeppelin in his dirigible in one of his flights, and that it was a wondrous spectacle; the thing appeared as big as an ocean steamer to the ordinary observer.

Diamond Analyzes Tire Cost—The Diamond Rubber Company has published a statement of the cost of tires in the recent Glidden tour, showing the cost of traveling over the rocky and gully-scarred trails which the tourists often encountered. It would seem that the automobile owner had better pay cheerfully his share of the cost of good roads and save on tire expenses. According to this analysis, the average tire cost per car, on all the machines in the run, was $32.50. The Diamond Company says, however, that the average expense of the cars using Diamond tires was but $26.84.

Driver Accidentally Killed—John Swanson, the head tester of the Pope Manufacturing Company, Hartford, Conn., was accidentally killed on July 26 at Windsor, Conn., when out riding in a car belonging to a resident of Hartford, and driven by a fellow worker. Swanson, who was sitting in the tonneau was thrown out when the car rounded a curve too fast and collided with a telegraph pole. The young lady who was with him fortunately was not injured.

Factory for New Maxwell Model—The Cranston, R. I., plant of the Maxwell-Briscoe Motor Company will soon be ready for manufacturing operations. In accordance with the policy of the company, this factory will be devoted exclusively to the manufacture of one model, the new $850 four-cylinder runabout. The Newcastle, Ind., plant will make the $550 runabouts and the factory at Tarrytown will manufacture the big four-cylinder cars.

Colvin-Prost Tire Protector—The Colvin-Prost Mfg. Co., has been organized in Lansing, Mich., for the manufacture of a new metal tire protector. The members of the company are F. R. and C. R. Colvin and C. A. Prost. The protector, which is the invention of F. R. Colvin, is made entirely of steel, fitting over the tire nearly to the rim, but without interfering with its resiliency.

Muncie Concern to Make Auto Castings—The Muncie Foundry & Machine Company, of Muncie, Ind., has been equipped to specialize in the manufacture of automobile castings. A. C. Lipsitz, formerly of the Michigan Motor Castings Company, of Flint, will be the manager, and Edwin C. Slatery, formerly of the Michigan concern also, will be the superintendent.

Westinghouse to Make Motors—It is reported that the Westinghouse Machine Company, of Pittsburgh, Pa., is to take up the manufacture of automobile motors, in addition to electrical machinery. The company has been experimenting for some time in this direction, and had made all the necessary preparations be-before it accepted the order for 1,000 motors.

Hearst Prefers the Matheson—William Randolph Hearst recently cabled his New York office from Italy to ship his Matheson car to him at once. Mr. Hearst had this same car abroad with him in the Summers of 1907 and 1908. This year he started with another car, which is reported to have broken down. Hence the hurry call for his old standby.

Timken Enlarges Plant—The Timken Roller Bearing Company is making additions which will practically double its plant at Canton, O. The officers of the company are very proud of the fact that the cars which won all three trophies in the recent A. A. A. Reliability Tour used Timken bearings.

Defiance to the Automobile Industry—The automobile industry of northwestern Ohio is to be augmented by the Defiance Screw Machine Products Company, which has just been incorporated and has started the erection of a factory at Defiance, Ohio. Metal automobile parts are to be made.

The White Line Radiator—The F. B. Stearns Company has applied for a copyright on the use of a white line around the radiator, as on the Stearns cars, in order to protect themselves in the rights to their slogan "The white line radiator belongs to the Stearns."

IN AND ABOUT THE AGENCIES

New Franklin Branches—The Franklin Automobile Company, the selling company for the H. H. Franklin Manufacturing Company, has added six branches to its list of those in New York, Chicago, and Boston. The half dozen new ones are in San Francisco, Pittsburg. Buffalo, Rochester, Syracuse, and Albany. The managers of the new branches are, respectively: John F. McLain, W. F. Reynolds, George Ostendorf, F. H. Sanders and George E. Messer, with the appointment for Albany to be announced. Each of the appointees has been a district representative for the Franklin Company. In connection with these selections is announced the appointment of T. R. Lippard as assistant general manager of the Franklin Automobile Company. Mr. Lippard has for the past two years been connected with the executive office of the manufacturing company. The managers of the three Franklin branches heretofore maintained are retained for 1910 as follows: New York, W. S. Jewell; Boston, A. B. Henley; Chicago, F. L. Thomas.

Franklin, New York—A building having five stories and basement, on Eightieth street just west of Broadway, has been leased for a repair shop by the New York branch of the Franklin

Annual Outing of the Young Women Employees of the Franklin Factory—The Start at Burnet Park, Syracuse, N. Y.

A Type of the Lights that Are Required by the Recently Enacted French Lighting Law

According to the new automobile regulations which require that the number should be as bright at night as in the day, some form of luminous number is necessary. Above is shown three views of one form of tail number now in use. An electric light with the aid of numerous reflectors illuminates the whole surface of a plaque upon which the number is placed.

Automobile Company, larger quarters than those it had had in use being required for its purposes. The building has a frontage of thirty feet and a depth of 100 feet. The headquarters of the branch are at Broadway, Amsterdam avenue and Seventy-third street.

Packard, Hartford, Conn.—The Packard distributors have secured the third floor of the R. D. & C. O. Britton building, where headquarters for this section will be established. The Packard does not conflict with the cars handled by the Britton Brothers. M. J. Budlong, of the Packard Motor Car Company, has been in Hartford to bring the deal to a close. Charles Embilton, of New York, will be the sales manager of the new concern.

Maxwell, Boston—Frank J. Tyler, manager of the Maxwell-Briscoe Boston Company, announces the purchase of the Kenney & Clark stable property at the corner of Massachusetts avenue and Newbury street. The building is a modern one and will need but slight alterations to make it suitable for the automobile business. A large garage will be conducted.

American Simplex, Boston — The American Simplex Company has moved its Boston headquarters from 10 Columbus avenue to a more commodious location at 261 Dartmouth street. Manager Turner has engaged Walter C. Cady, formerly with the Boston Packard agency, to increase his selling staff.

Rider-Lewis and Hupmobile, New York City—The H. J. Koehler Company, Newark, N. J., has secured a large slice of eastern territory for the Rider-Lewis and Hupmobile, and will also make a car of its own.

Goodrich, Boston—The Goodrich Tire & Rubber Company is erecting a five-story building at 853 Boylston street for the use of its branch. The structure has been promised for occupancy on October first.

Haynes, Brooklyn, N. Y.—Joseph D. Rourk, 1001 and 1003 Bedford avenue, has taken the agency for the Haynes cars, and will be the sole representative in Brooklyn and Long Island.

Oldsmobile, San Francisco—The Oldsmobile agency in this city has been transferred to the Howard Automobile Company, managed by Charles S. Howard which also handles the Buick.

Rambler, Brimingham, Ala.—J. E. Henderson, the Alabama state agent for the Rambler, and Nat Granger, from the Thos. B. Jeffery Company, are arranging to open an agency here.

Mitchell, Atlanta, Ga.—The Mitchell will be represented here by R. C. Howard, who has secured the agency for a large part of the state. He will be located at 88 Prior street.

Chalmers-Detroit, Wilmington, Del.—Col. Grantley P. Postles has taken the Chalmers-Detroit agency and is now settled in the Dupont Building on Market street.

Hudson, San Francisco—The Pioneer Automobile Company, which holds the agency for the Chalmers-Detroit, will also represent the Hudson roadster.

Hupmobile, Louisville, Ky.—The Hupmobile will be handled in this city by Fulton Mandeville, who will open salesrooms as soon as possible.

Chalmers-Detroit, New Bedford, Mass.—Wayland L. Sturtevant has taken the agencies for the Chalmers-Detroit and the Hudson roadster.

Pennsylvania, Ford, Hupmobile; San Antonio, Tex.—The Lemly-Mills Auto Company, corner East Houston and Nacogdoches streets.

PERSONAL TRADE MENTION

George S. Waite, of Boston, has accepted a position as general sales manager of the American Simplex Company and will be located at the home office. Mr. Waite has resigned as sales manager of the Boston Packard agency to take up his new office.

Charles W. Talbot has taken a position as salesman and demonstrator with Ellerd Brothers, the Franklin agents at Plainview, Tex. Mr. Talbot has been with the H. H. Franklin Company for a number of years as a contest driver and demonstrator.

Frank Bowen, for many years connected with the Ford Company, and later with the Houpt Company, has become a member of the Carl H. Page organization, and from August 1 will be identified with the Chalmers-Detroit.

A. L. Bolster, for ten years connected with the Fisk Rubber Company, has been appointed Philadelphia manager for that company, with headquarters at 258 North Broad street.

RECENT BUSINESS CHANGES

Etablissements Lemoine—This well-known French company, a maker of springs, axles, forgings, etc., for automobiles, will henceforth be represented in the United States by the International Engineering Company 1779 Broadway, New York City, instead of by Lavalette & Company, as formerly.

The Ewing Auto-Cab Company, it is said on the authority of a stockholder, has decided to move its factory from Geneva, Ohio, to Easton, Pa., but the removal will not take place for some time, as a suitable building must first be erected in the latter city.

TAXICABS AND TRANSIT

Bellefontaine, O.—A number of local capitalists are interested in a project to establish an auto omnibus line between this town and Richwood, O., and have interested the Commercial Club in the project. The country is thickly populated and not served by any electric line.

TO MAKE TRUCKS IN MINNEAPOLIS

MINNEAPOLIS, MINN., Aug. 9—A company to be known as the Minneapolis Motor & Truck Company has been organized here with a capital of $500,000 to manufacture touring cars and trucks. Land has been purchased for a factory and work will be started as soon as possible on a large concrete building. The motors to be used are of the two-cycle, three-cylinder type; drive will be by shaft except on the heavy trucks. One light truck will be interchangeable with a touring car body, and will be known as the "Handy Man." This is intended to appeal especially to farmers. The one chassis will take several different bodies and will be strong enough to carry a load of one ton. By an ingenious arrangement the rear wheels can be jacked up and a belt adjusted to guides on the spokes; the motor will then be useful in many ways.

Some Recent Trade Publications

Oscar Lear Automobile Company, Springfield, O.—Catalogue of Frayer-Miller blower cooled motor trucks, and facsimile letters commending the same. Since the letters come mostly from hilly country, or, rather, from cities which are known to be very hilly, the letters are more convincing than such letters usually are. Among the well-known cities included are Pittsburg, Cincinnati, Denver, Troy, and Chicago, the latter, while not so uneven as the others, being equally well known as hard on horses and trucks. Three forms of commercial vehicle chassis are made by this concern, these being the delivery wagon, 1 1-2-ton truck, and the 3-ton truck. They are each fitted with a number of bodies, which allow of their adaptation for numerous and varied uses. Much space is devoted to the blower cooling proposition, original with this firm, and very lately adopted by another prominent air-cooling advocate. Beyond this are a number of new and excellent pictures of three-ton trucks, with widely different bodies. They include the standard stake truck, long stake, stake and bar combination, express, enclosed, sight-seeing, bus, and many special large capacity bodies. Since businesses requiring a motor truck, particularly those necessitating as large a truck as a three-ton vehicle, need different body types, those shown are of great interest.

Packard Motor Car Company, Detroit—As the title of this small folder, "Packard Three-Ton Trucks in a dozen different lines of business," would seem to indicate, it is devoted to a display of three-ton trucks at work in many different fields of endeavor. Since actual photographs of cars at work are far more convincing to the average man than any amount of talk or catalogue language, this little book will do much useful work. Doubtless the most convincing of this lot of persuasive pictures is that of the vehicle now in the service of T. G. Patterson, Inc., New York City, which is built with a very strong, overhanging body so as to accommodate large bulky loads. When running in the streets of the big city with its enormous loads, it is always an object of much interest. Next to this, the record of the sales made to the Adams Express Company, New York City, will be very convincing, as it shows that, following the first trial order in September, 1905, this company has bought Packard trucks continuously, in August, 1908, October, 1908, and in June, 1909. This would not have been the case had the trucks not "made good," so the three repeat orders speak volumes for the merit of Packard trucks.

Geiszler Brothers, New York City—Besides a book describing the Geiszler storage battery in detail, this firm is sending out a pamphlet entitled "Are Geiszler Storage Batteries Non-Sulphating?" consisting of a series of questions and answers relative to sulphation. These questions take up in the most pointed fashion the subject of sulphation, its cause and remedy. Although a small leaflet, this should be in the hands of every battery user, for the information which it contains. The book goes into the construction of batteries in a very plain, sensible way, telling first what a storage battery is and what it is for. The active material is then described and its formation and diseases mentioned. The Geiszler battery is made with an extra thick rubber case, divided into compartments, within which the plates form separate batteries. Each one of these compartments is sealed on the outside by means of a hard rubber cover, which is the internal one, and an outer sealing compound. This makes the whole both acid- and water-proof, which is an appreciable advantage.

Apple Electric Company, Dayton, O.—Intense and widespread interest in the subject of improved lighting for automobiles just at this time makes the appearance of this folder entitled "Electric Lighting System for Automobiles," particularly appropriate. The system described and illustrated is, of course, the Aplco system, in which a special dynamo is used in connection with a 6 volt 100 ampere hour storage battery. The very even and regular current output, regardless of the speed of the engine, so necessary for success in electric lighting, is secured by the use of a recently perfected and patented device which is called a load regulator. This device holds the current output down to very close limits, and through the medium of the cut-out switch, does it in such a manner that none of the generated current is wasted. Aside from a description of the system and its cost, a very convincing set of pictures show how the system may be applied to a number of popular makes of car, a Franklin, Stoddard-Dayton, Cadillac, and others being shown.

J. H. Williams & Company, Brooklyn, N. Y.—Drop-forged wrenches of the "Vulcan" brand, illustrated and thoroughly described, comprise the main portion of an artistic catalogue of most convenient size issued by Williams & Company. From five-inch down to the diminutive one-eighth inch, the sizes are shown in single or double head, straight or S shape, and for a large variety of purposes. A novelty in triple-head wrenches is shown and also thin wrenches for use on lock nuts. In addition, a variety of general forgings such as lathe dogs, hooks, machine handles, tool posts, etc., are illustrated for service in the shop. For the experimenter or manufacturer are crankshafts, connecting rods and other motor parts. An interesting feature of the work is the section describing and illustrating the process whereby drop-forgings are made. The whole catalogue is well worth a place at the right hand of the manufacturer and designer.

Pierce Arrow Motor Car Company, Buffalo, N. Y.—The handsome booklet entitled "Routing Suggestions for Pierce Arrow Tourists" would really be a welcome addition to the equipment of any automobilist, whether his car be a Pierce or not. One of the useful features is a tabulation of state license provisions for non-residents—little matters which the prospective tourist often forgets, much to his sorrow. The body of the booklet is devoted to routing suggestions. Each page lists the routes from some one city as a center, indicating them by the intermediate towns and distances; and at the top of each page is a photograph of the Pierce Arrow agency in the city which is taken as the base. The usefulness of the book will not be confined to any one section of the country; the East, of course, is covered very thoroughly, but among the central cities are Houston, Dallas and San Antonio, Texas; San Francisco; Salt Lake City, Utah; Butte, Mont.; Portland, Ore., and Seattle and Spokane, Wash. One of the objects of the booklet, as stated in the introduction, is to place Pierce Arrow tourists in touch with the Pierce representatives in all parts of the country.

Fisk Rubber Company, Chicopee Falls, Mass.—In a 24-page booklet, 4 by 6 in size, the Fisk company describe the construction and operation of the Fisk removable rim. This consists of a specially designed rim which carries the tire, and which is beveled on the outer side to receive the expanding ring. This is shrunk on the felloe in the usual manner. Within the tire rim is a hollow drop center which allows the expanding ring plenty of inside locking contact, as well as making the whole light yet strong. The expanding ring has five bolt holes which correspond to the five holding bolts fitted to the wheel rim. A split in one place allows of sufficient expansion or contraction to permit of wedging the ring in place or removing it. Aside from the space devoted to the rim itself, most of the book is taken up with letters from prominent motorists, who not only use but also advocate the use of the Fisk rim.

The White Company, New York City—White route books are too well-known to require an extended description, and book No. 8 is no exception. An excellent cover is adorned with the view of a toll gate near Wilmington, Del., which reveals some of the picturesque features of the section with which the book deals. This is the Southeast, and two routes are given complete. These are New York City to Richmond and Atlanta to Staunton, covering sufficient territory to allow of the trip from New York to Atlanta without other aid, although there is a gap between Richmond and Staunton. This gap has, however, been described and routed in another previous book, No. 2. The illustrations constitute a well-chosen lot of Southern scenes, all but two or three of the first ones being devoted to that section of the country.

Hoyt Electrical Instrument Works, Penacook, N. H.—This company's neat and business-like catalog illustrates and describes the Hoyt line of voltammeters, voltmeters and ammeters, of the D'Arsonval type for direct current. The instrument which will be of most interest to automobilists is the voltammeter specially designed for use in ignition circuits. It is so wired that both the voltmeter and the ammeter are in circuit during the whole time that the motor is running, and their fluctuations enable one to detect immediately the cause of faulty ignition.

H. H. Franklin Mfg. Co., Syracuse, N. Y.—The purpose of this "Franklin Tourist Book," as stated on the title page, is to help every owner of a Franklin automobile in increasing the satisfaction and decreasing the discomforts of touring. It contains many useful hints on preparing for the tour, the rules of the road, how to prevent trouble, points about the engine, care of tires, etc.

Gospel Auto in Which a Noted Evangelist is to Tour Country

This car was especially designed and built by the Rapid Motor Vehicle Company, of Pontiac, Mich., for T. A. Snider of the T. A. Snider Preserve Company, of Cincinnati, who is actively interested in philanthropic work, and will be used by a well-known evangelist, Miss Anna L. Cartwright. The platform in the rear will be used as the speaker's rostrum.

SOME SELECTED AUTOMOBILE PATENTS

Issue of July 6, 1909.

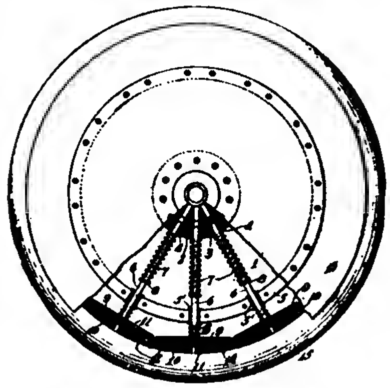
927,355. Tire—Knut Karlström and Gustaf Holmquist, Buffalo, N. Y. Filed May 6, 1908.

This tire has an outer shoe with a rubber base to which is attached a metallic band, the same having a curved cross section to conform with the shape of the outer portion of the time. The metal band is a single strip, being complete around the circumference and overlapping at the starting point. It is covered with canvas on both sides so as to prevent the action of metal on rubber. In order to reduce the weight, which a full band of sheet iron, no matter how thin, would add, a series of oval holes are formed in the metal slip, these being very narrow in the direction of running, and extending nearly to the full width.

Issue of July 13, 1909.

927,511. Spring Wheel for Vehicles—Thomas S. Dunn, Los Angeles, Cal. Filed Nov. 4, 1907.

Spring wheels have excited much interest in the past and appear to be about to attract still more in the very near future. The idea here is spring spokes which carry at their outer ends a series of short sections of secondary felloe. These press against the felloe proper, which, from the nature of the elastic

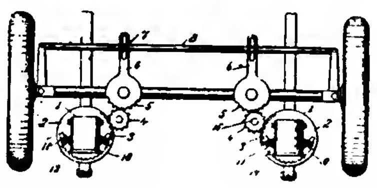


Dunn Spring Wheel, Partly Sectioned

action, must be elastic itself. This elasticity is obtained by making the true felloe in a number of sections equal in number to the number of spokes. It would seem that this method would cause much and severe wear on the inner part of the tire where the outer felloe is divided.

927,619. Automobile Curved-Road Illuminator—Darius W. Wells, Oakland, Cal. Filed Jan. 2, 1908.

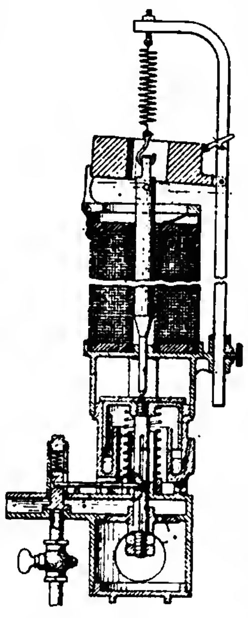
Danger lurks in every turn of the road, as made at speed on a dark night, so, any arrangement for having the lamps turn with the turning front wheels is praiseworthy. Many schemes for doing this have been advanced, but it remained for Wells to use gears to effect the desired result. This he does by attaching to the cross connection, placed back of the axle, a pair of levers, which are connected rigidly at the front end to two gears. These, when rotated, actuate a pair of small pinions, which in turn actuate the base of the lamps, the latter being made with teeth around the periphery for this purpose.



Wells Scheme for Road Illumination

927,541. Electromagnetic Governor for Internal Combustion Engines—Eber Hubbard, Chicago, Ill. Filed Aug. 24, 1908.

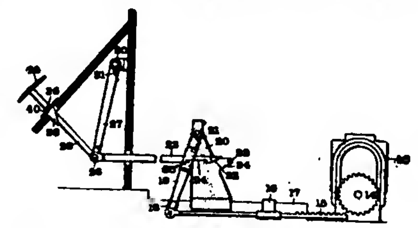
Mechanical devices for regulating the speed of automobile engines have been built and tried for many years, but until recently very few electrical governing methods have been developed. Hubbard has worked out a way of governing, using a solenoid, which works a rod up and down according to the electrical energy passed through the coil. This rod is attached to the throttle and manipulates in that way the fuel entering the cylinders. An evidence of more than ordinary inventor's thoughtfulness is found in a means of detaching both the electrical arrangement and the mechanical substitute, which is also fitted. While the whole arrangement sounds complicated, the drawing shows its simplicity.



Magnetic Governor

927,681. Starting Device for Internal Combustion Engines—Welton H. Rozier and Samuel C. Igou, St. Louis, Mo. Filed Oct. 10, 1908.

With a magneto as a source of ignition and a modern engine, all that is necessary to start the motor is a means of rotating the armature of the magneto at a rapid speed, so as to build up the current very rapidly, resulting in a fat spark. In this arrangement for effecting the desired result, a gear is attached to the magneto armature and is rotated by means of a rack, this being long



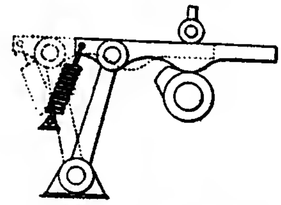
Magneto Starting Device by Rozier

and fastened to the end of a swinging lever. A foot pedal operated by the driver from the seat swings this lever and with it the rack. A tripping device throws the rack out of engagement when the magneto is running normally. The whole scheme looks like the Moon self-starting device.

Issue of July 20, 1909.

928,390. Valve Operating Mechanism for Internal Combustion Engines—Samuel Löffler, Witkowitz, Austria-Hungary. Filed May 26, 1906.

Löffler has pursued the ideas of the earlier Daimler and Peugeot engines, in that the control of the engine is effected by means of a variable valve lift. This is obtained by interposing between the cam and valve tappet rod a sort of lifting lever, which has two straight portions on each side of a cam projection. Normally the cam operates on the cam projection, but to vary the speed, the lever is moved to one side or the other. On one side, the right, the height of the cam

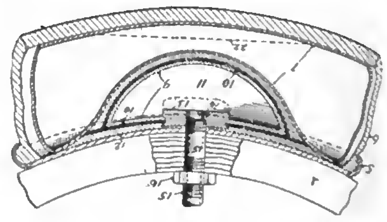


New Form of Valve Operation

is all that is obtained, but on the other side there is a slight multiplying action which makes the lift greater on that side.

928,553. Signal for Pneumatic Tires—Samuel Silverman and Joseph E. Trahan, Watertown, N. Y. Filed Feb. 18, 1909.

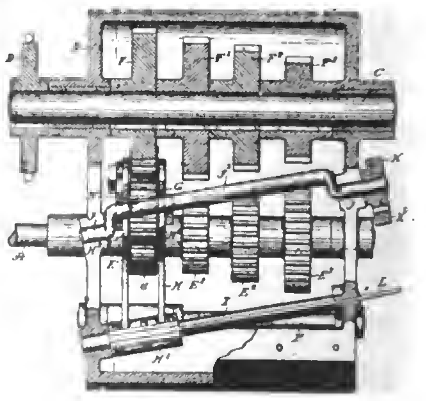
Here, the idea is to apprise the driver of the failure of the inner tube of any tire by attaching to it a whistle, which is blown by the action of the deflated outer shoe pressing on an internal diaphragm. The whistling sound would warn the driver of the car that the tire was punctured and deflated to the extent of the outer shoe pressing upon the diaphragm.



Tire Puncture Signaling Scheme

928,705. Changeable Speed Gearing—Walter Scott, Sheridan, Wyo. Filed Dec. 10, 1908.

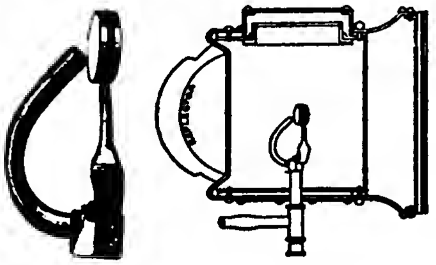
Scott's idea is to move an intermediate gear into mesh with any desired pair of stationary gears, so as to obtain the speed changes. This operating gear is mounted upon a diagonal shaft upon which it is both slidable longitudinally and rotatable in a vertical plane. This construction allows of moving the operating gear up out of mesh, sliding it along to the desired change, then dropping it back into engagement. There is also provision for locking it in any position, as would be necessary with the diagonal shaft mounting, since the thrust of the gears would resolve itself into a sliding motion of slight but measurable amount. As shown, there are four forward speeds provided but no reverse, which would seem to require the use of four gears.



Scott's Transmission in Plan

Information for Auto Users

Wunder Button Lights—An improvement for automobile and motor boat headlights, in the shape of a new burner, has been introduced by the Wunder Button Light Company, of New York. After a number of years of experiment the device has been brought to a stage where its makers state they can prove



NEW BURNER FOR WUNDER LIGHTS

greater efficiency and less gas consumption, the percentages being very high.

The burner is one designed to be exactly interchangeable with the fan tail, and the gas is projected upon a button of material whose composition is a secret of the company. It becomes incandescent under the action of the burning acetylene and oxygen, and projects a wonderfully strong white light, so that the illumination at 2,000 feet is sufficient to light 50 feet on each side of the roadway distinctly. The burner is comparatively simple and anyone can apply it to the gas lamp, in that it has but three parts and they are all assembled for use. The gas is forced through a tiny nozzle, six-thousandths of an inch in diameter, and is mixed with the proper amount of oxygen from the air, through little holes, to furnish good combustion. It is then projected from the rear on the button, and there is no danger of cracking a lens, because the flame is pointed away from it. There is also no danger of soot depositing, because none can deposit at the hole on account of the two pounds pressure behind.

In tests it has been shown that the button light, with a one-quarter foot burner, produces 100 candle-power. A heat of about 2,400 degrees is generated, but it is absorbed by the button, and therefore the danger of cracking the mirror, lens, or glass around the interior is obviated. The buttons are thirteen-sixteenth inches in diameter, held in place by brass clips, and can be changed easily. A different style of burner for those who desire to be able to alter the mixture is being made, and this will have a jacket to regulate the air and a needle valve for the gas.

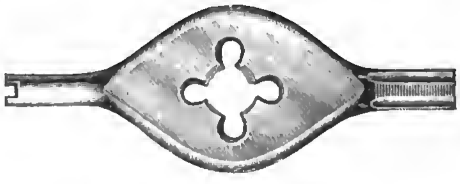
In addition to the button projecting light, the company is preparing to go further with its pencil light, one which radiates and is suitable for interior or street lighting.

The manufacturers claim excellent results with the buttons applied to headlights, and state that there is sufficient dispersion not only to light the road immediately ahead of the automobile, but to project a bundle of rays forward so that twelve telegraph poles (the method of judging a light) can be counted.

New Light Rear Axle—Added interest on the part of the public in small cars has stimulated the parts makers to bring out accessory and parts for this type of car. One of these is the rear axle illustrated herewith. This is a new product from the Long Arm System Company, Cleveland, and is intended for use on cars weighing empty either 2,000 or 2,500 pounds. In the latter case, the axle may be had in the full floating type, while for cars of a maximum weight at the former figure, the construction is changed and the axle is fixed in the hubs. Steel parts are of carefully selected open-hearth carbon steel, while all cast parts are made from malleable iron of good quality and possessing a high factor of strength. Brakes are supplied either single or double, and of 12 or 14-inch diameter. The brake bands are lined with any of the standard non-burnable brake lining fabrics, or the internal band may be had of chilled gray iron. Brake levers are either mounted inside or outside of the springs, as desired. The torsion tube surrounding the propeller shaft is made to specifications as to length, supporting device or diameter.

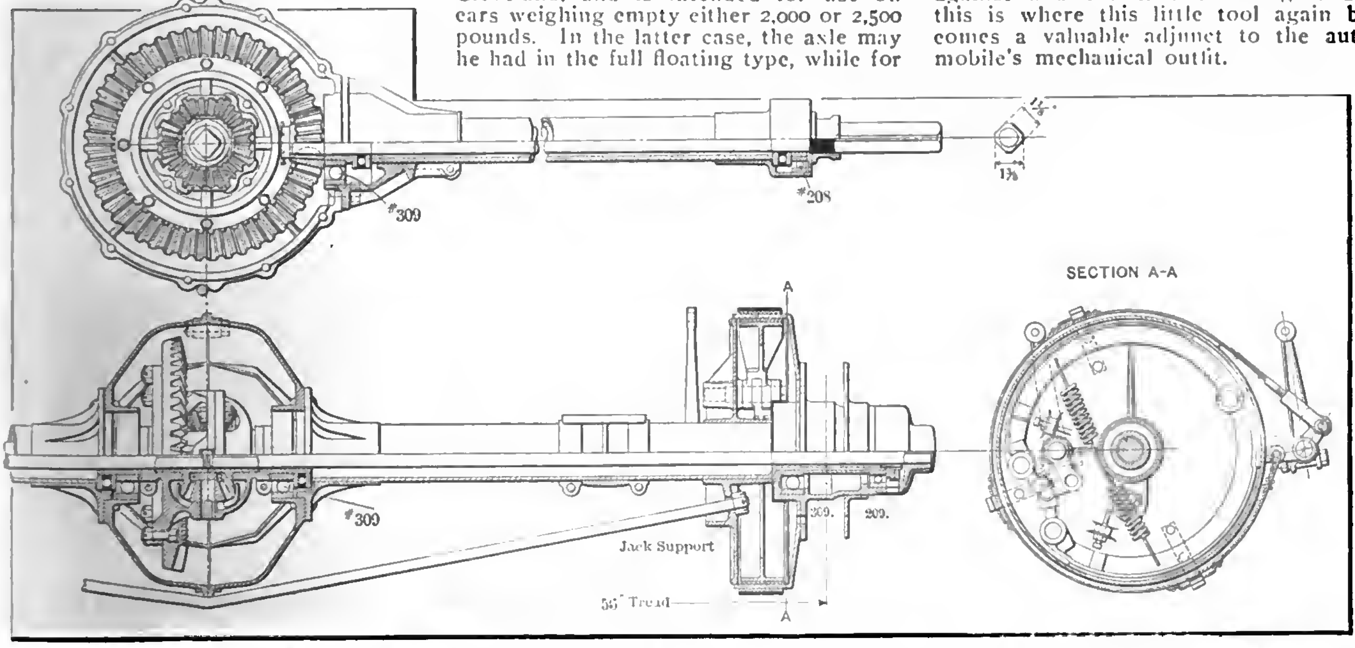
The usual gear ratios are from 2½ to 1 up to 4 to 1, anything between being obtainable. The gears used have wide faces, are of good material and run quietly.

New Tire Valve Tap and Die—This new production of the Motor Car Equipment Company, of New York City, is made in one piece of drop forged and hardened steel, highly polished. It is used for removing the internals of tire



M. C. E. NEW TIRE VALVE TOOL

valves, which through rust and perhaps cutting of threads have become wedged in the valve. When in that condition it is almost impossible to remove them with the ordinary cap valve that is supplied on the valve, but it is asserted this tool removes them with ease. Then, again, when the internals have been removed, the tap end can be used for cutting out a new thread, allowing the repair parts to be inserted. The center portion of the tool is for re-threading the outside of the valve. The cap which fits over the valve is very often knocked against and the thread damaged, and this is where this little tool again becomes a valuable adjunct to the automobile's mechanical outfit.



FULL FLOATING TYPE OF REAR AXLE JUST BROUGHT OUT BY LONG ARM SYSTEM COMPANY FOR LIGHT CARS WEIGHING 2,500 POUNDS OR LESS

INDEX TO ADVERTISERS

Vol. XXI NEW YORK—THURSDAY, AUGUST 19, 1909—CHICAGO No. 8

THE AUTOMOBILE

Britain's Motor Track Has Entries But Not Crowds

Start of the Relay Race in the Recent August Holiday Meeting at Brooklands Track, England

LONDON, Aug. 12—Brooklands promises to regain its proper position as the most popular, as well as the largest and fastest automobile track, if its managers can continue to provide such close and speedy racing as was seen at the recent two-day August meet. Although the general public had not forgotten last year's uninteresting exhibitions and was chary of its patronage, there was still a by no means inconsiderable attendance of the track's hardy habitues. The weather, too, was threatening. But several of the finishes were as close as human handicappers could hope to obtain, and were fought right up to tape. Nearly every one asserted that Saturday's sport, in particular, was the best ever seen since the opening of the track.

For the first day five car races and three for motorcycles made up the program. In the August Junior Handicap came one of the best finishes ever seen at Brooklands. Mr. Colmore and his 24.8-horsepower Darracq, starting from scratch, made up his distance on the five-and-a-half-mile double circuit, and succeeded in passing the other eleven competitors, snatching the victory by a hair's breadth from Roy Fedden on the Straker-Squire. Motorcycles had their innings in the third race, and another scratch man, Lee Evans, on his American Indian, put the race away on the finishing straight. The only race which was really disappointing was the July Junior Handicap, in which a little Sizaire "one lunger," which was sent away first, developed an unexpected burst of speed, and far from being overtaken, opened up a wide gap on the other competitors. It was a runaway win at an average speed of 44 miles an hour for the double circuit.

The two-mile sprint race was expected to furnish some fast time, as entrants were required to have an official record of 80 miles an hour. Unfortunately, Mr. Stirling's Brasier went out of commission on the way to the track. Although the time was not quite as fast as might have been expected, for Sir George Abercromby's Napier fell short by five miles of its previous achievement, the race was nevertheless a good one, calling for skilful work on the part of the drivers in securing the best acceleration.

The July Senior Handicap added another win to the already long record of O. S. Thompson's reliable Austin "Pobble," although the Abercromby Napier was in the lead and within a few hundred yards of the tape when an ignition connection broke. It finished coasting, just beating out an Itala for second place. Lee Evans and his Indian scored again at 60 1-2 miles an hour in the Senior Motorcycle handicap.

The final event was a relay race, a form of contest which rarely fails to be close and interesting. Two cars form a team; when the first completes its circuit the driver passes his voucher to his team-mate, who then makes the second circuit. Here the Austin "Pobble" came to the fore again, its running mate being P. C. Kidner's 20.1-horsepower Vauxhall. Thompson led throughout the first lap, but overshot the finish line, and had to get out and run back on foot to pass the voucher. Second place went to the Abercromby Napier, mated with Bray's little Sizaire. Although Abercromby was next to last to get away for the second lap, he was rapidly overhauling the Vauxhall on the homestretch. There was quite a thrill when one of the drivers, in going out of the straight, got high up on the banking and came within an ace of slipping down again. These team events have proved so successful that they will probably have a permanent place on the Brooklands programs.

Monday's racing seemed rather anticlimactic after Saturday, although in itself above the average. Perhaps this was due partly to the weather. Even the most optimistic felt that it would be necessary to put up with a showery afternoon, but although the clouds remained black and threatening, the rain still kept at a distance.

The comfortable entry of twenty-five cars in the August Senior handicap necessitated running the race in heats, for the first time this year. Mr. Thompson secured the first heat with "Pobble," and Mr. Hammond with the low, flat-shaped gray Lagonda, a newcomer to the track, was second. The next heat was won by Sir George Abercromby's Napier at a speed of 84 miles an hour, followed by Mr. Paton's Darracq. The final went to "Pobble," with 2 minutes 27 seconds allowance, at the rate of 69 3-4 miles an hour. The Napier, from scratch, was a good second and the Darracq third.

After two motorcycle races had been disposed of, with a result of a third victory for the Indian, the field was made ready for the second Grand Prix race. This turned out to be a great disappointment. Mr. Stirling's Brasier had failed to appear, owing to stripped gears, so that the contestants were reduced to three. The starting gate was used for this race. At the rise of the gate, Mr. Loder's big red Itala jumped to the fore, but stopped at the first corner for lack of gasoline, as was afterwards explained. The Weigel, driven by Mr. Whittaker, did not come up to form, leaving the race to Mr. Astley's 59.2-horsepower Napier in easy fashion. The average time was 86 1-4 miles an hour.

For the second race for the O'Gorman trophy, the rules stipulated that the rating of the competing cars was not to exceed 21-horsepower nor the stroke 121 millimeters. The race was to be a long one, 28 miles, and at first it appeared as if it would be another battle royal between those old rivals, the Vauxhalls and the Talbots. Both the latter cars, however, had ignition trouble which put them out of the running, and thereafter the race lay between the two Vauxhalls. That of Mr. Hancock won by a few feet over its team-mate, driven by Mr. Kidner, at the rate of 70 3-4 miles an hour. There was no limitation as to the use of fuel, and Mr. Stewart's Lancia took advantage of this by fitting an oxygen cylinder to feed the carbureter. He did not appear to gain any great advantage by it, however.

The last event on the card, the August Winners' handicap, was finely contested, and won great praise for the handicappers. The principal contestants were the two Napiers, the Vauxhall, and the Indian motorcycle, and the latter secured its fourth well-deserved win. With an allowance of 1 minute 45 seconds on the 5 1-2 miles, it just kept ahead of Mr. Astley's 59.2 Napier from scratch.

In short, it was a most successful meet, even with the small attendance, and every one is looking forward to the next one, to be held October 2. Then, it is expected, Brooklands will at last be free from its last vestige of ill-luck.

PARTRIDGE TRIED BROOKLANDS TRACK

New York, Aug. 14—E. S. Partridge, of Wyckoff, Church & Partridge, returned this week on the *Adriatic* from his European trip, during which he visited France and Germany, besides spending a week in England. While there he sampled the Brooklands track in the Stearns touring car which he took abroad with him. One of his companions in the eighty-miles-an-hour ride was James G. Holland, a newspaper man well known here in the early days of automobiling. According to Mr. Partridge, the Brooklands course is perfectly banked, and he did not feel the least bit of hesitation in encircling it at racing speed. On his return voyage he ordered by wireless one of the W. C. P. yellow taxicabs to meet him at the dock. This so interested other passengers that they did likewise, and the entire reserve squadron was necessary to satisfy the demand.

ONE-MILE TRIALS FOR LONG BRANCH

Long Branch, N. J., Aug. 16—Ocean avenue will on Saturday be the scene of a series of mile time trials by automobiles, as a part of an athletic programme arranged by the local board of trade. The city authorities have given permission to close the boulevard to the public, and sanction has been obtained from the A. A. A. for the meet. Prizes of cash, statuary and cups, representing a total of nearly $5,000, will be awarded, and from present indications there will be a large entry list of New York and Jersey coast autoists. The road is well oiled and there is an extra three-quarters of a mile, part for a flying start and the rest for the finish. The committee: M. G. Kahn, M. R. Rothschild, Failing Baruch, C. L. Bowler, Jr., H. A. Content.

LATEST NEWS OF THE MUNSEY TOUR

Washington, D. C., Aug. 14—Frank H. Trego, secretary of the Chicago Motor Club, has been selected as chairman and referee of the Frank A. Munsey reliability contest to be run September 21-29 from this city to Boston and return. Mr. Trego is one of the best posted technical men in the country and enjoys the confidence and esteem of automobile manufacturers and automobilists generally. With Mr. Trego at the helm, contestants will be assured of having the tour conducted properly. Nineteen cars have been entered in this tour to date, and the probabilities are strong that the number will be increased to 35 before the entries close at noon on September 11. The latest additions to the entry list include two Croxton-Keetons, entered by the Croxton-Keeton Motor Car Co., Massillon, O.; a Spoerer, entered by the Spoerer's Sons Co., Baltimore; a Corbin, by the Corbin Motor Vehicle Co., and a Columbia, by Frank P. Hall, of this city. The latter is the first private owner to enter the tour. The pathfinders who are blazing the route in a Chalmers-Detroit reached Boston early in the week and are now en route home by way of New York.

GUTTENBERG TRACK TO BE MOTORDROME

New York, Aug. 16—Up on the palisades of the Hudson where the natural rock forms a hard foundation, is the old Guttenberg track. This was one of the first in the country to be used for automobile racing, many years ago, and now it is to be rebuilt into a modern motordrome, with banked turns and concrete surface. The Palisade Automobile Association acts as the promotor. A schedule is being prepared.

"Zodiac III," a New Type of Dirigible, Making Its Experimental Flights at St. Cyr, France

AMERICANS ARE CONCERNED IN EUROPEAN AERONAUTICS

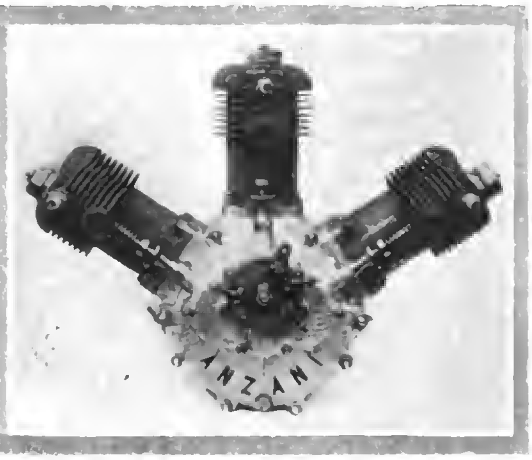
PARIS, Aug. 13—Automobile America is pretty well represented in Paris at the present moment. As aeronautics have taken first place, and indications are that the building of aeroplanes can now be classed as an industry, it is but natural that leaders of the American automobile industry should look closely into the aeroplane as a prospective field for commercial activity. One evening this week, among a group of Americans who had gathered at Issy-les-Moulineaux to watch Bleriot teach one of his pupils to fly, three American factories were represented. Roy D. Chapin, general manager of the Chalmers-Detroit Motor Company, watched the proceedings closely and looked into the details of the Anzani engine. L. H. Kittredge, president of the Peerless Motor Car Company, kept an equally open eye. Charles Y. Knight, who has just come over to Paris from a huge success in England, was the Chicago member of the group. Frank S. Lahm still claims America as his country.

J. N. Willys, of the Overland Automobile Company, is another American manufacturer who passed through Paris this week and left for an extended tour through France. Jefferson de Mont Thompson, ex-chairman of the Vanderbilt Cup Commission, after

Group of Americans Watching Bleriot Flying at Issy-les-Molineaux—Messrs. Chapin, Kittredge and Lahm Are Included in the Group

Carbureter Side of the Anzani Motor

Side View of Anzani



Front of Anzani 25-H.P. Aero Motor

spending a couple of weeks in the capital, left for a tour through Germany and Holland, but will return to France in time to witness the aeroplane races at Rheims this month. Messrs. Chapin and Kittredge also intend to be spectators at the Rheims gathering, the week of August 22-29.

Cortlandt Field Bishop, president of the Aero Club of America, who has been over here most of the Summer, is now busy making arrangements for the reception of his flying machine to be piloted by Glenn H. Curtiss at Rheims. This will be the only American flying machine taking part in the big French races. David Bruce Bishop, brother of the president of the Aero Club, is dividing his time between watching the various French aeronauts and piloting the fast hydroplane boat produced by W. H. Fauber, formerly of Chicago. The Packard Motor Car Company has one of its representatives here in C. G. Moors, general works manager.

Active Preparations for Aeronautical Salon

The opening of the Paris Aeronautical Salon, to be held in the Grand Palais, has been fixed for Saturday, September 25. The closing day is at present Sunday, October 17. As, however, the hall is not needed for any other event, there is a possibility of the show being continued, if this is found desirable. The aeronautical Salon this year replaces the automobile show, abandoned after eleven consecutive years of existence. Last year the aeronautical section joined forces with the commercial vehicle Salon, each of them having a half of the hall. The 1909 exhibition is the first one held exclusively for aeronautics, and will be the first purely aeronautical exhibition of real importance held in the world. All the plans for the show have now been drawn up, the center of the hall being occupied by a spherical balloon, with a dirigible of the Republique or Ville de Paris type to left and right of it. In the centre of the floor space, under the dome, will be a number of stands of honor, important among them being one reserved to the Bleriot aeroplane which flew across the English Channel.

CURTISS ARRIVES, READY TO COMPETE

Paris, Aug. 12—Glenn H. Curtiss arrived here to-day with his aeroplane, and left immediately for Rheims, where he will compete in the International Aviation Cup race on August 28 as the representative of the Aero Club of America. He is carrying the aeroplane as "personal baggage," so as to lose no more

Comte de la Vlaux (with canes) and Constructor Mallet

Sommer in Driver's Seat of His New Record Breaker time than possible, and hopes to have it set up to-morrow in time to begin his practice flights and get acquainted with the ground. After the Rheims meet is over Mr. Curtiss will proceed to Brescia, Italy, and will take part in the aeroplane races there.

Curtiss Repairs Quickly

RHEIMS, FRANCE, Aug. 17—In a test flight yesterday Curtiss' motor stopped and he had a severe fall, painfully bruising one leg. He had already made two short flights of two minutes each. The aeroplane was thought to have been seriously damaged, but under Curtiss' supervision it has already been completely repaired.

NEW McCURDY FLYER

PETEWAWA, ONT., Aug. 14—J. A. McCurdy and F. W. Baldwin, formerly connected with Dr. Bell's Aeronautic Experiment Association, whose successful *Silver Dart* was wrecked here August 2, have completed a new machine after the same model, which has been tested with good results. It is called the *Baddeck No. 1*. No extended flights were made, but it was proved that the motor and propellers worked properly and that the arrangement of the surfaces was correct. If the trials here come up to expectations Messrs. Baldwin and McCurdy will probably go to England and attempt to win some of the prizes offered for British aviators.

Willard Making American Record for Cross-Country Flight, on Long Island

WILLARD FLIES 12 MILES CROSS-COUNTRY

Charles F. Willard, who is operating the Aeronautic Society's Curtiss aeroplane, made a new American record for cross-country flight last Friday. He remained in the air nineteen minutes and thirty seconds, and covered a distance of approximately twelve miles in an irregular square, from the grounds at Mineola, L. I., over Garden City, Westbury, Hicksville, and back to within a mile and a half of his starting point.

The motor was started for the flight about 5 o'clock in the morning. The aeroplane rose gracefully in the air, reaching an elevation of 100 feet as it passed over the trees and telegraph wires at the edge of the grounds, and then headed straight across the plain toward Garden City. For eight or ten minutes the machine was out of sight of the spectators at Mineola. Hardly had he reappeared, traveling at forty miles an hour, when the motor stopped, and Willard brought the machine to earth in a smooth glide. The stoppage was caused by a broken camshaft in the motor. Willard's successful landing was as much of a triumph in its way as his flight. It will be remembered that he received his first lesson from Glenn Curtiss July 18, never having been in an aeroplane before. Since that day he has steadily increased the length of his practice flights and has been uniformly successful, never having had a serious accident.

U. S. NAVY WANTS TO TRY AEROPLANES

WASHINGTON, D. C., Aug. 14—The Navy Department, not to be outdone by the War Department, wants some aeroplanes of its own, and specifications have already been drawn up. Unless Secretary Meyer disapproves—which is not likely, as he was one of the most enthusiastic attendants at the Wright trials—bids on two aeroplanes will probably be advertised for in the near future. The Navy specifications will call for some sort of landing boats sufficiently buoyant to keep the machine afloat if it is forced to alight on the water. The experts see no difficulty in launching an aeroplane from the deck of a battleship; it is pointed out that a fast cruiser will attain sufficient speed to cause an aeroplane to rise from its deck without the use of any special devices. The problem now is to find some way to enable the machine to return to the deck without injury. If the aeroplanes can be made to carry a searchlight they will be almost invaluable for naval operations.

The ground for the new training ground at College Park, Md., has been leased, and work has been started to put it in condition for Wilbur Wright's future flights.

Sommer Aeroplane Which Recently Broke World's Endurance Record in France

INDIANAPOLIS SPEEDWAY TO HAVE ITS GREAT INITIATORY

INDIANAPOLIS, IND., Aug. 16—Everything is in readiness for the opening automobile events on the Indianapolis Motor Speedway, which will be held Thursday, Friday and Saturday of this week. The entry list now numbers sixty-two cars, with the probability that it will grow to more than seventy before Thursday, when the list closes.

Seldom has such an aggregation of drivers been seen at a meet as will appear at the Speedway during the three days. Chevrolet, Dennison, Strang, Oldfield, Zengle, Christie, De Palma, Hearne, Knipper, Lorimer Burnham Ryall, Aitken, Drasch and De Witt are among those who will drive.

When the motoring army invades Indianapolis this week it will be treated to a great surprise party in the way of this great speed enterprise, which is even more stupendous than one imagines in his mind's eye before seeing it. The plat of ground on which it is located is 1 1-2 miles in length and 1-2 mile wide, containing 320 acres of ground. Inside those whitewashed fences is a racing plant complete, on which has been spent at least $400,000 and into which has been inculcated every modern idea in a speed way that such enthusiasts as Messrs. Fisher, Wheeler, Newby and Allison could conceive. A bird's eye view of the layout shows two tracks—one a huge oval, 2 1-2 miles in length and enclosing another which is a sinuous, twisting thing, bending here and curving there until it covers fully as much ground as does the outside circuit. This is the basis of the plant, but everywhere else on the grounds there is more evidence of thought and care in providing not only for the convenience of the manufacturer wishing a place where he can try out his product as well as for the comfort of the spectators.

The main entrance to the ground is at the southwest corner, and a road runs directly from the front gate to the main grand stand, a commodious structure, which is covered and which will hold 10,000 people without crowding. This is not the only provision made for seating the spectators, though, for ranging around the south turn are thirteen miniature grand stands intended for private parties, each of which will hold twenty-eight people. Then, in about the middle of the south turn is another big stand—the bleachers—which will hold 4,200 more.

Aside from the grand stands, there are many other features of the plant, not the least of which are fifteen garages which are to be used by the racing teams, each of which will have its own garage, which will be fitted up with tool bench and other facilities for tuning up cars. These garages vary in size, from one car up to a dozen, the big one being located outside the larger track. The others are bunched in a picturesque position just south of the south end of the inner loop and only a few hundred feet away from the finish line. Each garage is painted green, with white trimmings, and the doors are the full width of the building. Leaving this feature, one finds a row of repair pits on the inner side of the outside track. There are twenty-five of these repair pits, half on one side of the judges' and press stands and the remainder on the other side. These pits are nothing more or less than huge boxes without a cover.

Every effort has been made to make the officials' stand complete in every detail. It is located at the tape and between the main and inner tracks. It is a three-story affair, boarded up on all sides and with slanting wooden windows which will keep out the glare of the sun and the rain if the weather man becomes perverse. The press stand, right alongside, is designed with the same care, there being accommodations for about sixty newspaper men and operators. The man who takes pictures is not overlooked, either, for the ground floor of this pretentious establishment contains a dark room where pictures may be developed. From this press stand, as well as from the judges' stand, one may look at any corner of the track, the windows being on all sides. The only obstruction to the view is a bunch of trees at the northern end of the grounds—a small wood in which may be parked cars if it is found there is not enough room in the vast expanse of infield, which offers 180 acres of space for parking spaces.

Now as to the course itself. Most of those who follow racing matters know that the Indianapolis speedway consists of an outer track 2 1-2 miles in circumference, while another one of similar length occupies the infield. Both are surfaced alike, but the idea of the winding track is to secure conditions approaching what is to be found in the open country. The turns on this course are not banked, but are so gradual that it ought not to be any trick at all to hold them at top speed. This inside course will not be used for the meet this week, for it is not done as yet, but when it is completed it will make a pleasing variation to see a big field of cars strung out over the two courses, which might well be likened to a magic maze.

Every effort has been made to finish the outer track, but it has been only by the hardest kind of work that the task has been accomplished. Night and day of late the men have been working, the track at night being lighted with Prest-O-Lite gas tanks. By this kind of labor the speedway was ready for the motorcyclists, but now comes the job of refining it for the motor car races.

Upon the shoulders of P. T. Andrews, an engineer from New York City, has devolved the job of finishing this work, and right well has he stuck to the job. At times he has had as high as 450 men working, and besides this has employed five steam tractors, 300 mules, 150 scrapers and four 6-ton and three 10-ton rollers. The result of this is an outside track 2 1-2 miles in circumference and with four curves. The banking is 20 per cent. At each end—the north and south—there is a 660-foot turn, and each of the straights measures 3,300 feet. The banking itself is unique, and it is doubtful if anything like it ever has been used in track construction. The track itself runs up 50 feet from the pole, and at this point there is another smaller banking, which is termed a cap, and which rises two feet in 10, making a sort of a bumper or fender. A car can run on it if necessary, but the tendency seems to be to stop skidding in case a car hit it. To further safeguard the turns and prevent any distressing accidents which would result if a car ran off the track, there is a small board fence 24 inches in height, at the cap, which is scientifically designed so that a car skidding up to it will strike the hub caps instead of the wheels, thus holding the car on the track. The banks themselves are 12 feet in height, while the radius of the curves is 840 feet.

In building the track Engineer Andrews first used clay for a base and then put on a top dressing of taroid macadam. At the present time the top dressing needs traffic to smooth it down, but by the time the second meet is held it ought to be lightning fast. Some of the skeptics who have noticed this declare that the big cars will tear up the surface, but this is scoffed at by Engineer Andrews, who declares he has tested the surface and not found it wanting. He points out that 500 teams hitched to narrow-tired vehicles have run over it without injuring the surface, and that a big wagon loaded with 3,500 pounds of stone had failed to leave a trace of its passage.

"I never have seen Brooklands track in England, but I have had correspondence with the people who built it, and also have studied the plans," declares the engineer. "I believe we have a track that will be faster and safer than Brooklands. The English speedway has no fixed radius and easements, while it is flat on the pole. You will notice that our track gives a car a fixed position at any and all angles. A car has the same position on the banks as on the straights, while the approaches are so laid out that it is possible to hit them at 100 miles an hour without skidding. On this track there is no tendency to climb a grade when on the turn, as I have demonstrated to my own satisfaction by tests with weights on different tracks and cars."

Willie Haupt and His Winning Alco "60"

Referee S. B. Stevens

DePalma and Fiat That Won Free-for-Alls

QUAKER CITY "SHOCK ABSORBERS'" MIDSUMMER MEET

PHILADELPHIA, Aug. 14—"The Shock Absorbers," a body of local automobile writers, to interrupt the deadly monotony of a usually meetless month, took a chance to-day and ran off a midsummer race meet and gymkhana at Point Breeze track. The affair was well conducted, but it cannot be said that Philadelphia enthusiasts manifested a proper degree of appreciation of the efforts of the committee to furnish entertainment along gymkhana lines. The Quaker public showed that it preferred action for its money, and during the long-drawn-out preparations, with barrels and wires, potatoes, and spears among the "props" necessary to pull off the stunts, the crowd kept its good humor by audibly criticising the contestants and the management's efforts to amuse them.

The track was as dry as a chip, and the practice previous to the races cut up the turns until they were inches deep in dust. Big fields were an impossibility, and at one time Referee Stevens and Starter Wagner seriously considered postponing the 50-mile Point Breeze Marathon to give the watering carts a chance.

The Marathon, at fifty miles, furnished the only thrills of the day. There were four starters—Heitemeyer's Simplex "50," driven by Frank Lescault; a 70-horsepower Welch, driven by Erwin Bergdoll; American Locomotive "60," with Willie Haupt at the wheel, and the little 18-20 Lancia, Al. Poole driving. Getting away to a good start, Lescault soon forged to the front, followed by Haupt, Bergdoll, and Poole, in the order named. The Simplex steadily increased the daylight between it and the Alco, until, at the end of the thirtieth mile, Lescault was leading by nearly half a mile, the other two cars, which were apparently very evenly matched, having been lapped once by the leaders. Lescault maintained his advantage until the thirty-fifth mile, when, in negotiating the particularly soft and dusty turn leading into the back-stretch, the car plunged into and through the fence, fortunately catapulting its driver and mechanician onto the grass before turning turtle. Neither suffered anything worse than a few scratches and a general shaking-up.

With the Simplex out of it, Haupt and the Alco took the lead, and with a lap advantage on the others, easily retained the position and landed a victory by a lap and a half. Al. Poole made a sturdy fight to snatch the place from Bergdoll, and the big Welch was just 20 seconds too fast for the little Lancia.

Ralph DePalma was the "big smoke" of the day. In the five-mile free-for-all, which was run in heats, best two in three, he staved off his only opponent, Frank Lescault, in the Simplex "50," and won in the comparatively slow time of 5:35 2-5 and 6:02. In the 10-mile handicap, however, he gave the spectators a run for their money. He had to, for Al. Poole, in the Lancia, was given a start of 1:20, and Harry Davis, in the Moon, 1:45. It took seven laps and a half to catch Poole, the leader, and resulted in a new 10-mile record for the track—10:59.

The $1,251 to $2,000 five-mile race for the Frank L. Poth cup resulted in an easy win for the Oldsmobile "35," driven by Tom Berger. Wilkie's Buick dropped out owing to ignition troubles, and Borie's Mitchell did not have sufficient speed to compel Berger to exert himself. The latter, however, met his match in the ten-mile $2,001 to $3,000 race, when Harry Davis drove his 30-horsepower Moon to victory in 12:56.

The one-mile city speed limit test gave the spectators an idea of the ridiculousness of such a gait, and the veritable crawl of the eleven entrants around the mile oval was greeted with a continuous sally of witnesses. No speedometers or watches were permitted in the cars. "Jimmy" Florida, the Vanderbilt and Fairmount Park race driver, was the best guesser of the lot, landing his Locomobile "20" at the tape just two seconds short of the exact time, with George Daley, in a Woods electric, second; and W. B. Dannenhower, in a Franklin, third.

The good-natured crowd greeted the gymkhana stunts with a volley of sarcastic remarks, apparently being of the opinion that such tomfoolery was a waste of valuable time.

Ralph DePalma made two unsuccessful attempts on his own mile record for the track (1:01 4-5). The summary:

50 MILES, POINT BREEZE MARATHON—Q. C. M. C. CUP

No.	Car	H.P.	Driver	Time
1	Alco	60	Willie Haupt	:59:32
2	Welch	70	Erwin Bergdoll	1:01:10
3	Lancia	18-20	Al. Poole	1:01:30

10 MILES, $2,001 TO $3,000—GEORGE H. STETSON CUP

1	Moon	30	H. Davis	12:56
2	Oldsmobile	40	Tom Berger	

5 MILES, $1,251 TO $2,000—FRANK L. POTH CUP

1	Oldsmobile	35	Tom Berger	7:57
2	Mitchell	30	Cherie Borie	

10 MILES, HANDICAP, FREE-FOR-ALL—HOTEL WALTON CUP

1	Fiat Cyclone (Scr.)	60	Ralph DePalma	10:59
2	Lancia (1:20)	18-20	Al. Poole	
3	Moon (1:45)	30	H. Davis	

5 MILES, FREE-FOR-ALL—M'DONALD & CAMPBELL TROPHY

FIRST HEAT:

1	Fiat Cyclone	60	Ralph DePalma	5:35 2-5
2	Simplex	50	R. Heitemeyer	

SECOND HEAT:

2	Simplex	50	Ralph DePalma	6:02
1	Fiat Cyclone	60	Frank Lescault	

MILE TIME TRIALS FOR TRACK RECORD (1:01 4-5)

1	Fiat Cyclone	60	Ralph DePalma	1:01 4-5
			Second trial	1:02

1 MILE, SPEED LIMIT TEST, 12 M. P. H.—BAILEY TROPHY

1	Locomobile	20	J. W. Florida	5:02
2	Woods Electric		G. W. Daley	5:19 3-5
3	Franklin	18	W. B. Dannenhower	5:30 3-5

GYMKHANA FOR FIRESTONE TROPHY

1	Buick	18	Eddie Wilkie	
2	Simplex	50	Frank Lescault	
3	Oldsmobile	35	Tom Berger	

LOWELL BUSY ON NATIONAL STOCK CAR RACES

LOWELL, Aug. 16—Rapid progress is being made by the Lowell Automobile Club in its preparations for the automobile carnival the week beginning September 6, and everything promises to be in the best of shape for the national contests. The racing cars and drivers are not expected until about August 23, but the A. A. A. contest committee has already taken up its headquarters on the course, between the grand stand and the Vesper Country Club. Several of the racing teams have engaged their quarters, and people anywhere near the circuit who have barns that are not occupied find them in great demand by the manufacturers whose cars will be in the races.

Though the Merrimac Valley 10.6 mile circuit was considered extra fine last year when the first race was held, the Lowell club officials have not been content to leave it as it was, and in all parts of the course repairs are being made which will tend to make it faster and safer than before. Wherever it is necessary the roadway has been widened, the surface scraped and smoothed, corners changed and rebuilt, and before practice begins the whole will be treated with dust-laying preparations.

The Lowell boulevard, a mile stretch from the lower or city end of the course to the grand stand, has been smoothed and rolled and will be treated with heavy asphalt oil and covered with a thin layer of sand, making a resilient but dustless surface. Beyond this broad stretch, where three or four machines abreast can be driven at the highest speed of which they are capable, is about four miles of State road with a surface as smooth as could be desired, and without grades of any consequence. There are, however, a deceptive S curve and other curves, but they will offer no difficulty to the drivers after a little practice. Over this stretch the cars can make fast time and there is plenty of room to pass anywhere.

No Longer a Speed-Reducing Hairpin

At the end of the State road is the upper turn, a veritable hairpin. Last year this presented much difficulty to the drivers attempting to take it at speed because of a large tree that stood just at the point of the turn. This tree has been cut down and the road widened about twelve feet with a gentle slope toward the inner side, giving in effect a banked turn with a macadamized surface. The cars ought to be able to take it without shutting off very much. This turn is regarded as one of the spectacular spots on the course. After swinging around the hairpin turn the cars will enter the back stretch, Varnum avenue, at this point a country road with a dusty surface. It has been widened on both sides and the dust is being scraped away. Oil, which will be used on the State road, as well as on the boulevard, is not considered the proper treatment for this stretch and calcium chloride will be supplied. This part of the course is in the town of Tyngsboro and until the Lowell city boundary is reached, a distance of perhaps two miles, the surface is not of the best, though it will be smooth for the races. The road is winding, with one long climb: in this stretch the road has been built out in places, menacing ledges have been blasted away, and trees too near the highway have been cut down.

The worst place on the homestretch is "the dip." Approaching on a slight curve the driver finds himself on the edge of a precipitous drop with a small bridge at the bottom followed by a long climb, with a curve at the end. Cars took this at forty miles an hour last year but this year they should be able to go even faster, for the rocks that stuck out to the edge of the road at the top of "the dip" have been blasted away, the road down the declivity has been materially widened, and the bridge changed so that there will be no bump.

Reaching the city line the road changes to excellent macadam. It is winding but broad, with little grade. At the lower end for a few hundred yards there is a single car track, but there are macadam driveways of sufficient width on both sides of the flush rails. The cross over from the back stretch to the boulevard is a street with right angle turns at both sides. To prevent the tearing away of the surface at these turns and consequent deep ruts, the Lowell club is having both of them resurfaced with heavy macadam. The back stretch, with the exception of the upper end, and Dunbar avenue will be treated with oil.

A Presidential Box in the Grand Stand

The grand stand, seating 5,550 people, is nearly finished. Opposite the starting line in the middle of the stand is a special box for President Taft and party, who have been invited to witness the races. From all parts of the grand stand there is a fine view down the boulevard and up the State road. Opposite the grand stand is a commodious official and press stand and this will be connected with the grand stand by an overhead bridge, upon which the score boards will be located. A telephone system is being installed around the circuit and telegraph wires will run to the press stand. Near the main entrance of the grand stand is one end of a pile and pontoon bridge that is being constructed across the Merrimac river. On the other side the Boston & Maine railroad company has built a wide platform upon which passengers from the special trains will be disembarked. From there they may cross the bridge directly to the course. Persons arriving on street cars will also be landed at the end of the bridge. Spaces have already been staked out for 5000 automobiles along the boulevard, on the opposite side from the grand stand, and excellent arrangements have been made for reaching these parking spaces.

The entry blanks for the mile sprint races on the boulevard Tuesday afternoon, September 7, have just been sent out. These provide for eleven events, five for stock cars under the A. A. A. price classification, four for stock chassis under the A. A. A. piston displacement and weight classification, a free-for-all and record trials. The entry fee is only $15 so a very large field is expected. Bronzes, shields or sterling cups will be given as trophies in all these events. Flying start will be permitted.

The complete programme for the carnival is as follows:

Monday Sept. 6, 10 a. m.—National small stock chassis competition in three classes at 127.2, 159, and 212 miles, to be started together for the Vesper Club, Yorick Club, and Merrimac Valley trophies and $2,700 in cash prizes. Fireworks in the evening from the temporary bridge over the Merrimac river near the grand stand.

Tuesday, Sept. 7, 2:15 p. m.—Speed trials, mile straightaway with eleven classes, including free-for-all and record trials.

Wednesday, Sept. 8, 10 a. m.—National stock chassis race, distance 318 miles for the Lowell trophy and $2,100 in cash prizes.

Thursday, Sept. 9, 10 a. m.—National Marathon run over the Merrimac Valley course, distance 26 miles. Motor boat races on the river and athletic sports in the afternoon.

Friday, Sept. 10, 10 a. m.—Meeting of the American Federation of Motor Cyclists, six events for $600 in prizes.

Entries are coming in thick and fast. Nineteen additional entries were made on Saturday last, which augments the already large list considerably, and a score or more are expected within the next few days. Those made last Saturday include a string of ten Buicks, to be driven in the various events by Louis Chevrolet, Strang, Burman, Ryall, DeWitt and Arthur Chevrolet; three Maxwells: one Moon, to be driven by Harold Brinker, the western crack; one Allen-Kingston, a Columbia, an Isotta, an 18-horsepower Mercedes, a Bergdoll and a second Apperson. Paul Lacroix has decided to swell the list of foreigners by putting a second Renault among the contenders, with Charles Basle as the pilot.

Walter Christie has entered his new 100-horsepower front-wheel drive racer in the mile straightaway competition and time trials, and Mrs. Cuneo will have her Knox "Giant" in the same, driven by Louis Disbrow. Numerous manufacturers have promised more entries, which will not be announced until the checks for entry fees are paid.

Practices in Water-Cooling
Chapter II

INDIRECT COOLING involves the circulation of a liquid, as water, the function of which is to absorb heat from the cylinders and deliver the same to a current of air, which is passed over the surfaces of a radiator, within which the water, in its heated state, is circulated, for which purpose a pump is used excepting in the cases involving the thermo-syphon principle of circulation. Water-cooled motors, so called, are all of the indirect system, and this is quite independent of cyclic relations, etc. In indirect cooling there are several considerations, as follows:

(A) The specific heat of the liquid.
(B) Boiling point of the liquid.
(C) Difference in temperature of the cooling medium.
(D) Internal surface of cylinder exposed to heat.
(E) Thickness of the cylinder wall.
(F) External surface of cylinder wall submerged.
(G) Conductivity of the metal of the cylinder wall.
(H) Ability of circulating pump or equivalent means.
(I) Internal (wetted) surface of the radiator.
(J) Thickness of walls of water tubes in radiator.
(K) Conductivity of the metal used in the radiator tubes.
(L) External surface of radiator exposed to air.
(M) Efficiency of the radiating surfaces.
(N) Ability of the air propeller.
(O) Distribution of the stream of air circulated.
(P) Specific heat of air.
(Q) Difference in temperature of air circulated.
(R) Effect of "gills."
(S) Effect of incrustation.
(T) Relative values of tubes of various shapes.
(U) Influence of location.
(V) Problems involving advancing and retarding ignition.
(W) Influence of changes in the fuel ratio.
(X) Influence of time, involving speed of the piston.
(Y) Volumetric efficiency changes due to heat.
(Z) Advantages of efficient cooling.

Thermal Capacity of Substances—The thermal capacity of any body is the quantity of heat required to raise a unit of the mass 1 degree on a thermometer which registers sensible temperature. Water is taken as the standard of comparison, and when one pound of water is heated one degree Fahr. the energy expended in the process is said to equal one British thermal unit (abbreviated B.T.U.). The several heat units used are:

(a) British thermal unit (B.T.U.).
(b) French thermal unit (F.T.U.) or calorie).
(c) Pound-calorie unit (P.C.U.).

For convenience the values of the respective units may be resolved as follows.

B.T.U. = P F.
F.T.U. = Kg C.
P.C.U. = P C.

The last named unit is but little used, although it represents a certain utility in practice when the centigrade scale is used.

When P = weight of substance in pounds.
Kg = weight of substance in kilograms.
F = temperature in degrees Fahrenheit.
C = temperature in degrees centigrade.

Equivalents of thermal units may be determined as follows:

F.T.U. = B.T.U. × 3.968.
B.T.U. = F.T.U. × 0.252.
P.C.U. = B.T.U. × 1.8, or F.T.U. × 0.4536.

Mechanical Equivalent of Heat—Since heat is a form of energy it may be resolved into other units, and Joule's equivalent (mechanical) of heat as determined by him, between 1843 and 1850, was stated as 772 foot-pounds: that is to say, one B.T.U. represents enough energy which, when expended mechanically, will raise 772 pounds one foot in one minute. Professor Rowland, in 1880 (*Proc. Acd. Arts and Sciences*), proclaimed that a difference was found and his determination of the mechancal equivalent of heat was probably nearer to 778 foot-pounds than 772 as fixed by Joule.

It is sometimes convenient to reduce heat to electrical units, which may be done as follows:

$$\text{F.T.U.} = I^2Rt \times 0.24, \text{ and } t = \frac{\text{F.T.U.}}{I^2R} \times 0.24,$$

when,

I^2 = square of current in amperes.
R = resistance of the circuit in ohms.
t = time in seconds.

As a matter of fact it is easier to handle all of these computations, using electrical notation, which to do requires a certain familiarity with the methods in vogue. In the absence of this knowledge it will be necessary to proceed in the customary way, and with the constants as here afforded it should be a sufficiently easy matter to proceed without the other method.

Specific Heat Variations—Water is not of the same density at all temperatures, and since the specific heat is measured in terms of mass and temperature, it follows that a correction must be made for volumetric changes due to temperature when great accuracy is desired. The temperature of maximum density of water is 39.1 deg. Fahrenheit, or about 4 deg. Centigrade. In ascertaining the equivalents of temperature in the several standards it is convenient to proceed as follows:

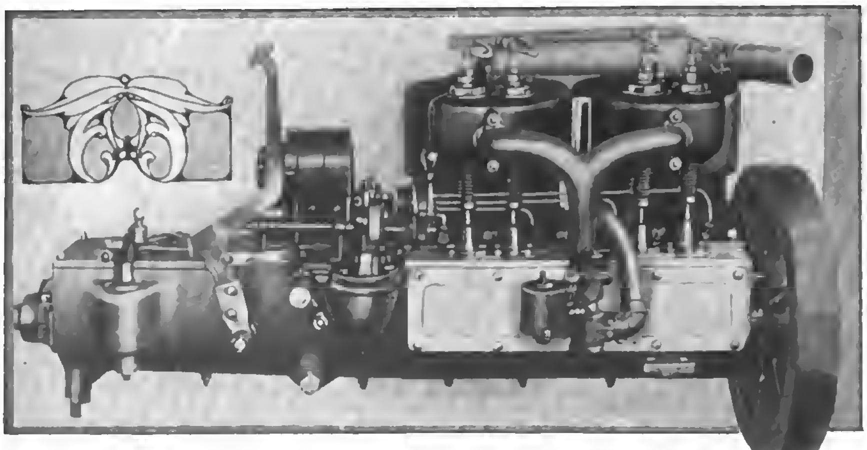


Fig. 1—Thermo-syphon system of cooling as used on the Maxwell Model Q motor for 1910

Extracts from Vol. I., Part V., Chapter II., of a set of books, in preparation, by Thos. J. Fay, covering all phases of automobiling, from the point of view of designers, and in actual service.

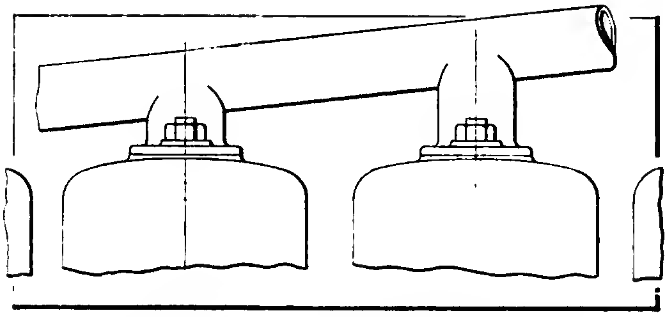


Fig. 2—Rigid water manifold above cylinders

Let F = temperature in degrees Fahrenheit.
C = temperature in degrees Centigrade.
R = temperature in degrees Reaumur.

$$\text{when, } F = \frac{9 \times C}{5} + 32, \text{ or } \frac{9 \times R}{4} + 32$$

$$C = \frac{5\,(F - 32)}{9} \text{ and } R = \frac{4\,(F - 32)}{9}$$

As an numerical example of the use of the formulae let it be granted that the temperature of maximum density of water is 39.1 deg. Fahrenheit, and to reduce this to degrees centigrade proceed thus:

$$C = \frac{5\,(F - 32)}{9} = \frac{5\,(39.1 - 32)}{9} = 4 \text{ nearly.}$$

Saline solutions, as sodium chloride, calcium chloride, alcohol and water, glycerine solutions, etc., will not have the same thermal capacity as water, the actual thermal capacity of the solution to be used in cooling must be considered, especially as water is the more competent solution, so that, if the ability of the circulating system is limited, the cooling medium may be below the requirements in point of quantity circulated, unless the circulating pump is speeded up or some equivalent method is employed. To illustrate the point it is only necessary to set down some thermal values of saline solutions alongside of water, as follows:

SOLUTIONS	SPECIFIC HEAT
Water	1.
Sodium chloride (20 per cent)	0.829
Calcium chloride (20 per cent)	0.834

If a cooling system is so closely designed that the water will steam under the conditions of its use, it is certain that saline solutions will give trouble, in view of the above, since the quantity of "brine" circulated will be no more and the thermal capacity of the same is less than water.

Just as the thermal capacity of the cooling solution is a factor, when the ability of the same is being measured, so must the thermal capacity of the air used for cooling be considered in any attempt to ascertain the weight of air required for the purpose.

Specific Heat of Air—The specific heat of air, according to Regnault, has mean values as follows:

Between —30 and +10 deg. C. specific heat = 0.23771.

Between 0 and 100 deg. C. specific heat = 0.23741.

Between 0 and 200 deg. C. specific heat = 0.23751.

The specific heat of air at a constant volume differs from the

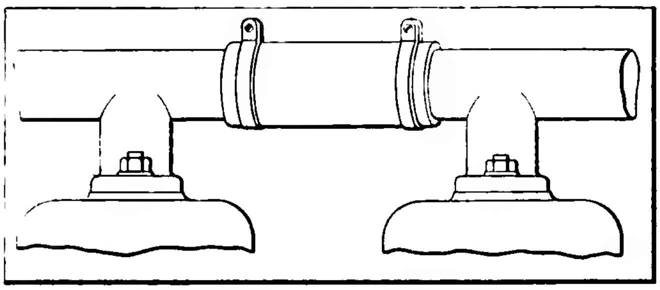


Fig. 3—Flexible connection in water manifold

above, and, according to Professor Woods, the value which will most nearly represent the same may be found as follows:

$$\text{Specific heat at a constant volume} = \frac{\text{mean specific heat}}{1.406}$$

The value, at a contstant volume, is usually taken to be 0.1689.

In cooling work, it is of some importance to note the manner of the use of air, and if it is at a constant volume, the ability will be much reduced, as the above values indicate.

Effect of Heat on Volume of Air—When the cooling air strikes a heated wall, the heat is communicated to the cooler air, and the volume of the air is increased in consequence. The coefficient of expansion of air is given as follows:

In the centigrade scale, at a constant pressure, the coefficient of expansion, per degree centigrade, is equal to;

$$\frac{1}{273} = 0.003665,$$ in which 273 represents the absolute zero on the centigrade scale.

In the Fahrenheit scale: at a constant pressure, the coefficient of expansion, per degree Fahrenheit, is equal to:

$$\frac{1}{491.2} = 0.002036,$$ in which 491.2 represents the absolute zero in the Fahrenheit scale.

Absolute Temperature Measurements—The melting point office is represented by:

0 degrees centigrade; 0 degrees Reaumur, and 32 degrees Fahrenheit.

Absolute temperature, unlike the degrees on thermometer scales, which deal with sensible measurements in common practice, as above depicted, date to the point at which an imaginary gaseous medium would be without volume. Absolute temperatures may be measured in degrees centigrade, Fahrenheit, etc., in which the following will hold:

On the Fahrenheit scale: 32 degrees Fahrenheit = 491.2 degrees absolute.

On the centigrade scale: 0 degrees centigrade = 273 degrees centigrade.

With the above considerations as a basis, computations, involving air, may be made as follows:

One cubic foot of free dry air, at the sea level, weighs 0.080728 pounds, and the volume of one pound:

$$v_o = \frac{1}{0.080728} = 12.837 \text{ cubic feet.}$$

Since, under the conditions named, the pressure of the air is equal to 2,116.2 pounds per square foot, (14.682 pounds per square inch) the following will hold:

$$\frac{p_o\,v_o}{T_o} = \frac{2{,}116.2 \times 12.387}{491.13} = 53.37 = \frac{p_o v_o}{T_o} \text{ and}$$

$pv = 53.37 \times T_o$ as arrived at by Prof. Woods, when,

p_o = pressure due to a temperature of 32 degrees Fahrenheit.

v_o = volume of the gas at the same temperature.

T_o, p and v being the temperature, pressure and volume at any other temperature; T being absolute temperature, at the melting point of ice.

The Latent Heat of Fusion and Evaporation—It is generally considered that the latent heat of fusion does not come into play when reference is had to cooling problems, and this is true, unless account is taken of the performance of excesses of salts, in a saline bath, as calcium chloride. Fusion, in the sense that a solid is liquified, takes place when salts are dissolved, and amonia chloride, for illustration, is a decided refrigerant under such conditions. The ability of solvents is limited, and when the amount of salts which can be dissolved in a liquid, as water, is up to a certain point depending upon the salts and the liquid, the solution is said to be saturated.

A state of saturation is dependent upon temperature to quite some extent, and as the temperature is increased the saturation limit increases also; in other words, if the liquid is heated, the amount of salt which can be dissolved will be increased. It follows, when dealing with saline solutions in a state of near saturation, that some of the salt will precipitate, when the temperature is lowered, only to dissolve again when the temperature is increased: under such conditions the latent heat of fusion would come into play, and there are conditions under which this principle might be of value in cooling work.

The latent heat of evaporation is of the greatest importance, and when water, in the cooler, reaches the boiling point, it is because of this latent heat that the water does not quickly boil away. Water boils at 212 degrees Fahrenheit at the sea level, and if the water enters the radiator at 100 degrees Fahrenheit, the thermal value of one pound of the same, between the entering temperature and the boiling point will be $212 - 100 = 112$ B.T.U. (approximately). When one pound of water is boiled, under a pressure of one atmosphere (14.7 pounds per square inch) the latent heat of boiling is 965.7 B.T.U. From this, it will be observed that one pound of water, if it is turned into steam, in a cooler, if the same is opened to the atmosphere, which is always true, will require the expenditure of nearly ten times as many heat units as will be taken up in raising the temperature of the water from 100 degrees F. to the boiling point.

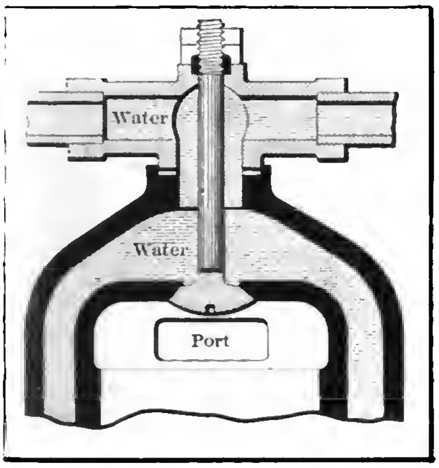


Fig. 4—Showing water connection above cylinder and a liberal body of water

The effect of altitude will be present, since water boils in a vacuum at a lower temperature than it does at the atmospheric. The approximate effect of altitude on the boiling point of water in the radiator, may be stated as follows, remembering that increasing altitude has the effect of rarefying the air just as it is reduced in weight for volume in a vacuum, and in a vacuum water boils at a lower temperature than it does at sea-level pressure.

BOILING POINT OF WATER AT VARIOUS ALTITUDES

Altitude Above Sea Level in Feet	Boiling Point of Water in Degrees Fahrenheit
Sea level	212
1,025	210
2,063	208
3,115	206
4,169	204
5,225	202
6,304	200
7,381	198
8,431	196
9,579	194
10,685	192

It is considered good practice to run the temperature of the water in the radiator at about 202 degrees Fahrenheit, under normal conditions, which allows a margain under adverse conditions, as on a long steep grade, and when cars at the "curb," running the motor free, on a retarded spark. These radiators would steam where the cars are running under normal conditions at an altitude of about one mile. In cases involving steaming radiators under normal conditions, at the sea level, mountain climbing becomes quite out of the question.

Internal Surfaces of Cylinders—The prime object in cooling is to maintain the temperature of the metal of which the cylinders are made, below the point that will produce lubricating trouble, preignition and pronounced rarefaction of the incoming charge. Were the cylinders made of a material such as would not absorb heat, there would be no occasion for cooling, and the principle of limiting surface exposed to the hot products of combustion, on the inside of the cylinders, has the virtue of reducing the cooling requirement without interfering, in any way, with the functions of the motor, and with a gain represented by reduced cooling trouble.

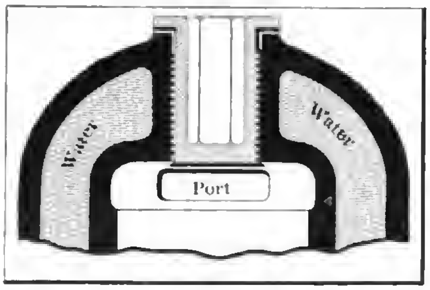


Fig. 5—Liberal body of water above dome of cylinder with side connection

It is common practice to extend the water-jacket, of cylinders, to a point just below the bottom of the stroke, measuring at the top of the piston. Watering below this point would add weight and complication, without delivering an equivalent advantage. The combustion chamber space begins at the top of the piston, at the top of the stroke, and the major portion of the heat must be tapped away through the surface thus exposed, although it is true that overheating would be eminent were the water-jacket stopped off at the top of the stroke rather than at the bottom.

Since all cylinders are round to a point well above the top of the piston, on the top of the stroke, none will differ overmuch as respects the internal surface, up to a point near the fillet of the dome; beyond this point there are wider differences in the several designs, partly due to differences in shapes of domes, but mostly on account of the location of valves, and differences in surfaces of valve-ports. Considering domes only, it is to be expected that a half sphere will offer the least internal surface, since, for a hemisphere, surface for volume is a minimum. Through the use of the formula as given below, it will be found that flat heads offer the greatest surface, and hemispherical domes the least; modifications of both will resolve into areas between the two limits, and when valves are not in the head, it will be necessary to ascertain the increase in area due to port-walls, as an especial effort in each example, since no two designs will be alike, nor can any rule be established which will be general in application.

In considering this phase of the cooling problem, it is a simple matter to assume that surface (internal) is the "valve" which allows the escape of heat, and limiting the surface, limits the escape of heat. This very idea carries with it the logical conclusion that, the greater the effective external surface, in proportion to the internal surface, the cooler will the metal of the cylinders become, and the better will cylinders perform in service, under adverse conditions.

Surfaces May Be Resolved for Comparison—

Let,

d = diameter of cylinder bore.

l = length of cylinder between the top of the piston at the top of the stroke and the point of beginning of the hemispherical dome.

A = area of internal surface of combustion chamber.

a' = area of flat dome not counting area of side walls.

a'' = area of hemispherical dome not counting area of side walls.

a''' = area of side walls neglecting area of walls of valve-ports when valves

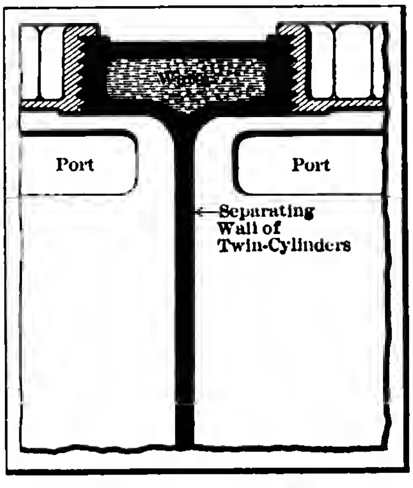


Fig. 6—Common wall for twin cylinders which defeats equal cooling to some considerable extent

are in the head as in some types of cars, mostly for racing.

For hemispherical head types, not counting errors due to shapes of valves in the head:

$$a'' = \frac{\pi d^2}{2}$$

$$a''' = \pi d l$$

$$A = a'' + a'''$$

For flat heads, neglecting irregularities due to shapes of valves, considering types with valves in head:

$$a' = d^2 \frac{\pi}{4}$$

$$a''' = \pi d l$$

$$A = a' + a'''$$

The magnitude of a''' will not be the same when the dome is a hemisphere as it will in flat-head cylinders, since some of the combustion space will be within the dome of the hemispherical contour, which will not be true when the head is flat.

Best Thickness of Cylinder Walls—From the point of view of cooling, which is a matter separate from the strength required to resist pressure, the best thickness of walls to establish, will be the least possible. If internal surface is restricted, thus serving as a valve, limiting the amount of heat which can pass through, the coolest condition of the metal will follow under the conditions as follows:

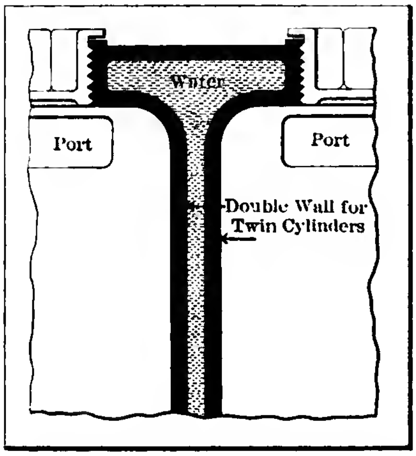


Fig. 7—Separate walls, with a water space between, rendering cooling uniform

(A) With the greatest possible effective external surface.

(B) With the maximum difference in temperature between the metal in the external surface and the cooling medium.

(C) If the walls are thin, since the distance heat will have to travel in the metal will then be minimum.

(D) When the cooling medium is circulated at a sufficiently rapid rate to maintain the greatest possible difference in temperature.

(E) With a cooling medium of the maximum specific heat, highest boiling point, lowest internal heat resistance, best conditions of conduction, and the best conditions of convection, which is a property depending upon the relative motion of the molecular structure of the fluid, which is augmented properly regulated circulation.

That the walls should be thin, is shown by consulting the law of internal conduction, as follows:

"For a given heat conductivity of the material used, internal conduction is directly proportional to the difference in temperature and inversely proportional to the thickness of the wall." This same law indicates, in no uncertain way, that the cooling medium should be a thin layer circulated over a large surface, beyond a certain speed, it will be of small avail to circulate the liquid, for, when the speed is so great that the molecules of the liquid will fail to absorb sufficient heat, which property is retarded by limiting conduction, the circulating effort is excessive, and power will be saved by lowering the rate of circulation of the liquid.

The lower the rate of circulation of the liquid, the thicker should be the layer of cooling liquid over the surface, and in the thermo-syphon system of cooling for illustration, this idea is reduced to a logical conclusion. The thermo-syphon principle of cooling is depicted in Fig. 1 of the Maxwell Type Q motor, which is a 1910 product. Referring to the illustration, and the water connections at the top of the cylinders, it will be noticed that the piping is tapered towards the radiator, at the front, and in order to take full advantage of the principle, the area of the piping is made very liberal. In this system, instead of circulating the water by means of a pump, the whole jacket system is submerged in water, due to the elevation of the radiator, and there is a natural exchange of cold for hot water going on all the time.

Weight of Water at Different Temperatures—Rankine gives, for the weight of water at its point of maximum density, 62.425 pounds per cubic foot. At the boiling point, the weight is less, by 2.77 pounds per cubic foot, which is a mean average of values as given by several authorities. At 62 degrees Fahrenheit, the weight is generally taken to be 62.355 pounds per cubic foot.

In view of the positive difference in weight, between hot and cold water, and since the phenomena of segregation assures that the heavier liquid will migrate to the lower level, this method of cooling possesses the virtue of affording a uniform temperature over the surfaces to be cooled, and a relatively slow but dependable method of circulating the water, thus bringing the cooling influence of the radiator to bear, and while it is necessary to use a radiator of adequate area, it is unattended by such complication as a pump must necessarily involve.

Some Minor Details to Consider—Besides having the piping of adequate area, it is necessary to assure that one cylinder will not rob the other of its share of the cooling fluid, and it is also desirable to maintain tightness of the joints of the piping, which may be done, either by properly contrived manifolds, without flexible joints, as shown in Fig. 2, or, with hose joints, as depicted in Fig. 3. At all events it is desirable to have a substantial body of water above the dome of the cylinders examples of which are offered in Fig. 4 and 5, with the understanding that the methods of sealing the cylinders, shown, are not here under discussion, nor do they represent the most approved ways.

Fig. 6 shows a dividing wall between cylinders, which is common for both, and that a certain amount of unequal expansion will result from this plan, is a common claim, yet even so, a vast number of motors have been put out in this way, and it has not been indicated that any serious ill resulted. Fig. 7 depicts the plan that represents freedom from unequal expansion, and when room is not at a premium, it is well on the side of safety.

Conductivity of Metal of Cylinder Walls—When cylinders are finished all over, as they are in the examples involving the use of copper jackets, the conductivity of the metal is that of cast gray iron, when cylinders are so made, but in most cases the walls are not finished on the exterior, and the conductivity is that of the iron hampered by a skin, which detracts from the heat-conducting ability to a very considerable extent.

That this skin will act quite as badly as a crust is generally well understood, and as for incrustation, there is bound to be a certain amount of it after a motor has performed in service for a certain length of time. The nature and hardness of the scale will depend upon the substances held in solution in the cooling liquid and to a vast extent upon the amount of boiling that takes place. If the cooling system does not waste water, it is then possible to consider that the amount of scale which will form will be limited to that in the small amount of water likely to be used.

It is estimated that a scale to a depth of 1-16 inch will diminish the conductivity by 13 per cent., while a coat 1-4 inch in depth over the surfaces will diminish the conductivity 38 per cent. That this is at the bottom of some of the troubles experienced with high compression motors is one of the matters to be relied upon, and even if the scale is not baked on it will have substantially the same effect. In certain parts of the country, notably in the vicinity of the Great Lakes, this question of scale (deposits) is uppermost.

(To be continued)

Grease or Oil in Transmission Gears?

By H · L · Towle

WITHOUT a doubt the duty imposed on the transmission gears of an automobile, including the bevel gears, is more …ere in proportion to the size of the gears than that encoun…ered in any other class of machinery. The steels used for these …ars are among the strongest and toughest known in order to …sist breakage, and the toothed faces are brought to a file-like …ardness to resist wear. The pressures per square inch between …e teeth are greater than those of almost any other bearing sur…es, and in spite of their hardness wear is more rapid than …uld be considered permissible in bearing surfaces of other …sses. As it is only the lubricant which prevents these gears …m reducing each other to a powder in a short time, the char…er of the lubricant is a matter of considerable importance.

…f there were no other consideration involved one might say …hout hesitation that a fairly heavy grease would most effec…ely protect the gears from wear. Undoubtedly where grease …n be used it is the most suitable lubricant. Nevertheless, it is … most cases necessary to consider not merely the gears, but …e bearings as well, as usually these depend on the same lubri…nt as the gears. The selection of a lubricant is therefore fre…ently a compromise between conflicting interests.

…f the bearings of the gear case are anti-friction throughout—…ter yet, if they are not only anti-friction, but separately in…sed and packed with vaseline—one may safely treat the gear …ication on its own merits, and the choice will probably fall … a grease of medium consistency with a moderate amount of …ng." The purpose of the cling is to prevent the gears from …ing a path in the grease and therefore turning in empty space. … the other hand, in some transmission greases observed the …g is excessive, and the drag due to the churning action cannot … being considerable. If the grease is just soft enough so … it will not quite hold its shape it will continually settle to … bottom of the case and keep the gears supplied. It is not …essary that the case should be filled to the level of the shaft, … only that the smallest gear should dip an inch or so into … grease.

…orm of Bearings Influences Lubrication—All this assumes … there is not a plain bearing anywhere in the gear case. In …y otherwise anti-friction transmissions, however, there are … plain bearings. One is the reversing pinion bearing, and the …er is the bearing by which the squared shaft enters the main …ing pinion. As the reverse gear is seldom used, and then … for a few moments (unless one breaks the first speed and … to back up hill), the present writer is not prepared to affirm … a plain bearing at this point prohibits the use of grease. …lly this bearing is supplied through one or two holes drilled … the pinion at the base of … teeth, so that oil or grease … forced in when the pinion is … mesh. It is fair to suppose … grease may be used if … holes are not too small. … other bearing, however—…de the main driving pinion …ust be well lubricated be…d peradventure, and if it is … the plain bushed type, the …al one or two one-eighth …h holes drilled at the base of … pinion teeth are far from …ficient to induce grease to …ter in sufficient quantities. … plain bearing at this point, …erefore, definitely debars grease. In many recent cars, this fact is recognized and anti-friction bearings are employed. Fig. 1 is an example. The shaft *A* is connected to the clutch, and shaft *B* carries the forward universal joint of the propeller shaft. The end *C* of shaft *B* turns in a bearing of long rollers of small diameter inside the main driving pinion *D*, which is formed on an enlarged portion of shaft *A*. *A* runs in a taper roller bearing, and is steadied against possible rocking by shaft *C*. In other constructions a pair of annular bearings is used between *C* and *D* in place of the roller bearing, Fig. 1.

In case grease cannot be used in a gear case, the usual alternative is gear case oil, which is a low-priced grade of steam cylinder oil to which tallow has been added to give it as much body as is consistent with ability to flow. It is not a bad plan to add a small quantity of graphite to gear case oil, as experience seems to show that the graphite prolongs the life of plain gear shaft bearings considerably by giving them a glaze which helps them to resist the cutting action of small particles of steel worn off from the gears and floating in the oil. Caution must, however, be used not to add too much graphite. About one-half teaspoonful to the quart is sufficient. An excess is liable to clog the bearings or oil grooves.

Jack Frost Calls for Oil—In cold weather it is sometimes necessary to thin gear case oil to counteract its tendency to thicken by degrees after it is put in. Unless the oil will flow, it is worse than grease. A suitable quantity of cheap machinery oil or even kerosene may be used as a thinner.

Allusion was made just above to the grit worn from the gear teeth. This grit is a factor demanding serious recognition, as it is impossible to prevent the gears from wearing at a rate which even at the slowest would be considered quite inadmissible in ordinary shaft bearings. The steel powder thus ground away is more or less supplemented by actual pieces or fragments knocked off when the gears are shifted, and forms an abrasive which would be admirable if it could be applied to a useful purpose. It seems impossible to prevent this grit from entering the bearings to some extent. Attempts were made in cars of a few years ago to oil the gear shaft bearings (which were plain bushed) by separate oil pockets with oil rings or chains. The results were unsatisfactory, as it was difficult to keep the oil pockets filled and the grit-laden oil from the gears persisted in working along the shafts into the oil pockets, cutting the bushings as it did so. The attempt to use grease in the shaft bearings would probably have been successful if the owners of the cars could have been persuaded to keep the grease cups filled, but their neglect to do this necessitated a hunt for a more nearly automatic system. It seems impracticable to use oil so thin that the grit will settle (except the heaviest chips), and the best alternative appears to be using grease, if possible, for its protective effect on the gear teeth, and using bearings of such form as permits grease lubrication. As already stated, any form of good anti-friction bearing falls in this class, although it may be surmised that ball bearings are better than roller bearings, owing to the chance they give small solid particles in the oil to squeeze out instead of being crushed

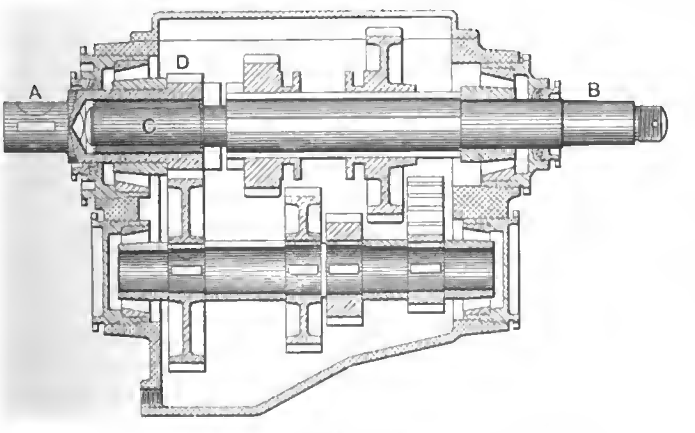


Fig. 1—Typical transmission with roller bearings

between the rolling surfaces. If the principal ball bearings could be enclosed in boxes and packed with vaseline, they might be deemed to be protected as thoroughly as possible, and a few builders of the more expensive cars have gone to this expense, although it must be said that most of them leave the inner faces of the bearings open to the grease from the gears.

Consider the Differential, It Toils Not But Spins Continuously—Let us now consider the bevel gears and the differential. One might be disposed to assert off-hand that these should be packed with grease. However, we are again confronted, as regards the differential at least, with the presence of plain bearings which, if small, are still important. Grease is an ideal lubricant for work of this class *provided* it can be forced to the bearing surfaces either by pressure or by the relative movement of the parts. Bearings fed by compression cups fulfill the first requirement; the majority of universal joints and grease-packed steering gears fulfill the second. But in the bearings of the small differential pinions we have a situation which offers grease of ordinary stiffness small chance to be effective. Figs. 2 and 3 show two typical differentials. The shell *A* has openings of sufficient size to admit grease freely to the bevel gears and pinions within. The pinions run on arms of the spider *B* and have oil holes *C C* drilled at the base of the teeth. The whole arrangement is rotating more or less rapidly, and the tendency of centrifugal force is outward. Of course, some grease or oil will enter the shell in spite of the centrifugal force, but is it not certain that the rolling action of the teeth will force enough grease through the oil holes *C C* if the grease is stiff. It may almost be declared to be the exception rather than the rule to take the differential apart and find the pinion bearings in even moderately good condition. They are usually "cut to pieces," and the thrust washers back of the pinions are not much better off. It is hard to propose a more effectual way of feeding lubricant to these small bearings than by way of the holes *C C*, but in view of this fact it seems clear that oil—as heavy as may be depended on to flow—is the more suitable lubricant.

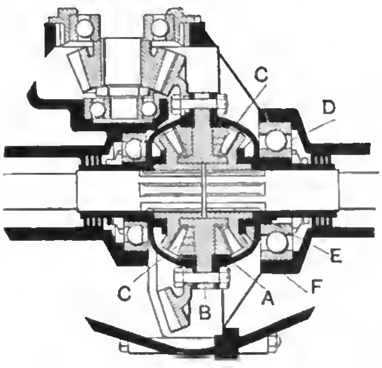


Fig. 2—Differential on ball bearings

In most modern cars, ball bearings *D* are interposed between the sleeves *E* and the stationary housing *F*. In many of the older, and not a few of the modern cars, however, plain bearings are used at this point. This is particularly apt to be the case in chain-driven cars, in which the differential is in the gear box, and the sleeves *E* are extended to a considerable length on each side, one or both carrying brake drums outside the gear box. It is conceivable (though hardly probable) that if grease be used here the external bearings of the sleeves *E* in the stationary bushings will be properly lubricated without special provision being made. But how about the shaft bearings inside these sleeves? The shafts turn relatively to the sleeves whenever the differential is working—and in practice, if not in theory, the differential is working more or less most of the time. If one hunts, he will usually find one or two oil holes hidden away somewhere near the inner ends of the sleeves *E* by which oil is supposed to enter and lubricate the shaft. But any repair man can tell of cut bushings and shafts needing to be reground on account of refusal of the oil to disobey the law of centrifugal force and work in through those holes instead of out. If reasonably fluid oil is used the shafts have at least a chance, but if grease is used they have no chance at all.

Grease That Is Grease—It is, of course, understood that where the word "grease" has been used above, a stiff body is meant —in other words, grease that really is grease. Quite possibly it is the recognition of the limitations of grease in such cases as those cited above that has led the manufacturers of certain greases to add to their product so-called greases which are in reality heavy oils, and are sufficiently fluid to feed by capillarity rather than by pressure. As these products are doubtless called grease for trade purposes, no quarrel need be raised with the name. The important thing to be remembered is that where pressure in one form or another—from a compression cup or from motion of the parts themselves—is available, grease is more suitable than oil; but where no such feeding force is at hand, the lubricant must be sufficiently fluid to feed itself by gravity and capillary action. This, of course, refers to plain bearings only.

To sum up, grease is abstractly preferable for gear lubrication to oil, and is to be preferred wherever the gear lubrication is not complicated with questions of plain bearing lubrication. If there are plain bearings to be lubricated by the same unguent that lubricates the gears, oil is almost invariably essential.

Whether grease or oil be used, it must be renewed occasionally when an examination discloses gritty particles floating in it. A simple way to test the oil is to dissolve a spoonful of it in a tumbler of gasoline and strain it through a cloth, when any suspected metal particles will easily be found.

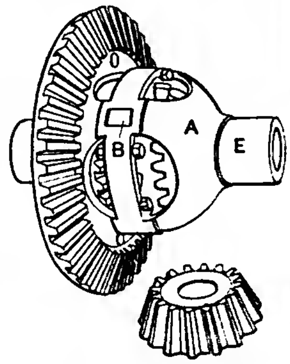


Fig. 3—Spider allows grease to pass

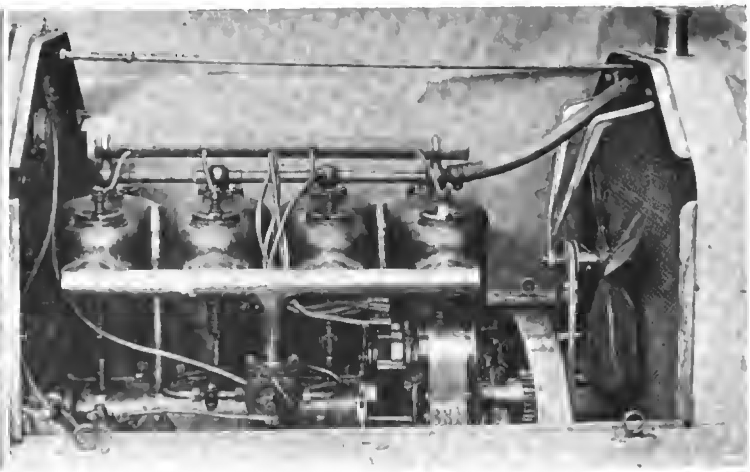
In closing, it should be said that the above remarks apply only to mineral greases. Greases compounded of animal fats have not been considered at all, since while they have their uses, they are distinctly unsuitable for gear lubrication, because of the fact that they remain hard until softened by heat—which heat must generally be engendered by the friction of the rubbing parts themselves. In addition, animal greases are not permanent. They turn rancid in time and form acids very deleterious to bearing surfaces. Where ball or roller bearings are used, grease containing any percentage of animal fats should be absolutely excluded.

FLAME TEMPERATURE OF BURNING GAS

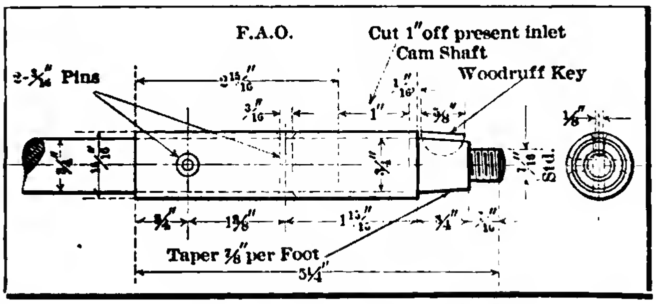
Calorific value of a combustible, as gas made from air more or less saturated with a hydrocarbon, as gasoline, is not all to take into account when reference is had to the intensity of heat, referring, of course, to the sensible temperature. Take, for illustration, hydrogen; a much hotter flame will result if the hydrogen is burned in the presence of pure oxygen than will follow if the oxygen is conveyed into the cylinder with nitrogen, as in air. The number of heat units will be the same in the hydrogen in both cases, but when the air is considered, account must be taken of the nitrogen content, which, it will be remembered, represents 3.35 parts. This nitrogen represents nothing by way of calorific in itself, and it has to be heated at the expense of the heat units in the hydrogen. Since the specific heat of nitrogen is 0.24 (approximately) the large nitrogen content has a marked effect upon the sensible temperature of the burning gas. Likewise, "spent" products of combustion, left over from the previous charge, will reduce the temperature of the burning gas, and even the hydrogen itself has to be heated, and the net result is a lowering of temperature. These events might be looked upon in the light of an unmixed evil, but account must be taken of the heat that would pass off to the water-jacket in excess of that which now passes off that way were the sensible temperature increased, as it would be in the absence of the very nitrogen to which allusion is here made. In view of all the influences, the right plan is to strike a happy medium, rather with the expectation that, on the whole, the best results will follow if no one point is accentuated at the expense of the other and equally important details.

How I fitted a Magneto to a Small Runabout

By Joseph Tracy.



IT is to be remembered that I have always been an advocate of magneto ignition, not alone on the racing cars that I have driven, but also on all kinds of touring cars, so when I became possessed of a Model "S" Buick which was fitted with battery ignition I at once became obsessed with the idea of converting it into a car having magneto ignition only. My Model "S" Buick is a runabout, carrying two people, and the motor is of the 4-cylinder type, developing 24 hp. I use it largely in the streets of New York for business purposes, in the vicinage of Automobile Row. The car, which is one of the first of this model produced



Sketch of Necessary Machining on Camshaft

by the Buick Company, has had steady and strenuous service, but now that I have changed it from battery ignition to an up-to-date magneto system I feel that others might be interested in the way in which I did it, and hence this story and the copies herewith of the six mechanical drawings showing the change, accompanied by a photograph of the right side of the motor.

Now, there are three systems of high-tension magneto ignition in vogue—the single system, the magneto alone, as the sole source of current supply; the dual system, which embraces the magneto and the battery system combined through one set of plugs, wires and a switch, and which really might be called a system and a half, but in a mechanical sense rather than in a derogatory sense. The third and last system is the double system, which embraces two complete systems, a double set of plugs, a double set of wiring, a magneto and a battery, so that either can be switched on at will, as in the dual system. I decided to install a simple, single system, and finally selected the U. & H. Master Magneto of the C B 4 type for the alteration.

This magneto is of the true high-tension type, and no coil is necessary for its operation. It not only furnishes the high-tension current, but times and distributes it so that the spark occurs in the proper cylinder at precisely the right time in relation to the piston travel. Thus the entire ignition apparatus necessary to operate the motor consists of simply the magneto and the spark plugs in their respective cylinders.

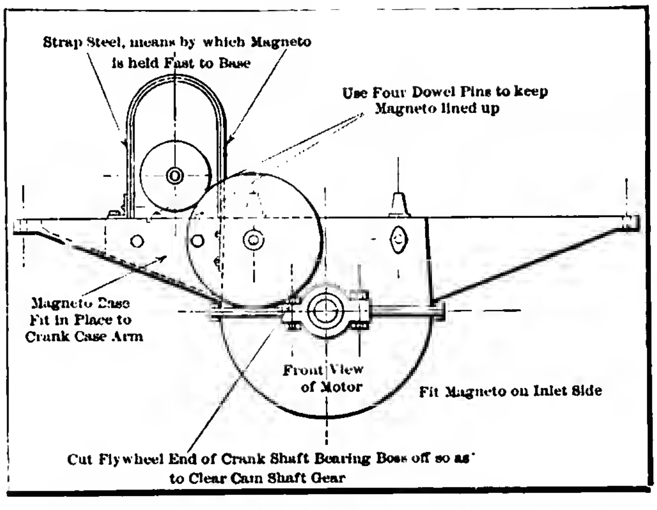
The spark delivered by this magneto is entirely different in its character from the spark produced either by battery and coil systems or by magnetos which employ a separate coil to transform (or step up) the low-tension current they generate. It is not a mere spark leaping across the gap of the spark plug, but an actual arc flame, which plays across the gap for an appreciable length of time.

The principles upon which this magneto operates are not new, having been in use for a number of years, in which time the superior igniting qualities of the spark and the absolute reliability of the system have been thoroughly demonstrated.

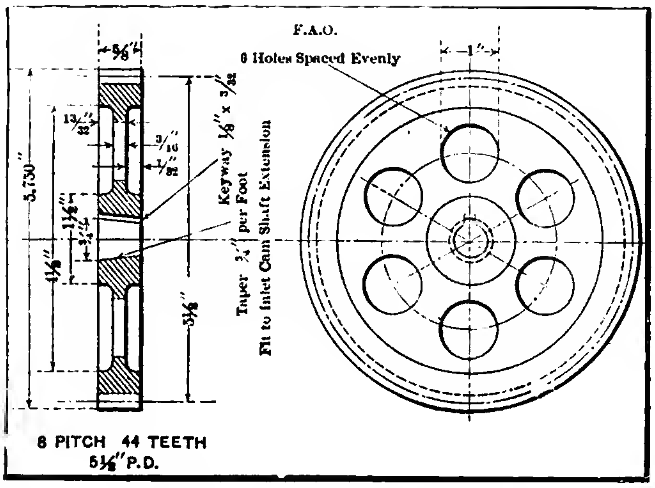
The photograph shows the method of wiring, which consists only of one wire for each cylinder leading from the magneto directly to the spark plug, and a single wire leading from the magneto to the switch on the dash, the four wires being first carried in a hard, red fiber busbar, as shown, on the top of the motor, and from there branching out to each separate sparking plug.

For the detailed plans of the alteration I refer the reader to the six clear reproductions of the original drawings shown herewith, because, in the language of the specifications of the Patent Office, to those familiar with the art they will be readily understandable, and any good mechanic who can read a drawing should be able to thoroughly understand them.

In looking the car over before commencing to make notes for the drawings, I found that the only alterations to be made would be on the right-hand side of the motor. Here the main feature in the way of placing the magneto was the shape of the curved gas inlet manifold. I removed this and replaced it with a perfectly horizontal one, as shown in the photograph. Having no further use for the battery, which was carried under the rear turtle deck, I removed that also. The coil was removed from the dash, and as the magneto carries its own timer internally, I removed the timer and covered up the shaft hole in the crank case with a plate cover, bolted on, as shown in one of the draw-



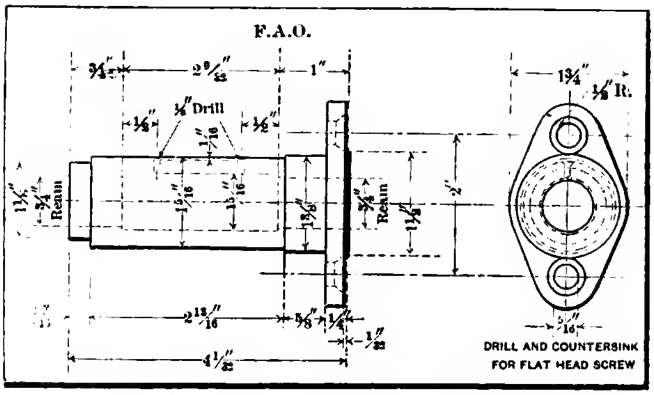
Drawing to Show General Scheme of Magneto Fitting



Detail of New Camshaft Gear Required

ings. The extension of the cam shaft which carries the gears to drive the magneto I carried out through a blind hole in the forward end of the crank case, and all that was necessary to do there being to remove the cover of the hole. The bed plate in the arm of the crank case, on which the magneto rests, I made of bronze, and after having everything fitted I found that it was as easy—a quarter turn sufficing—to crank off the motor on the magneto as it was previously on the battery, and that has been my experience ever since.

In order to prevent "joy" riding on my car in my absence, I fitted a little Yale lock on the dash, which locks the bonnet in place so that it cannot be opened; it also cuts out the ignition service, and, as I have the only key for the lock, the car cannot



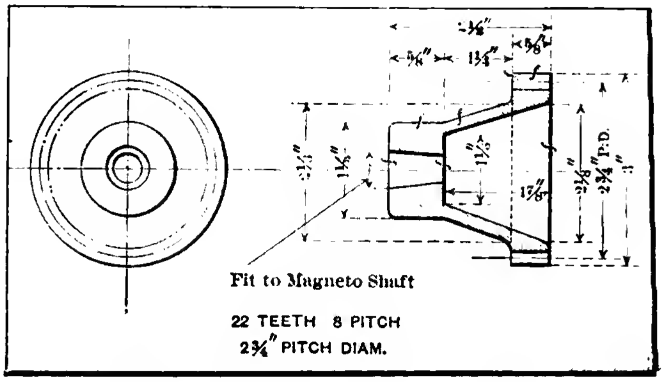
A Flanged Driving Sleeve Is Also Used

be used; and even if this system could be tampered with, I added a French oscillating odometer in a sealed glass case on the dash, which works on the well-known principle of a pedestrian's pedometer, so that the slightest movement of the car will register from the odometer. Beyond all this I did nothing else with the car except to take the steering wheel column a little more toward the rear, giving the car a much more sporty and racy appearance, and placing the steering wheel closer to me, with its gas throttle lever; the spark lever I cut away as useless for fixed ignition. I might further add that a coat of light gray paint which is so fashionable, some black striping and a coat of good varnish have made the little car very presentable, and with its up-to-date ignition system I find it attracts a great deal of atttention, and when the car is standing still and the motor running the magneto driving gears run so quietly and with so little vibration of the bonnet as to deceive many experts along Automobile Row, who doubt very much indeed that the motor is running until a lifting of the bonnet reveals the fact. It also demonstrates to their satisfaction that the U. & H. Magneto is able to produce a good spark when running at an exceedingly slow speed, besides always starting on a quarter turn without spinning the motor.

Any good mechanic can follow out my lines and plan of operation, and the plan may be adapted to use it on many makes of cars where it is desired to change from battery to magneto ignition, and thus bring the car up to date.

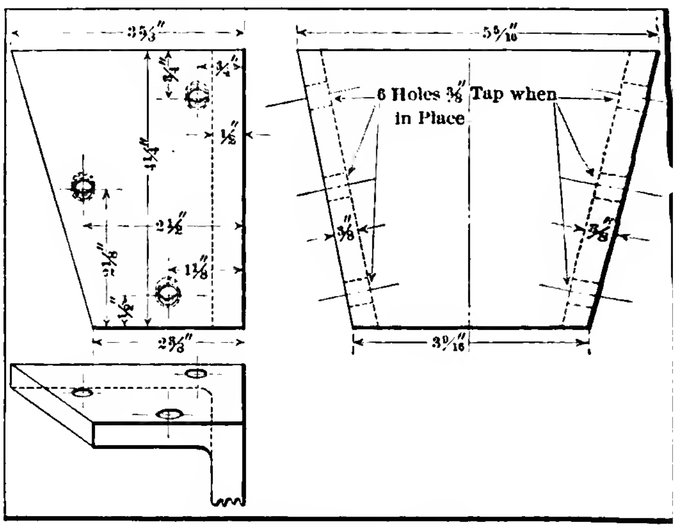
SAFETY IN CONNECTION WITH PRESSURE

Sometimes the exhaust pressure from the motor cylinders as it is led to the gasoline tank is "flaming" and to assure safety it is the custom to pass the exhaust gas to the bottom of the gasoline tank, so that the flame will be quenched in liquid gasoline before the gas is allowed to rise in the tank to the space above the liquid. A further measure for safety consists in placing a copper screen, of close mesh, and two or three layers deep, in the system at the entrance of the gasoline tank, as well as the same kind of a safety device in the reducing valve at the cylinder of the motor. True, the atmosphere in the gasoline tank, as it usually obtains, is non-inflammable, due to the en-



Magneto-Driven Gear Has an Odd Shape

riched condition and the lack of oxygen sufficient to support combustion. On the other hand, it is not considered safe to depend upon the non-explosive characteristics of the atmosphere in the tank, especially in view of the prospect following the time when the gasoline will all be used up, excepting the remaining vapor in the tank, which might then become lean enough to take fire. The screen built on the principle of the "Davy" lamp assures safety if it is of copper, about 120 mesh and about two layers deep, free from seams, and put on without solder which will melt in the heat it will encounter. The tube should be of steel, perforated with small holes.



Bronze Bed Plate for Magneto

AUTOMOBILE SPRINGS AND THEIR CHARACTERISTICS

INVESTIGATION and practice of the members of the Association of Licensed Automobile Manufacturers as to the springs which carry their car bodies and frames make a very interesting tale. Many grades of metal, domestic and foreign, have been used, including chrome nickel steel and steel containing chromium combined with tungsten, vanadium, etc. With special alloy steel, a very superior article can be produced provided the requirements of heat treatment are followed. By some it is advanced that silico-manganese steels will endure longer than high carbon steels. Springs of certain specific analyses are to-day being made which will successfully withstand any test to which they would be subjected.

Typical practice is to have the proper ingredients in the initial product, insisting upon a strict maintenance of this standard when the product is delivered, following with a standardized method of treatment all the way through, including the requirement that the spring will take only so much set under the first test and then stay there. It is necessary to have the furnaces, in which the steel is treated, under pyrometer control, with very slight variation in temperature allowed; and with a so-called "soft" heat, not harsh or severe, as to which the kind of fuel employed is important. The most commonly used heat treatments are annealing, hardening, tempering, hardening and annealing, double annealing, and double hardening and annealing.

It is contended by some producers that a spring with the least arch, that is, the nearest flat, is the safest spring, if enough room for the proper amount of deflection is reserved. This is on the theory that the greater the arch the greater is the fiber strain in a spring.

In connection with front springs, one authority states they should, to preserve proper resiliency, not be thicker than their width; should be fairly stiff, with a maximum deflection of not over one-quarter of an inch per hundred pounds; not off-centered, and have the front eye set higher than the rear eye not less than one-half inch, this latter preventing the car from ducking. That in rear springs, where the problem is relatively easy, the length and width should be as great as possible, if made scientifically as to the spacing of the leaves, the length of the taper and the grading of the steel. There can be made a spring that will take certain dimensions under a given load, and ten thousand other springs which will take the same dimensions under the same load, but it is essential that they have a large number of leaves of special grade steel, specially tempered, with an absolutely correct grading, so that there will be spring play from the center of the eye to the center of the spring, and, too, it is important to have the strains equal in the section of all leaves.

It has long been seen that the carriage spring steel of the last quarter of a century will not do for automobile springs. And successful experiments of the last ten years have given us various satisfactory designs for automobile springs, securing reliability and ease of riding with lower suspension of the body.

The weight, the speed, the traction feature and the variation of passenger load are elements that never until the case of the automobile existed to the same extent in any one vehicle.

QUALITY IN VALVE SPRINGS IN MOTORS

If the valve is light, and if the spring is properly designed and made of good material, it is desirable to have the spring pressure as low as possible, to abort undue pressure on the cams and the mechanism. In many cases the spring pressure is as high as 45 pounds, and that this pressure is prone to cause rapid wear of the mechanism, is assured. If the valve is made as light as the situation would warrant, providing the design is good and good materials are used in the valve, the spring pressure might be reduced by one-half. It must be remembered that springs will not always remain at the same tension, otherwise it would be possible to consider even a lower pressure than the amount above named. The angle through which the camshaft will rotate while the valve is closing is the matter to be noted, which may be done as follows:

Let

θ = angle of camshaft rotation while valve is closing under the action of the spring.

s = speed of camshaft in revolutions per minute.

W = weight of valve in pounds.

P = mean spring pressure in pounds.

l = lift of valve in inches.

Then

$$\theta = \sqrt{\frac{l\,(s \times W)^2\,W}{0.67\,P}}$$

In general the valve should close within an angle of the camshaft rotation of 15 degrees. This will only be possible when the valve is very light, and with well-designed springs. Many springs are very lazy in action, due to improper design, and it is important to note that it is more than a question of size of wire, and number of turns of the same. Diameter of the spring must be considered. Sometimes springs are damaged by heat, due to placing them in contact with heated cylinder walls. To abort this, it is necessary not only to have the springs correct in design, but to limit the lift of the valve, and contour the cams to engender easy action.

PROPORTIONS OF ATMOSPHERIC AIR

(1) To find the quantity of nitrogen by volume corresponding to one volume of oxygen, multiply by 3.77092.

(2) To find the quantity of oxygen by volume corresponding to one volume of nitrogen, multiply by 0.265182.

(3) To find the quantity of nitrogen by weight corresponding to one part by weight of oxygen, multiply by 3.313022.

(4) To find the quantity of oxygen by weight corresponding to one part by weight of nitrogen, multiply by 0.301839.

(5) To find the quantity of nitrogen by volume corresponding to one part by weight of oxygen, multiply by 2.6365411.

(6) To find the quantity of oxygen by volume corresponding to one part by weight of nitrogen, multiply by 0.2730071.

(7) To find the quantity of nitrogen by weight corresponding to one part by volume of oxygen, multiply by 3.6629154.

(8) To find the quantity of oxygen by weight corresponding to one part by volume of nitrogen, multiply by 0.3792848.

Formula for correcting the voluume of gases for temperature and pressure:

$$\frac{V}{V^1} = \frac{(273 + t)\,P^1}{273 + t^1\,P}$$

When,

V = original volume.

V^1 = corrected volume.

t = original temperature in degrees Centigrade.

t^1 = final temperature in degrees Centigrade.

P = original pressure.

P^1 = final pressure.

273 = absolute temperature in degrees Centigrade.

Absolute temperature, if measured in Fahrenheit units, instead of in Centigrade, as above given, would be 491.13 below the melting point of ice. The volume of a perfect gas increases 1/273 of its volume at 0 degrees Centigrade for every increase of 1 degree on the same scale. According to this, absolute zero corresponds to the temperature at which the same perfect gas would reduce to nothing.

WEIGHT PER HORSEPOWER

Editor THE AUTOMOBILE:

[1,980]—Will you advise me as to the standard set by automobile builders relative to the horsepower required to carry a certain weight of car. I had a car built using a 24-28-horsepower motor, the car complete weighing 3,200 pounds. The engine does not appear to work properly, don't seem to pull light and does not do the work as it ought. The wheels are 36 inches in diameter and the gear ratio on the high gear 3 1-2 to 1. I have no fault to find with the engine; it is simply a case of knowing if the car is built too heavy. F. G. W.
Pittsburg, Pa.

To arrive at any such figure as you desire, it will be necessary to assume a basis of figuring power, since different makers rate their engines differently. If, then, the A. L. A. M. rating formula is used as a basis, some figures may be given which allow of intelligent comparison. The matter of weights is not in the same category, however, since some unscrupulous manufacturers understate the car weight, others only approximate it, while a third class intending to give it correctly, do not state whether the given weight includes anything but the bare car or not. So, it is hard to obtain anything reliable in the weight line. The tables given in THE AUTOMOBILE at the time of the shows last winter were made up from information supplied by the car manufacturers, and as such, must be taken with a grain of salt.

Thus from the cars of the A. M. C. M. A., the figures for the class costing $1,000 or less, the average of sixteen different weights is 65.6 pounds per horsepower. The lowest figure was 45.8 pounds and the highest 141 lbs. The average horsepower in this class was 19.5 and the average weight 1,280.

In the class $1,000 to $2,000, there are 54 cars of different weight, of which the average is 1,985 pounds, the average power 29.2, and the average weight per horsepower 68.1, which is a slight increase over the cheaper cars. The lowest figure for this was but 44.4, and the highest 91 pounds, the range not being as great as before.

Class $2,000 to $3,000 includes but 28 cars of varying weight, of which the average is 2,510 pounds. The average power is 38.3, from which the average weight per horsepower is found to be 65.4, the lowest yet found. In this class, the lowest was 46.3 pounds, and the highest 167 pounds. The latter was a car having an unusually long stroke, 1.46 times the bore, and would not class with the others for this reason. Eliminating it, the highest weight is 86.0, so this class has also the lowest range of weight values.

Next in order comes the class $3,000 to $4,000, in which are found but 26 cars. These average in weight 2,980 pounds and 41.6 in horsepower. The average weight per horsepower is the highest yet at 71.8. The range of values is also large, 52.5 pounds for the lowest and 107.5 pounds highest. The greatest power was 54.1 and the lowest 25.6. The greatest weight was 3,500 pounds and the lowest 2,250 pounds.

Combining all other cars into one class above $4,000, only 21 are found. The power of these varies from 32.4 up to 72.6, while the weight may be anything between 3,100 pounds lowest and 4,400 pounds highest. The average horsepower is 49.7. The weight averages at 3,550 pounds. Dividing one by the other, the average weight per horsepower is 71.4, lower than the previous class. The range of weight values was from 48.2 lowest up to 111 highest, this being on a limousine.

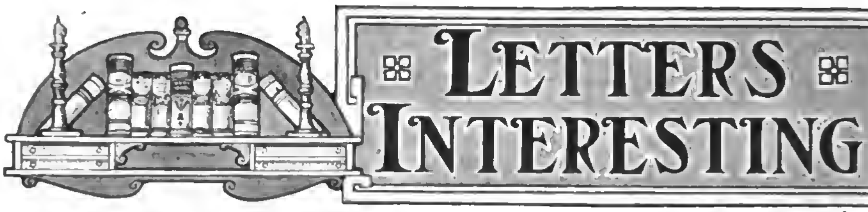
Summing up the whole five classses into a grand total, there are 145 cars, varying in weight from 900 up to 4,400 pounds and in power from 6.4 up to 72.6. The average weight was 2,418 pounds, the average power 35-horsepower, and the average weight per horsepower, the desired quantity, 69 pounds. Incidentally, the least weight per horsepower was 44.4 pounds in the second class, and the highest 167 pounds in the third class, next to which comes 141 pounds in the first class.

Viewed in the light of the above figures, your car is slightly underpowered for its weight, as you thought. The motor would be rated at 28-horsepower, which makes the weight per horsepower 114 pounds, as against the figure of 69 pounds above. Taking the latter into the weight of your car, and allowing 100 pounds more weight for the larger engine, your car should have a 48-horsepower engine. This will be obtained, according to the rating formula in a four-cylinder engine of 5 1-2 inch bore and in a six-cylinder motor of 4 1-2 inch bore.

MORE WHITE ENGINE

Editor THE AUTOMOBILE:

[1,981]—In reading over your valued publication of date, August 5, we notice the letter from B. F. Ulmer in regard to our rotary valve engine. Now, we are very sorry that this got into print, for we have been trying to keep it a secret until we had developed it to a state where we could place it on the market in competition with the poppet valve engine. Since something has been said about it, we will add that it was built solely for experimental purposes, to determine the relative efficiency of the rotary and poppet form of valve. The results obtained were very satisfactory, but as yet we are not ready to give out the details, other than the fact that the valve is placed directly in the head of the cylinder, which position permits of a spherical combustion chamber. In this way we are able to get a valve opening of 4 1-2 square inches on a 3 5-8 inch diameter of cylinder. We have in course of construction an engine which we hope to exhibit at the automobile show here next fall, which will dispense with all poppet valves, cams, springs, packing, water pumps, water connections, radiator, and many other parts. This engine is almost silent, or as near so as a dynamo. You will note from our description above that there is nothing to make noise. We developed the type of valve used by the Frenchman five years ago, but discarded it for the present one because we are able to get twice the valve opening with the same size. Despite faults, it is superior to poppet valves. Regretting the premature publication of this,
Atlanta, Ga. W. H. and E. F. WHITE.



CONTEST SUGGESTIONS

Editor THE AUTOMOBILE:

[1,982]—As it is proposed shortly to hold another 24-hour race at the Brighton Beach track it would seem as if a special opportunity is offered to those manufactures using air-cooled motors, two-cycle motors and slide valve motors to demonstrate in a convincing and readily understood way that these motors have the advantages claimed for them without the faults which they are commonly thought to possess.

It is true that the vehicles on which they are used have performed well in special tests and in endurance contests, but it is surprising how few users or intending users of motor vehicles know of these performances and many who have heard of them do not fully understand the methods of scoring and cannot appreciate the relative advantages shown by the different contestants.

Moreover, 24-hour contests, in addition to being readily understood by every one and consequently of more general interest, contain less of the element of luck (particularly after the first few hours) than most other contests and less opportunity for deception as the troubles of the contestants can be fairly well seen and any imperfections developed not attributable to mechanical inferiority can be allowed for.

Of course, some makers claim that they do not believe in such contests because of the danger (this has largely been eliminated by the removal of the fences and the provision of fairly level ground for the cars to run on if they leave the track at a turn), but in the opinion of many people this announced belief would possess little weight with these makers if they were more certain of making a good showing.

It would certainly seem as if even a creditable showing of a vehicle having one of the above mentioned motors would benefit its makers more than thousands of dollars spent in special tests, in contests of little general interest and in trying to convince the public by means of claims made in advertisements.

In closing, and in fairness to the most prominent makers of the slide-valve engine car, it might be well to point out that, in addition to its being an imported production, their abstaining from such contests may be due to the fact that it has only lately been marketed by them and they may not have had time to give such contests consideration, particularly as 24-hour races are as yet unknown in Europe. It would, however, be very interesting to have this type of car entered and even if it could only be arranged to enter one of the vehicles which have been imported for private parties it would seem as though the makers would benefit, as any handicap under which it might be operated would be, to a great extent, considered by the public. A. E. OSBORN.
New York City.

While suggestions of this sort are always welcome, it is rather difficult to see how a contest of the kind proposed above, namely, a 24-hour race between cars with air-cooled, two-cycle, and slide-valve engines, would serve any useful purpose. Unless we are very much mistaken, the races as planned are intended to bring out the merits of a number of competing cars, that is, cars which are natural competitors, aside from the matter of price. The cars mentioned do not compete with one another, but rather each stands in a class by itself. So, it would appear that such a contest would not fill in the simple matter of number of entries. Who could blame the makers of air-cooled engines for not caring to pit their product against two-cycle motors, or either one of them against the newest wonder, the slide valve engine?

ANSWERED AND DISCUSSED

CHAIN OR SHAFT?

Editor THE AUTOMOBILE:

[1,983]—Will you please advise me of the relative merits of the two following forms of construction: two-cylinder opposed engine set lengthwise of the car and driving by chain, and two-cylinder opposed engine set crosswise under the hood, driving the car by shaft.

Now that I have disposed of my single-cylinder car, it behooves me to advance one cylinder towards the four and my preference has been for the last mentioned car until recently, when a local automobile man undertook to convince me of the superiority of the former type of construction. He says that the last named method of placing the engine does not allow it enough room, and that, having a lack of room, it will also lack both speed and power, because it hasn't room enough. Similarly, the engine of the form first mentioned happens to have a slightly longer stroke, which he claims will give more power, therefore the car with that engine will travel farther in a day's run than a car equipped as in the second case.

In other words, I would appreciate your opinion of the relative merits of a two-cylinder engine placed in the two different positions. Also, what other considerations go with a two-cylinder engine that might make for or against speed and power? Why is a four-cylinder engine so far superior to a two? F. K. GREEN.

Louisville, Ky.

Your friend was wrong, radically wrong when he said that a lack of room for the engine would prevent it from developing either power or speed, for the engine could be hung on the roof, carried in your arms or put into any old position, whether there was room enough for it or not, and it would develop the same amount of power from a given quantity of fuel. So, if the fuel supply was all right, the position would not influence the power output in the least.

Your friend was also wrong when he stated that a longer stroke engine would carry a car a farther distance in a day than a short stroke. As a matter of fact, if the gear ratio was the same, the shorter stroke would carry your car farther, since to develop the same power necessary to propel the car the short stroke motor must turn over at a higher number of revolutions per minute. Consequently, this form of engine would carry the car farther in a given time. If the gear ratio of the car having the motor with the longer stroke were altered to compensate for the lower speed of rotation, the two cars would travel the same distance, always granting that the two engines were equally well made, so that the fuel economy would be the same.

Speaking of the stroke alone, without regard for the car or the gear ratio, the long stroke engine is supposed to give more power than the short stroke. That is regardless of speed, but seeking power and maximum power alone, a 4 by 6 engine will give more power than either a 4 by 5 or a 4 by 4 engine.

The real argument in the two cases you cite seems to be the relative merits of the chain and shaft for final drive, since the two engines were placed as you found them for the purpose of obtaining the different drives, across the car for shaft drive, and parallel to the axis of the car for chain drive. So, it is a question of chain or shaft, which? Chains are said to be more efficient than either spur or bevel gears, yet nearly 90 per cent. of the automobiles made to-day are shaft drive. This shows that other considerations enter into the matter than just the mechanical efficiency. Thus, chains are noisy, shaft is quiet; chains are very difficult to enclose satisfactorily, and when so enclosed are difficult to adjust and otherwise attend to; shafts are easy to enclose, in fact, all of them are found enclosed on the cars to-day. When not enclosed, chains gather dirt and thus wear rapidly; shaft being always enclosed does not gather dirt and dust, thus outwears chains. Less wear means less adjustment and less care. Chains are hard to lubricate; most shafts are packed in grease or oil, and are self-lubricating. If one of the chains break, on a double chain driven car, it is helpless, and must be towed home. So, too, with a single chain drive, but with a shaft drive, this seldom if ever happens. That is, it very seldom happens that a derangement of the propeller shaft puts the car out of commission.

To go back to the two different engine locations, the fore and aft one would seem to have some disadvantages not previously mentioned. Thus on climbing a steep hill, the front cylinder rises and the rear one falls relative to the crankshaft center line. This would conduce to poor lubrication within the cylinders, as the oil in the rear cylinder would all flow into the cylinder head, the lowest point, where it would mix with and dilute the incoming mixture, while the lubricant in the front cylinder would run to the low point, which is the crankcase, resultiing in both cylinder bores being without oil, or one without any and the other flooded. The engine placed across the frame would not be subject to this annoying trouble.

A four cylinder engine is superior to a two, just as a two has the advantage over a single cylinder, and as a six has "it on" a four, in the frequency and regularity of firing. That is, considering any two revolutions of the crankshaft, the single cylinder has one power impulse; that is, fires once. The two cylinder engine gives two impulses; the four produces four power strokes, and the six, six. As each revolution means two strokes, two turns will be four strokes. The four engines compared, then (if of equal power), will give: one tremendous power stroke in every four; the two cylinder produces two power strokes in four, each therefore being of lesser magnitude; the four cylinders turn out four still smaller impulses in four strokes, one per stroke; while, lastly, the six is so constituted as to produce six power strokes, an average of one every two-thirds of a stroke, and all of still smaller size than those of the four. You can readily see that the smaller the impulses and the more frequently they occur, the more quietly will the engine run, and the smaller will be the wear and tear on the whole of the mechanism.

CEMENT FOR RUBBER

Editor THE AUTOMOBILE:

[1,984]—Will you please let me have several formulas for cement to be used in patching inner tubes. M. H. P.

Newark, N. J.

In any cement for rubber, the cement must come in contact with the rubber, which result is obtained by brushing the surface with naphtha. This softens the rubber, and when partially evaporated leaves it in as nearly favorable condition for adhesion as it is possible to get.

Among the many cements used in rubber manufacture is marine glue. This consists of a pound of the crude rubber (caoutchouc) to one gallon of coal-tar naphtha and twenty pounds shellac, heated gently and poured upon metal plates to solidify. In using, small pieces are melted at 250° Fahrenheit. If required in a liquid form use more naphtha.

A good gutta percha cement is made of two parts of common pitch and one part of gutta percha, melted together and well stirred. When ready this is poured into cold water, which transforms the cement into a hard, brittle substance. To use, this is softened by heating, and at 100° Fahrenheit is a thin fluid.

The basis of nearly all good cements used in tire repairs is either india rubber or gutta percha dissolved in any one of the common solvents, which include benzine, carbon-bisulphide, chloroform and ether. Various other ingredients are necessary for a good cement, as, for instance, if quick drying is desired, some form of dryer is added, and to attain tenacity still other gums, such as rosin, mastic, gumlac, are used.

PLANS FOR A GARAGE

Editor THE AUTOMOBILE:

[1,985]—I want to get plans and suggestions for a small garage which I am about to build. Have you published anything of this kind? If so, kindly send it along. H. M. W.

Dayton, O.

No, we have not published anything that will help you in this matter, but a garage article now in preparation will cover all of the present tendencies in garage construction, and will doubtless furnish you the information you wish. All materials will be dealt with, for the man who wants to build. It will be complete in several numbers, beginning in an early issue.

TWO AND FOUR CYCLES

Editor THE AUTOMOBILE:

[1,986]—Will you kindly inform me through "Letters Interesting and Instructive" just what is meant by two-cycle and four-cycle engines. There are so many different opinions about this that I am very much puzzled to know which is which, and would be glad to have you give me something definite and something upon which I can depend.

Plattsburgh, N. Y. H. J. LANGLOIS.

The difficult thing in this explanation is to make it so simple that anyone, whether versed in mechanics or not, can readily grasp the idea. You doubtless know that in the operation of a gasoline engine there is a regular succession of events, which must occur in the same regular, unvarying order every time. This is called a cycle of events, or, for short, a cycle.

Now automobile engines may be so constructed as to have this cycle take place in varying lengths of time as determined by the number of strokes made by the piston. That is, the cycle may be completed in two strokes, or in four strokes. In the former case the engine is said to work upon a two-stroke cycle and is called a two-stroke cycle engine, the word stroke usually being omitted. In the latter case when the cycle of events is completed in four strokes, the engine is called a four (stroke) cycle engine. There is also an engine built which operates upon a six-stroke cycle, but not being in common use this is not worthy of further attention.

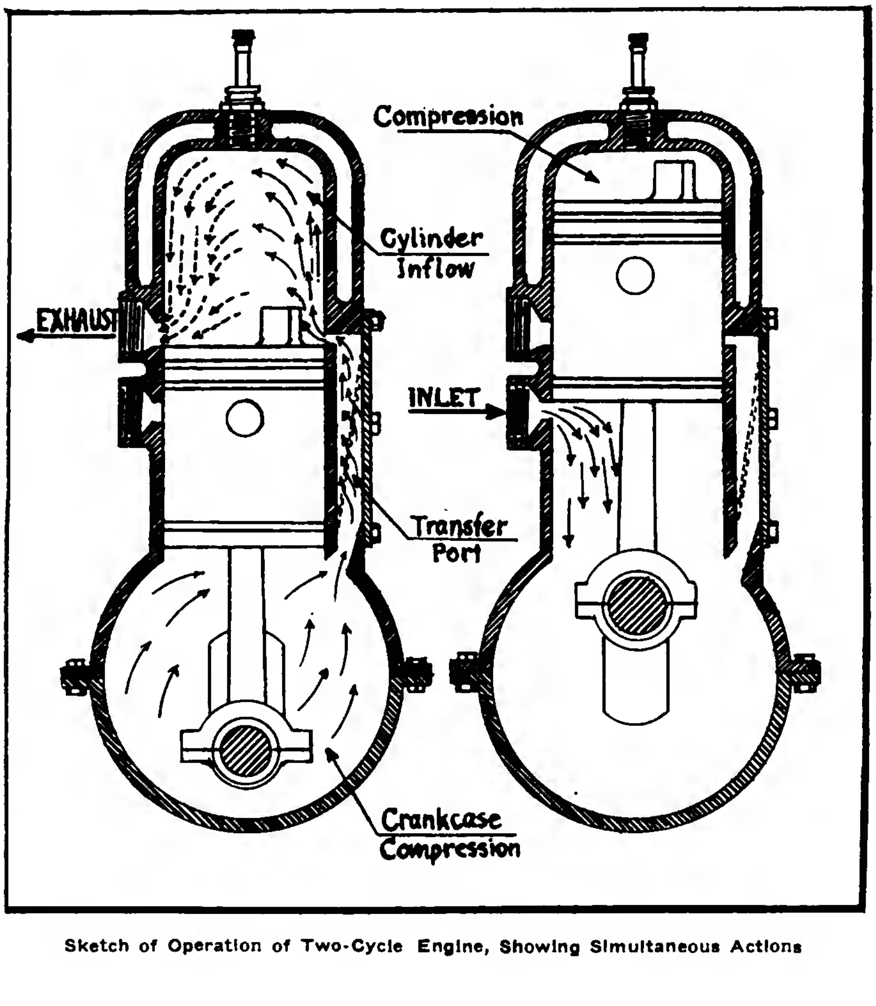
The cycle of events and the order in which they happen is as follows:

1. Suction, or drawing of the fuel.
2. Compression, or increase in the pressure of the fuel mixture.
3. Expansion, following the firing of the compressed charge.
4. Exhaust, or cleaning out the cylinder, so as to resume the first operation, or to allow of repeating the cycle of events.

In the four-cycle engine the first down stroke completes the first action (1), that is, the downward motion of the piston causes a partial vacuum into which the fuel rushes. The stroke being completed and the cylinder filled with gas, the return stroke compresses the charge, action number (2). A spark is then made in the cylinder containing the compressed charge, which burns or explodes more rapidly for having been compressed. In burning or exploding, the gases expand and drive the piston down the second time, this being action (3), and the only useful part of the whole cycle, in so far as producing power is concerned. At the close of this stroke, the cylinder is filled with burned and consequently useless gases, which the ensuing upstroke pushes out into the air or at least out of the cylinder, so as to make place for the next charge of unburned gas. This is action number (4), and concludes the cycle.

In the two-cycle engine, all this takes place in two strokes of the piston, one up and one down, just half the number necessary in the four-cycle. As the cut shows, the left-hand view is that at the close of the expansion the burned gases are exhausting through the exhaust pipe, while *at the same time* the fuel is entering the cylinder from the crankcase, where it has previously been partly compressed. The other view shows the condition just previous to expansion, and at the time when the spark is made to ignite the charge. The fuel in the cylinder has just been compressed, while *at the same time* the fresh charge of fuel was drawn into the crankcase base. The *italics* indicate that to perform the needful actions it is necessary to double up, and it is this doubling up which has held the two-cycle engine back, for with two things taking place in the cylinder at the same time it is hard to say when the one stops and the other commences. This is highly important, as may be seen from a single instance. Thus, how is it possible to stop the fuel from following the exhaust out of the cylinder and in this way waste some of the fuel? Or, on the other hand, how is it possible to have all of the burned gases expelled from the cylinder, so that none of them remain to dilute and render useless part of the simultaneously incoming fresh fuel?

Be that as it may, there is a power impulse on every down stroke, while in the four-cycle engine there is a power impulse on every other down stroke. This statement would lead a person to think that a two-cycle engine would develop twice as much power as a four-cycle of the same dimensions, but such is not the case. Far from it. The very best of two-cycle engines will not develop much over one-fifth more power than the same sized four-cycle.



Sketch of Operation of Two-Cycle Engine, Showing Simultaneous Actions

FIRST BLOCK MOTORS

Editor THE AUTOMOBILE:

[1,987]—I am an American and proud of it. My grandparents on both sides were ditto, and my sense of justice is well developed, I trust. So it grates when I see an able editor giving credit to a foreign country that belongs to America.

On page 70 of your issue of July 8 you give the French credit for originating the block system of casting auto motors. Now I would not take a single bit of credit from them that they actually deserve. They and their good roads have done much for the auto; but bless you, the block method of casting auto cylinders was used on Duryea double cylinders as far back as 1894. It was continued in '95 and '96, and in '97 the triple cylinder was designed, built and sold for the next ten years. In 1897 a four-cylinder Duryea engine was built having the heads, water jackets, valve pockets, and in fact everything but the cylinder shells, in one piece. This is close enough to the present block method to be called a starter even if the others had never been built.

These various motors were mostly of 4 1-2 bore and stroke, but other bores from 4 to 6 inches were tried. They were shown at cycle shows as far back as 1897 and at every New York auto show from the first up to quite recent years. There is no chance to say that they were hidden and not known by the public. It was a two-cylinder block engine which drove the winning Duryea in the first British event in '96 when it defeated the best three rigs of the French race of that year. CHARLES E. DURYEA.

Reading, Pa.

It was not the intention to deprive Mr. Duryea of any credit naturally due him. So, perhaps it should have been said that the French were the first to push the *en bloc* construction, adopting it widely.

IN in the development of models for 1910, the E. R. Thomas Motor Company, Buffalo, N. Y., took into account the lessons taught by the British "Four Inch" race and incorporated the results thereof in the latest production of the big factory on Lake Erie. Prime among the benefits accruing from that particular race was one that the whole automobile world has now learned, the very marked advantage of the long-stroke motor, both in power and in speed, wear being reduced incidentally.

E. R. Thomas has just returned from a five months' tour of the automobile factories of Europe firmly convinced that the most important new feature for 1910 on the other side will be the long-stroke motor. In explaining his company's departure from past practice as exemplified by the relative bore and stroke of the new model, Mr. Thomas had this to say: "By the long-stroke motor is meant one in which the travel of the piston is greater than the diameter of the cylinder bore. Heretofore, most motors have been what is termed short or square; that is, the stroke was either less than or equal to the bore. The long stroke has the advantage that the engine does not have to revolve so fast to deliver its power. Thus, a 4 by 4 engine must run at 1,500 revolutions to develop its A. L. A. M. rating, while a 4 by 5 motor, which is rated the same, would only have to run 1,200 revolutions, and a 4 by 6 would have to make but 1,000 turns."

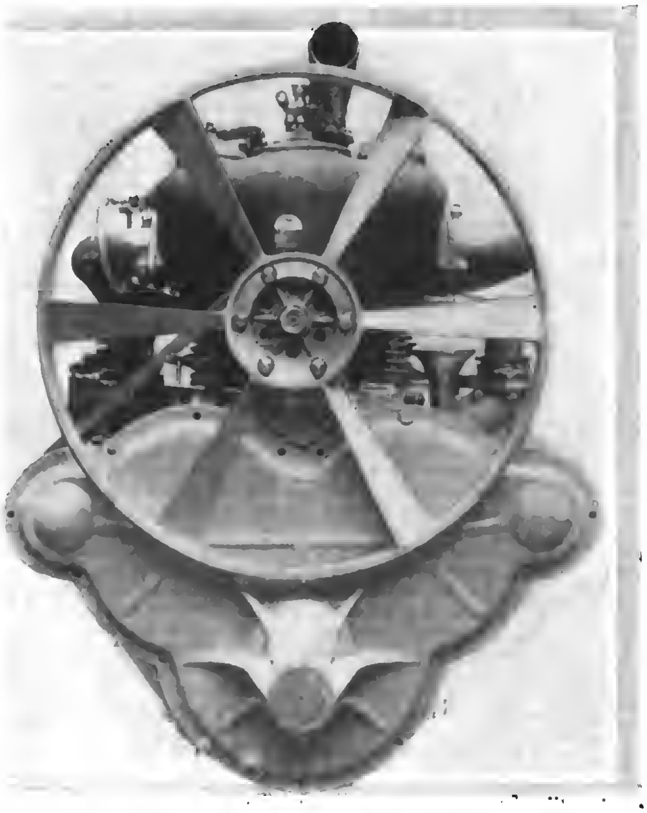
Newest Addition to Thomas Family Will Have Long Stroke—So it is that a new car has been added to the list of Thomases, a little "six," and this will be equipped with a long-stroke motor. The motor in detail is four-cycle, water-cooled, six cylinders, of 4 1-2-inch bore and 5 1-2-inch length of stroke. This gives a ratio of bore to stroke of 1 to 1.22, as compared with the 78 engines shown at the A. L. A. M. and A. M. C. M. A. shows in New York City last winter, which averaged but 1.14 for the value of this ratio.

The cylinders are cast in pairs, another departure from Thomas practice, and are exceedingly well water-jacketed. At the lower part of the cylinder the water-jacket is tapered to force more water to the top and hotter parts and less at the lower cooler portion. Moreover, the valves have been completely water-jacketed, and the stems of the valves are taken care of in the same thorough way. This prevents deformation of either valve seat or cylinder head.

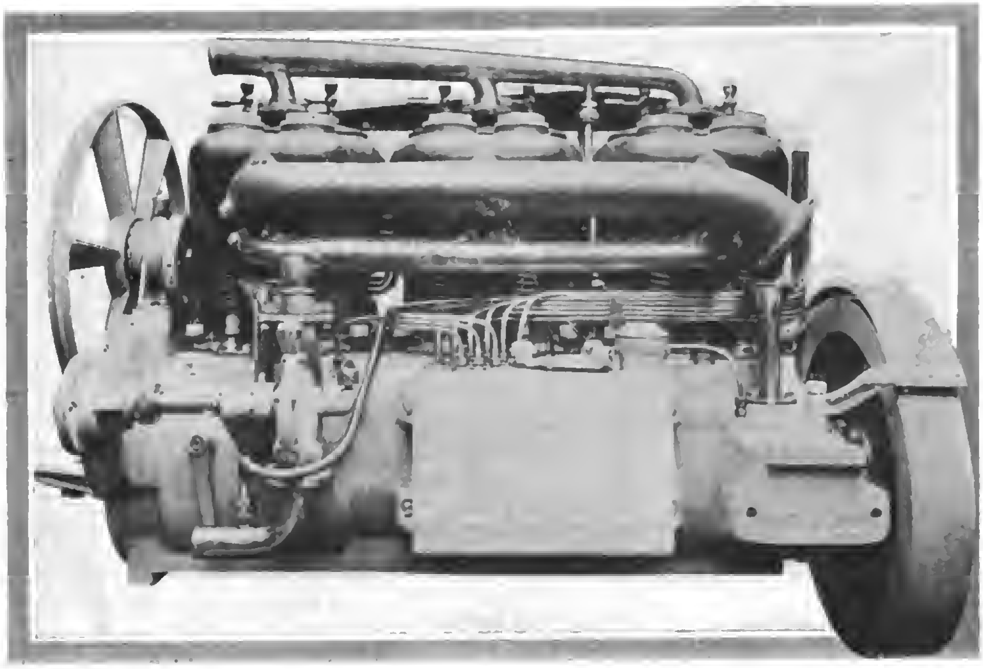
The cylinders are of what is known as the "Tee" head type; that is, they are symmetrical about the center line, the valves being located on opposite sides, inlet on the right and exhaust on the left. This form of construction lends itself well to the use of four bearings on the crankshaft, one at each end and one between each pair of cylinders.

Within the cylinders are placed the long pistons, with many rings. The length of the pistons is actually equal to the stroke, namely 5½ inches, and four narrow piston rings keep the cylinder heads gas tight. The connecting rod is also long, being more than twice the stroke length, that is, 11¾ inches.

Model M, as the newcomer is to be called, has been designed with a full knowledge of the latest foreign practice in large valves, big ports, and easy, smooth gas passages. The clear valve opening is 2¼ inches, or just half the diameter of the piston. The exhaust pipe is a casting of large internal diameter and easy bends; this, in combination with the large valves, serving to clear away the burned gases very quickly. The inlet manifold, on the other hand, is of drawn copper tubing, carefully built up to the required shape by brazing. This makes not only a serviceable job, but a fine appearance as well. When the speed at which



Motor as Seen from the Front Shows Symmetry



Exhaust Side of Model M Long-Stroke Motor, Showing Pump and Oiler

The bolts are of nickel steel. Camshafts are of the same material, while all gears are either steel and hardened or of bronze. Flywheels are usually of cast iron, because it costs little, but the Model M flywheel is of cast steel, which is better adapted to withstand bursting strains. This makes it possible to use a larger diameter also, which is advantageous in the weight; the same weight placed farther from the center of rotation being much more effective, or, inversely, with the same effectiveness less weight may be used if it is located farther from the center.

The crankshaft, being the most important part of the engine, should be given the most care, and, in this case, it is. The material is a high grade of carbon steel, drop-forged and specially heat-treated by crankshaft specialists to bring out the best qualities.

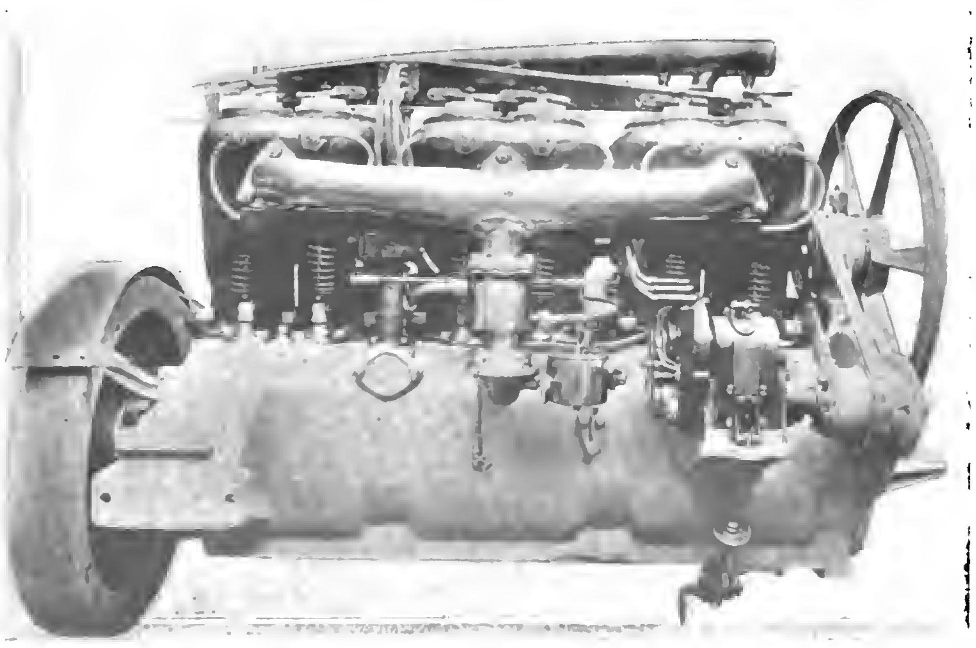
Three-Point Suspension for Crankcase—One of the newest ideas as expressed in this engine is the three-point suspension incorporated in the crankcase. This case is a one-piece casting of aluminum, with two very wide strong feet at the rear and close to the flywheel. At the front the extended crankshaft bearing of the gear-case cover is machined to a circular form and is used for the forward point of support. The front gear cover, as is to be seen in the front view of the engine, is symmetrical about the center, the cam and auxiliary gears being located so as to balance. These shafts also locate the accessories, the shaft on the right side driving the magneto and the fan, while that on the left drives the centrifugal pump. Forward of the magneto, which is strapheld in place, is the pulley which drives the fan, this being of the six-bladed type with a rim, driven by a trapezoidal leather belt. Back of the magneto on the right side is placed the carbureter, and back of that, in turn, but closer to the cylinders, is the Unisparker. This is driven by bevel gears from the camshaft, and is located high up and midway between cylinders four and five.

the gases travel in and out is mentioned—upward of three-quarters of a mile per minute—the importance of the size and proportions of the pipes will be appreciated.

Quietness Obtained in Many Places by Many Devices—One of the places where the noise has been reduced—and they are many—the valve plungers have been provided with fiber inserts, and the clearance reduced one-half of that ordinarily used. This combination makes an absolutely noiseless valve action. Another instance of this is in the gears for the camshaft. These are of steel and bronze, the camshaft gear being a pair of bronze helical gears, riveted together to form a single gear of herringbone tooth outline. This is well known for its quiet running qualities; so much so that the expense of cutting the double gears was not considered. Throughout the motor the materials have been selected with care, as will be seen in a mention of some of them. Thus the piston rings are of special iron developed from an exact cupola formula for this purpose. The connecting rods are of government specification nickel steel, with sulphur and phosphorus together limited to .04 of 1 per cent.

Nothing but the pump is placed on the left, the water entering from below, passing through the pump directly upward into the tapered section copper pipe, which divides, one branch to the rear for cylinders five and six, and one forward for the other two cylinder blocks. The water outlet is on top of the cylinders, just off of center to the left, the compression relief cocks being located on the center. This pipe rises gradually to its greatest height just at the radiator connection, the section increasing at the same time, and in the same way.

The bottom of the crankcase is closed by three handhole plates, these being ribbed to make them stiff, while being of very thin section and light metal, aluminum. The front one has a cored passage across the bottom, to the outer end of which is attached a cock and gauge glass. By reaching down and opening the cock, the oil rises in the glass to the same height as that within the case. If too low, more oil may be added through the vent pipes, of which there are two on the left side, the



Inlet and Ignition Side of the New Engine, Showing Cooling Fan and Belt rear one communicating with the interior through the hollow crankcase foot.

The oiler is fastened to the left side of the case, back of the pump, four bolts serving to make it practically an integral part of the case. From it about a dozen leads conduct the lubricant to the various parts which have forced lubrication.

Very Large, Liberal Bearings—Bearings interest everyone, for, no matter what else is right, if the bearings are not, it is dangerous to run the engine. On Model M the crankshaft is 1⅞ inch in diameter and provided with four bearings of a high grade of babbitt, die cast to insure absolute interchangeability. The total projected area of the four is 52.6 square inches. The same material is used for the big ends of the connecting rods, while on the camshafts bearing bronze is used. Each camshaft is provided with bearings which total 11.3 square inches projected area. This gives 22.6 square inches total for both shafts.

Perfect balance is obtained in two ways—every part is balanced on the ways for static balance; then, when completed and assembled, the units are tested for correct running balance. This constitutes the first part, while the second consists of machining the combustion chambers of the cylinder castings. Furthermore, these are measured and selected so as to match up, a set of six which exactly agree being selected for each engine. This care in balancing insures equal charges, equal explosions and equal expansions, all of which result in a quiet-running engine.

Double Ignition Features Show a Difference—It has come to be a trite saying that the motor is fitted with double ignition, two separate and distinct systems, so only the details of this one will be given. The two sources of current are a high tension magneto, Bosch, and the Atwater-Kent Unisparker for the second. The spark plugs for the latter are placed on the top of the cylinders, the wires being carried across the cylinder heads in an enclosed bus bar. The same method of procedure is carried out for the magneto, the plugs for which system are screwed into the side of the cylinders, projecting into the inlet valve pockets, as do also the other set. Among the little things worthy of mention is the ball and socket joint for operating the magneto, this being adjustable to very close limits.

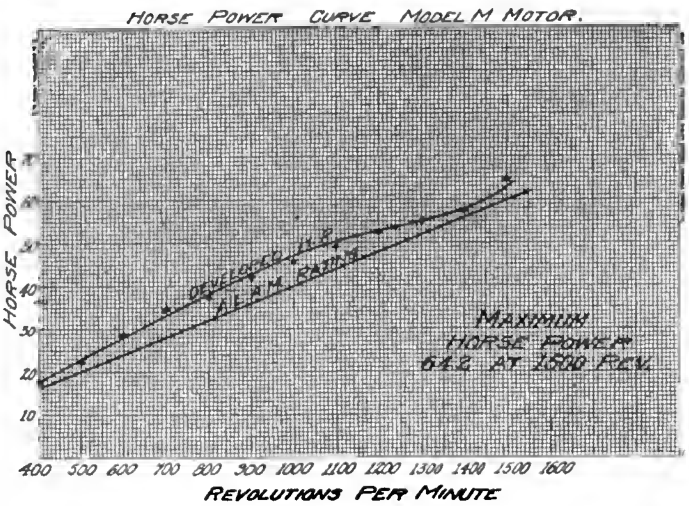
With this engine is used the three-disk clutch of which Thomas is the most consistent advocate. This is carried on two imported annular bearings, is provided with double adjustment, and is fitted with cork inserts. Back of the clutch and ahead of the transmission are placed two universal joints, of the internal gear type, which have stood up so well in motor truck service.

Transmission Shows Very Careful Designing—The gearbox is a very small, compact piece of mechanism. Some idea of the compactness may be obtained from the bare statement that the distance from center to center of the annular ball bearings, upon which the countershaft is mounted, is but 8 7-16 inches. Six of these bearings are used in all. The gears are of nickel steel, heat treated, hardened and quenched in oil. The net result of all this care in design and selection of material is that the complete gearbox weighs but 82 pounds.

In the rear axle Timken roller bearings are used throughout, the rear axle itself being a piece of Timken work. The axle casing is of pressed steel. Gears are of four pitch, and the gear ratio is three to one. In this axle the wheels are driven by jaw clutches at the outer extremities, the axle being known as of the full floating type.

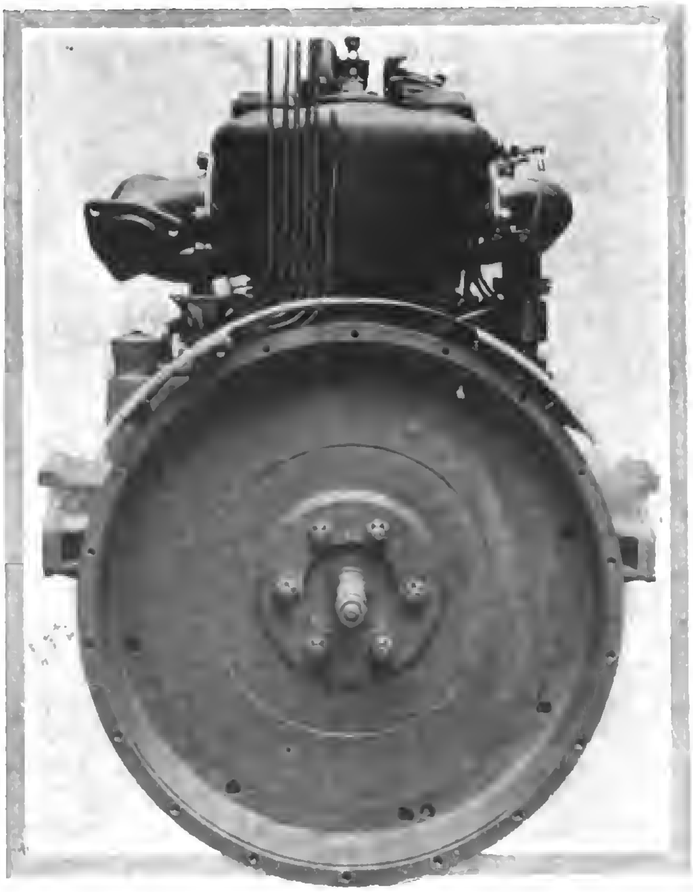
The front axle is a nickel steel I-section forging of large sectional area, as are also the knuckles and steering arms. The springs are of alloy steel, semi-elliptic being used in front, and three-quarter scroll elliptic in the rear.

Fenders and running boards, as well as the sheet-metal aprons, were the source of much attention to make the protection to the passenger perfect. The front fenders have a droop at the forward end which, together with the metal lip there fitted, prevent forward splashing, while a connection between fender and frame prevents side splash. The running board and the rearward extension of this connection eliminate danger from this source to the driver. At the rear, the same idea is well carried out by connecting the fender to the body or running board around its entire length.



Curve of Horsepower Obtained by Test

This Model M is made in six styles of body: touring car, runabout, tourabout, flyabout, limousine and landaulet. The open bodies are finished in royal blue with straw running gear, while the closed bodies are done in maroon with French gray, all being of hand-hammered aluminum construction. The touring car seats five and lists at $3,500, at which numerous extras are included. A few of these are: Speedometer, top, Prest-o-Lite tank, glass front, two oil side lights and tail light, robe rail, etc. The wheel base of the chassis is 125 inches and the tread standard. With full load of five passengers, all gasoline, oil and water tanks full, Model M has one horsepower A. L. A. M. rating for every 94 pounds weight. On the basis of the power the engine can develop, this is reduced to 50 pounds.


Rear View Displays to Advantage Flywheel Size

Chalmers-Detroit 1910 Presentation

"Forty" Touring Car — "Forty" Roadster

CONTINUED with slight and minor modifications, aptly describes the two models which the Chalmers-Detroit Motor Company, Detroit, will present for the season of 1910. These two cars will be the two made for 1909, with such alterations as a year's service has shown to be advisable. Naturally enough, these are few in number and small in their influence on the appearance and construction of both models. Being so little changed, both of them will be continued under the same name, that is, the small car will still be called the "30" and the larger, more commodious, more pretentious outfit will be continued as the "Forty." The former will be fitted with various bodies to suit every taste, from a three-passenger runabout to a five-passenger touring, several special productions being featured, such as the inside driven coupé, which can be instantly altered to a three-passenger runabout. The more powerful chassis will be made with bodies of three types, seven-passenger touring, pony tonneau and roadster. All of the bodies will be built of the same materials, which have proven so satisfactory in the past, namely, aluminized sheet steel and wood.

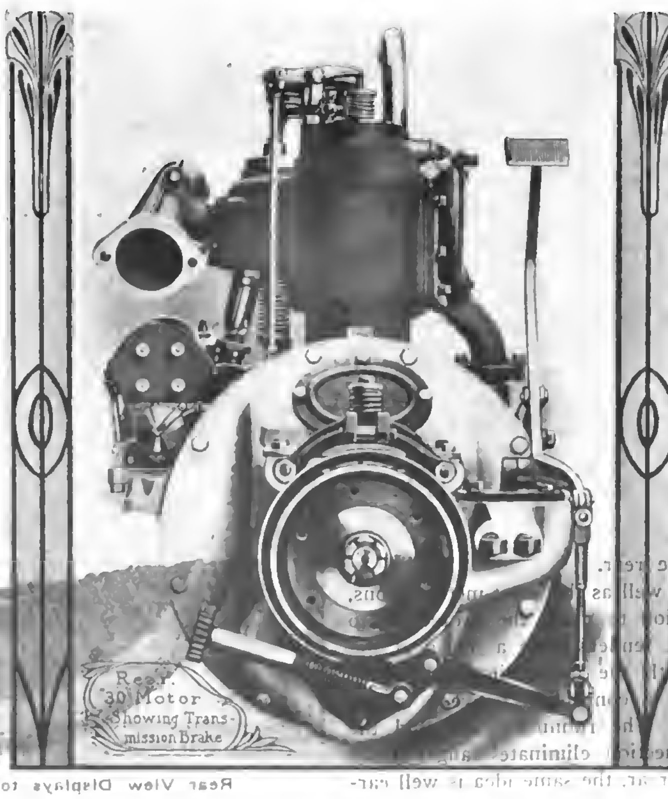
Larger Bore Means More Power—On the "30" chassis an engine will be used which is almost an exact replica of the 1909 engine, except that it has been made more powerful by an increase of 1-8 inch in the diameter of the cylinder bore. This makes the motor dimensions 4 by 4 1-2, which, according to the rating formula, would increase the power from 24 to 25.6 horsepower. The oil pump has been placed in a more accessible position. Whereas this was formerly placed in the bottom of the crankcase, in the oil well, it is now located on the exterior of the upper part of the case, opposite cylinder number four. A small plunger pump is driven from the camshaft of this cylinder, the inlet cam doing the work of operating the plunger. This is the prime mover in the circulating positive feed oiling system, which is otherwise retained complete. In this system the oil is pumped through a sight feed on the dash to the main bearings, whence it drips to the bottom of the case. There the collected pool of lubricant forms a splash system to cover the whole interior of the cylinders with a mist of oil.

The new exhaust pipe retains the admirable features of the old, including the very large diameters, easy bends, and other ideas which, combined with the big diameter exhaust valves, serve to clear the cylinders both quickly and effectively of the burned gases. The exhaust pipe itself, is, however, changed and now has individual leads from each cylinder. Whereas, the cylinder leads formerly started right downward, the newer pipe begins at number one cylinder and rises. So, too, does the pipe from number two, but between the middle pair the downward slope is commenced which continues unchanged right to the muffler, placed near the rear of the chassis. This makes the gases turn but one abrupt curve, that from the valve pocket to the pipe, and one easy one, in the middle of the exhaust manifold. The gases from the two rear cylinders turn but the once.

Aside from these changes, the motor is identical with that of 1909. The crankshaft is still mounted upon two large diameter ball bearings. The crank pins are 2 1-4 inches in diameter, hardened and ground. At the front, the camshaft and auxiliary shaft are driven by spiral gears from the crankshaft, this form of gear being utilized to lessen the noise. The cylinders are still cast in a block, with large inlet valves located in the top of the cylinder heads. This has been a feature of the Chalmers motors since their inception, and has been one of the features which enable the engines to develop so much power compared with the small piston displacement.

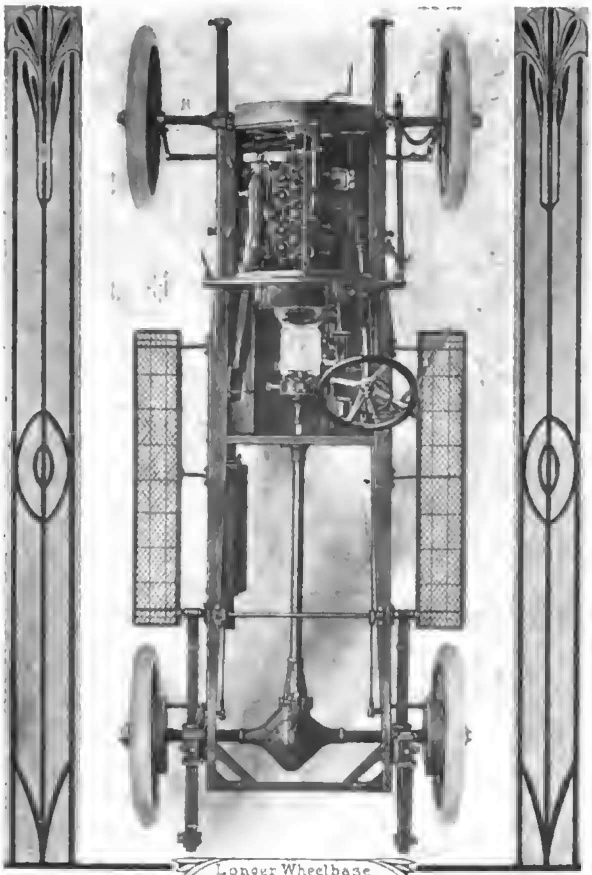
Multiple Disc Clutch Consists of Steel and Bronze Plates—The clutch is another part which is retained without change. This, it will be remembered, consists of alternate steel and bronze plates, the latter being connected to the flywheel and the former to the main driving shaft through the medium of keys. Three sets of spiral springs are used equally spaced around the periphery. These are of small diameter and medium size wire so that the pressure necessary to declutch is very small. Like all disc clutches, this one runs in a bath of oil, resulting in the gradual engagement of the clutch when the pedal is freed and the springs allowed to press the plates together.

Unit power plant construction is another Chalmers identification which needs little explanation or description. The transmission is a unit bolted up to the rear of the engine base and carries the clutch within. The three speeds and reverse operate selectively. Trans-



Rear "30" Motor Showing Transmission Brake sion bearings are all of the annular ball type, while the gears are of chrome nickel steel, carefully heat treated. The teeth are of large pitch and mechanically chamfered to render gear shifting easy. The shafts are of alloy steel and the gears are arranged upon them in as compact a manner as possible. This makes a small but very strong and stiff transmission case.

Brake Arrangement—Following the usual Chalmers practice, one transmission brake is provided immediately behind the gear case actuated by a foot pedal. A pair of internal expanding brakes operated from a side lever are placed directly on the rear wheels. The placing of the foot brake on the transmission has a number of advantages, among which may be mentioned: The increased braking power owing to the drum being geared up from the wheels; simplicity; cleanliness; obviation of clogging of braking toggles which occurs in the inside brakes mounted on the wheels; the removal of all superfluous weight from the axle, this being distributed over four wheels, and the consequent saving in tire wear; complete equalization of braking effort between the two wheels independent of the condition of the braking or road surfaces. As against these advantages, only one imaginary disadvantage can be cited, and that is the transmission of the braking effort through the rear axle driving mechanism. However, this mechanism must be amply strong to allow the motor slipping the rear wheels under all condition of load and road surfaces. The braking effort can't possibly exceed this. In fact it must always remain somewhat less. A brake placed on the transmission can therefore never strain the driving mechanism quite as much as the motor itself is capable of doing.



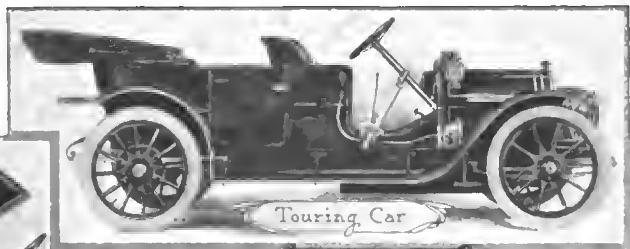
Longer Wheelbase Makes "30" Chassis Look More Simple

Details of the Final Drive—Directly back of the transmission and brake drum is placed the first and only universal joint. This is bushed with removable steel bushings and is enclosed in a metal case to keep lubricant in and dirt out. At this point is attached the forward end of the torsion sleeve, which surrounds the nickel steel driving shaft, and is bolted at the rear end to the axle casing. This sleeve renders unnecessary the usual torque rod and radius rods as well. It takes both driving and braking strains, while insuring rear axle alignment at the same time. Needless to say that it is of a very superior material, selected for its ability to withstand just such complicated strains.

From the propeller shaft the power is transmitted to the rear axle through bevel gears and the usual differential. The balance gear is of the bevel type, four pinions being used. This is very compact and the construction of the housing or case for it is such as to permit of its ready removal by simply taking off the cover and withdrawing the axles far enough to free it. The axle is of the full floating construction, which means that the weight of the car is carried on the sleeves surrounding the axles proper. The latter, then, simply transmit the power. Since they do not carry any weight, they may be withdrawn at will and while the car is standing on the wheels. This is effected by making the axles with six jaw clutches at the ends, which clutches do the driving. By taking off the hub caps, these are exposed to view and may be drawn out without the necessity for any tools. The construction of the axle tubing and differential housing has been improved by making the housing and tubes in one piece instead of the former method of using three pieces, riveted together. The new case tapers from the largest part of the balance gear out to the ends, which results in a very pleasing outline and strengthens the whole at the same time. Annular ball bearings are used on the axles, while the axle itself is of 3 1-2 per cent nickel steel, heat treated. The spring seats swivel upon the axle tube, which avoids twisting the springs, when obstructions are met that strain the two sides of the frame differently.

Steering and Larger Tires Conclude the Alterations—While the steering gear remains as before, the shifting or operating mechanism has been improved by enclosing it in separate casings. All steering parts are stout forgings, no castings being used on these important parts. The cross rod is behind the front axle and the reach rod above it, both being so placed for protection of these vital details. Steering arms are provided with bosses for the ready attachment of speedometers. Front wheels run on ball bearings and are fitted with larger wheels and tires. The wheels have been increased to 34-inch to improve the riding qualities, while 3 1-2-inch tires are fitted on four wheels.

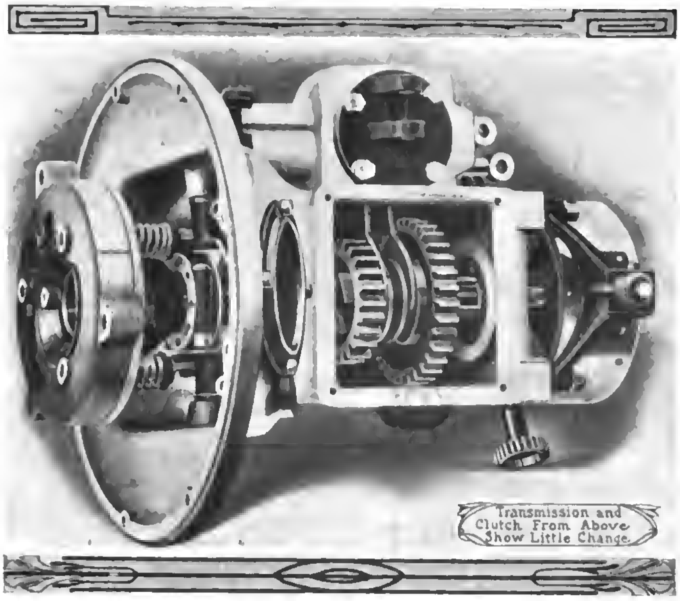
The frame, which is of pressed steel, shows one or two minor changes, as back of the front seat



Touring Car

Landaulet

Coupe



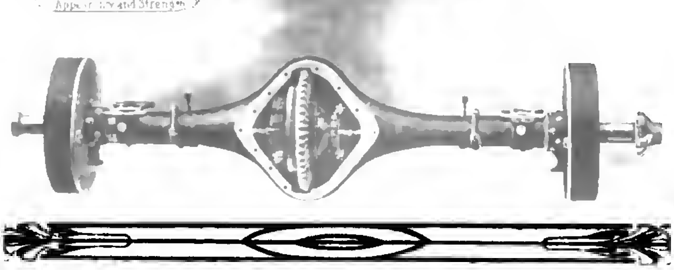
Transmission and Clutch From Above Show Little Change.

location it has been dropped in order to lower the rear floor boards, while a lower center of gravity is obtained incidentally. This section has been increased at the bend, the extra metal tapering gradually back to the very end of the frame. This extra metal is provided in both the upper and lower flanges, materially stiffening the frame. The section is a channel with the open side turned in toward the mechanism. The upsweep at the rear end is retained unchanged despite the additional forward drop just at the point where the tonneau entrance comes.

What the "Forty" Reveals That Is New—Generally speaking, the "Forty" shows a lesser number of changes than does the smaller car. These include a longer wheelbase, which results in a more commodious body; a change of position of the lay shaft in the transmission; ball bearings for the latter instead of the taper rollers of last season, heavier and stiffer frame; honeycomb radiator in place of vertical tube; and triangular torque rod consisting of two tubes, radiating from the front point of attachment to the axle casing. This last takes the place of the single tube formerly used, and gives increased stiffness and strength. The wheelbase shows a real change, the new figures being 122 inches as compared with the former figure of 112, an increase of ten inches, all of which is put into the tonneau or rear part of the body. This permits of making the capacity of the car seven passengers instead of five.

The same engine is used, 5-inch bore by 4 3-4-inch stroke, rated at 40 horsepower, according to formula. The valve sizes and location are unchanged, all being on the right side, in pockets. The crankshaft still has three bearings of good length and the material, die cast tin-babbitt. Oiling is the same. Like the motor, the clutch is unchanged, although the operating means is. This latter has been so changed as to permit of clutch operation with about one-third of the former spring pressure. In the transmission, the lay shaft has been moved from above the main shaft to a position below it. This works out to a reduction of the angle of the driving shaft, even with the larger wheels. The latter are now 36-inch in diameter, equipped with 4-inch tires all around. The rear axle will be of pressed steel, autogenously welded along the neutral axis, giving the greatest possible amount of strength for its weight.

[illegible] Axle Casing Tapered For [illegible] and Strength



The changed torque rod is worthy of more than passing mention. A triangular shape set on one flat side and presenting the point to the deforming force is the strongest shape known. The Chalmers engineers have taken advantage of this fact and have so shaped and set the torque rod that it has a triangular shape resting on a flat base at the rear end and presents a point, the forward end, to the deforming stresses, which tend to rotate the rear axle as the rotation of the engine shaft.

IMPROVED 1910 KISSELKARS ANNOUNCED

HARTFORD, WIS., Aug. 16—The factory of the Kissel Motor Car Company of this city has begun preparations for turning out the new series of Kisselkars, which, it is announced, will show many interesting changes. The publication of the 1910 specifications among the dealers has met a warm response and in consequence the factory expects a big demand.

This year's Model D-9 will be continued with slight changes as next year's Model D-10. It will, however, be rated at 50 horsepower instead of 40, though the refinements or increased dimensions which give this greater power have not been published. The wheelbase will be lengthened to 120 inches and the seating accommodations of the car will be made roomier. The change-gear will give four speeds instead of three. A great improvement in the appearance of the car has been effected by hanging the frame two inches lower. The price will be $2,000.

The smaller car, to be known as Model LD-10, will be built along the same lines as this year's 30-horsepower car, and will sell for $1,500. The wheelbase will be lengthened to 112 inches and the body will be altered to provide wider rear seats and more room forward of the front seats and in the tonneau. The general appearance of the car will be much the same as Model D-10. The body has been hung about three inches lower than formerly. This model will have double internal brakes, 34-inch wheels, and will be made both as a touring car and as a baby tonneau.

For those who wish a car of medium power but of ample capacity the new Model F-10 has been provided. This will be of 50 horsepower, seven-passenger, 124-inch wheelbase, and will sell for $2,500. It will also be built as a baby tonneau with 40-inch wheels. The adoption of this large size is another sign of the times, and doubtless before another year all makers of large cars will follow suit. There can be no doubt of the superiority of these large wheels over the old sizes from the users' point of view, as the cars equipped with them are much easier riding and also a shade faster. Last and largest of the Kissel line is Model G-10, the six-cylinder, 60-horsepower car, with practically the same features as the smaller models.

ADVANCE NOTES OF THE 1910 PULLMAN

YORK, PA., Aug. 16—The York Motor Car Company reports that it is turning out large quantities of Pullman cars and that it is making contracts so rapidly that its contemplated 1910 output of 2,000 cars will probably be completely allotted by the middle of September. The new model shows many improvements on previous ones. The power has been increased from 30 to 35 horsepower by lengthening the stroke from 4 1-2 to 4 3-4 inches. The radiator has been made correspondingly larger. A full floating type of rear axle is now used, with a double set of equalized brakes. The wheelbase has been increased by five inches, being now 112 inches, and the car as a whole is more richly finished than formerly.

Two Pullmans have been entered in the Munsey reliability contest to be run next month. The route lies through York, and the York Company has been constituted a reception committee in behalf of the city. The tourists will be supplied with lunch boxes as they pass through.

What the Clubs Are Doing These Days

HUGUENOTS TO HAVE AUTOMOBILE CLUB

New Rochelle, N. Y., Aug. 16—The reasons for the organization of an automobile club are so explicitly and convincingly set forth in a letter issued in connection with the formation of a club in this place, that its reading may be beneficial in other cities where the same conditions exist, requiring the attention of automobilists.

Herewith is the call sent out by E. T. Birdsall, well known since the introduction of automobiling in this country:

New Rochelle, August 12, 1909.

HUGUENOT MOTOR CLUB

Dear Sir:

In consequence of the large number of automobiles owned in the City of New Rochelle and vicinity, and in view of the bad condition of the pavements of the streets and other conditions which make the operation of our cars more or less of a burden instead of a pleasure, it is believed that the time for the organization of a strong and influential motor club has arrived.

The benefits that can be secured by a strong and determined effort on the part of a club are many. Individual efforts, no matter how well directed or energetic, never have the weight of those of a well organized body. It is the old story of "United we stand, divided we fall," or, to fit this case, "United we win, divided we fall."

In addition to the material benefits there are those of a social, technical, and sporting character, interchange of ideas and experiences, legal help when in trouble, and many others that will at once suggest themselves.

It is proposed to begin in a small way at first, only expanding as the growth of the club warrants. Mount Vernon has a good club with a fine house. New Rochelle can surely do better.

With several hundred owners in the city we should be able to start with at least fifty charter members.

The meeting for organization will be held in the hall of the Republican Club on Church street, at 8 o'clock, P. M., Thursday, August 19.

If for any reason you cannot attend, drop me a line saying that you are in favor of the scheme and will join the club.

Don't put it off, do it now!

Yours very truly,
E. T. BIRDSALL.

SECOND LARGEST IN PENNSYLVANIA

Media, Pa., Aug. 2—The monthly report of President Weeks shows that the Automobile Club of Delaware County is now the second, numerically, in the State of Pennsylvania, having 357 names on its membership roll. The clubhouse bee is now buzzing loudly, and President Weeks has appointed a committee to decide on plans and select a site.

A touring information bureau has been established for the use of the members.

NORRISTOWNERS GIVE A TIME TO ORPHANS

Norristown, Pa., Aug. 16—One Friday recently four hundred little children of this town were given the time of their lives by the Norristown Automobile Club. Sixty-two cars were donated to the committee having the affair in charge. The little ones, after a 90-minute dash through the country to Willow Grove, reveled in the delights of that place for nearly three hours. After luncheon in the grove, and listening to Victor Herbert's orchestra, the tired but happy bunch of youngsters were whisked back to their homes in the evening.

ANNUAL RUN OF THE ROCHESTER CLUB

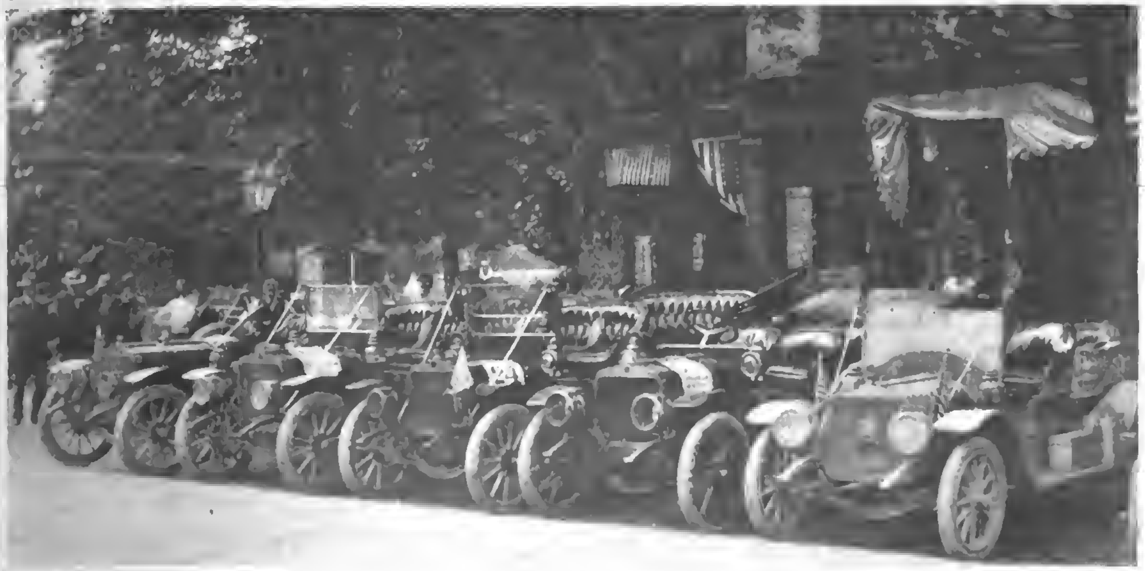
Rochester, N. Y., Aug. 16—Twenty or more automobiles turned out for the annual run of the local automobile club, and some three-score members had a most enjoyable outing. The run lasted a week, and took the participants through the lake region of central New York. Historic Watkins Glen and many other points of interest were visited. The photograph shows the cars parked at Lima, N. Y., and it will be noticed that the Seldens made in this city are much in evidence.

MACON, GA., OWNERS WANT A CLUB

Macon, Ga., Aug. 16—With over 250 automobile owners in this city, there is every probability that an automobile club will be formed at an early date. A number of the autoists have joined in a voluntary committee to secure an organization which will be a power locally for good roads. One man has offered a suitable tract of ground for a country clubhouse, about twelve miles out on one of the best roads.

CINCINNATI CLUB PLANS RACE MEET

Cincinnati, Aug. 16—There will be an auto day at Coney Island on August 22, when the Cincinnati Automobile Club will hold a series of track contests. The organization has started out to make this the biggest event of its kind on the local track, and five races are on the program. There will also be a chance given for dealers to exhibit the new models of cars and accessories.



Recent Run of the Rochester (N. Y.) Automobile Club, in Which the Local Made Selden Cars Were Much in Evidence

THE AUTOMOBILE

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GROWTH IS A MATTER OF ROADS

The automobile being a pleasurable necessity, its use is made more general by the existence of good roads. But even with roads not deserving of the name, it is still a necessity. Hence its greater use is inevitable under any circumstances. With the knowledge that real roads breed automobile owners, it is wise foresight on the part of those interested in the progress of the industry to aid, as far as lies in their power, the building of roads and the betterment of those now reluctantly accepted as such.

When all interested in this enormous work are organized so as to concentrate their influence and votes, the rapidity with which the movement will go forward will be most surprising. The reason has its basis in the coming of the automobile, which continually advertises itself in abridging distances economically. The vehicle is available, but to make it available to the greatest economical extent it must have the right kind of a road over which to demonstrate its superiority over previous kinds of transport.

During the Glidden tour of this year, in crossing Iowa, one county, Greene by name, was discovered to have roads that compared favorably with many highways in Eastern States which began roadmaking ten years ago. Inquiry brought forth the fact that this roads interest had brought in its train an increase of fifty automobile owners in a town of twenty-five hundred inhabitants. Humboldt county, in the same State, called attention to its roads when the A.A.A tourists entered its confines. Previously in Wisconsin, not far from Madison, a town called Baraboo supplied roads built by itself, which were the joy of the trophy-chasers, who were perhaps too much inclined to rate the worth of a State, county, or township by the kind of roads supplied to the tour.

Michigan was put down as mostly absolutely bad; Illinois was only slightly sampled with indifferent results; Wisconsin did fairly well; Minnesota, not being tackled during the rainy season, escaped with some credit and more doubt as to what would have happened if a hard downpour had interposed; Iowa created some pleasurable surprise; not much was expected of Nebraska; Colorado is awakening in the matter of roads; and Kansas was passed through at a favorable season.

Some day there will be only one kind of traffic on the roads, and then they will not wear out so quickly. When the horse goes to his well-earned rest the motor-driven vehicle will have the road to itself; and it has been proven that a highway for autos exclusively does not succumb to traffic with any such rapid disintegration as does the present road harassed by two antagonistic forms of usage, the antiquated form of which is bound to disappear.

But the horse is certain to be with us for some time yet, and therefore it is up to our roadmakers to invent a highway that will better withstand the conditions under which it must labor in the next few years.

NEED OF ECONOMICAL OPERATION

Automobile manufacturers, in their desire to outstrip one another in offering the public models bigger and better than any ever before made, have too often lost sight of the fact that, after all, the most generally desirable feature of any car is economy. True, there are thousands of men who will pay any price for speed and appearance, and these have been most in evidence as buyers in the past; but there are thousands of men who must count their pennies, and these are the waiting buyers of the future. Perhaps a score of makers can find room for their product in the high-priced market; the great majority, however, must rely on the patronage of farmers and business men of moderate means.

Then there is that great branch of the automobile industry whose possibilities we have hardly begun to realize—the commercial vehicle. No one can doubt that the time will come when horses will not be allowed within the limits of large cities, much less be stabled there; automobile trucks and delivery wagons will handle everything, from the lightest to the heaviest traffic. In this field economy is the pre-eminent requirement.

The need of economy is the last and greatest, and perhaps the most difficult, of the problems which have confronted automobile designers. Power and endurance, in reasonable measure, have already been obtained. Even more than these, the question of economy is one that calls above all for skill in design. Much progress has already been made; the long-stroke motor and the use of anti-friction bearings and large wheels are important steps in advance. What steps yet remain we can but guess. The use of some cheaper fuel, possibly alcohol: the discovery of a substitute for rubber; perhaps, even, the turbine motor—all these the future may have in store for automobilists of the coming generation.

CONTAINED IN CONNECTICUT'S NEW AUTOMOBILE LAW

HARTFORD, CONN., Aug. 16—Nutmeg State automobilists and their touring visitors from other commonwealths are now subject to a new automobile law. An increased system of registration fees and a tax of $2 an each engine produced by manufacturer and tested upon the roads, are the chief alterations over the enactment now in force. The speed law and non-resident clause remain the same, the former requiring a speed reasonable with regard to traffic, and making 25 miles per hour, for one-eighth of a mile, evidence of reckless driving. Tourists are given ten days each year in which they may use the highways of the State without taking out a license. In spite of the influence brought to bear upon Governor Weeks by the Connecticut State Automobile Association and individual autoists, he signed the bill with certain amendments required.

Chief opposition was centered against the increased fees, which are considered burdensome. Otherwise the main points of the law are as before, such as prohibiting local ordinances except in parks, but inserting the 10-mile an hour provision in regard to streets of incorporated cities. The law also states that cars must not proceed at a speed faster than three miles an hour when approaching trolley cars which are receiving or discharging passengers on the same side. Governor Weeks desires that autos be required to stop on such occasions.

Classification will be by the A. L. A. M. formula in determining the horsepower of gasoline-driven cars, and manufacturers' catalogues in regard to steam and electric vehicles. A definite schedule has been set down, although the Governor desires a rate calculated at 60 cents per horsepower. The following is the list:

Cars of less than 20 horsepower, $6; 20 to 29 horsepower, inclusive, $10; 30 to 34 horsepower, $15; 35 to 39 horsepower, $20; 40 horsepower and over, $30; liverymen, each car, $10; trucks and other commercial vehicles, $5; motorcycles, $1; dealers, each car, $20; factory engines tested or operated upon the roads, each $2; operator's license, $2.

The registration fees for the cars expire on December 31 of each year, and the license for the individual on the last day of each February. The act goes into effect on September 1, but it is understood that those already having licenses and registration under the present law will not be required to take out new ones until the first of January.

Clauses have been introduced to prevent tampering with cars without the knowledge of the owners; and fines for anyone who operates while under the influence of liquor, for trying to make a record, or for racing. Sixteen years of age is set as the minimum for licenses, and the Secretary of the State has power to revoke licenses for reckless driving or other sufficient reasons.

On the whole, the law has many good points.

MASSACHUSETTS BUSY THIS WEEK TAKING ROAD CENSUS

BOSTON, Aug. 17—Beginning Sunday morning at 7 o'clock, and to continue this week, the Massachusetts Highway Commission is taking the most comprehensive road census ever undertaken in this country. The plans that have been made call for a count of the vehicles using the State roads for fourteen hours each day during the week at more than 200 stations scattered all over the State, with a twenty-four hour count at eleven places on the principal through routes of travel. This count, which is to be made in the period of heaviest tourist traffic, will be supplemented by another week's census in October.

From time to time in the office of the Highway Commission questions have arisen as to the relative amount of traffic on State roads in different sections, and its bearing on maintenance costs, and the commission never has had any accurate data upon which to base its estimates. In its announcement the commission says the road census is undertaken "first, to determine the relative importance of the different lines or routes of travel throughout the State," and "second, to secure at least a rough approximation of the relative use of such routes by motor vehicles and by horse-drawn vehicles."

The observers, principally boys and girls from the schools, were selected by the chief engineers of the five divisions into which the State roads were divided. They will be on duty every day from 7 a. m. until 9 p. m., and with the exception of motorcycles, bicycles, pedestrians and cattle, will make note of all traffic movements by their stations. They will be provided with cards for each day.

The stations at which a twenty-four hour watch will be made are on the roads between Boston and Lynn, Medford, Lawrence, Marlboro, Providence, Lowell, Lexington and Concord, Beverly and Gloucester, and Beverly and Newburyport. In addition an effort is being made to have simultaneous censuses taken by the Metropolitan Park Commission on Parkways in Revere, Saugus and Medford by the Boston Park Commission on Commonwealth avenue and by the Newton authorities on the Newton boulevard. If this is done some important results in the relation of traffic and cost of maintenance under different conditions are expected.

This is believed to be the first time a complete State road census has been undertaken in this country, and much valuable data not only for Massachusetts but other places is confidently expected to result from the count.

PLANS FOR LONG ISLAND MOTOR DERBY

NEW YORK, Aug. 16—Over on Long Island, and in the headquarters of the Motor Contest Association in this city, plans are maturing for the Long Island Motor Derby. This event is planned to take place September 21, over a 22-mile circuit having Riverhead and Mattituck as prominent points. Senator W. J. Grattan last week took Ralph DePalma over the course, and the well-known driver declared his belief that the roads would prove both fast and safe. As laid out at present, the route leads from Mattituck to Riverhead in a straight line, with one turn two miles from the latter place, so that there are two 10-mile stretches without a turn. There are but three deviations in the entire round, and none of these is bad as compared with most courses. Starting at Riverhead the towns passed through are Jamesport, Mattituck, Northville and Centerville.

GOOD ROADS NEAR NATIONAL CAPITAL

WASHINGTON, D. C., Aug. 14—As the result of a good roads rally in Alexandria, Va., Thursday night, the Alexandria-Washington Highway Association was formed for the purpose of securing the construction of a macadam road between the two cities. A tentative plan for the construction of the road, prepared by Charles H. Hoyt, a road engineer from the office of public roads, Department of Agriculture, was submitted. The meeting was attended by several hundred representative men of the two cities. About 25 cars took the Washington delegation over to George Washington's home city, and all who made the trip had a practical demonstration of the great need of improving the road connecting the two cities. The proposed improvement in this road will be the first step in the work of securing a boulevard between Washington and Mount Vernon.

JEWEL NOW CROXTON-KEETON COMPANY

Massillon, O., Aug. 16—The Jewel Motor Car Company, of this city, will in the future be known as the Croxton-Keeton Motor Company, with a capitalization increased from $250,000 to $500,000. H. A. Croxton, whose name now appears in the designation of the company, will continue in his former position of president and treasurer. He is also connected with the Massillon Iron & Steel Company, the Massillon Bridge & Structural Company and the Massillon Foundry & Machine Company, and has been designing and constructing machinery and machine tools for the past fifteen years. F. M. Keeton has been in the automobile business for ten years, serving in various capacities with the Pope-Toledo and De Luxe companies, and for the past two years has been making a close study of the taxicab situation.

For 1910 the Croxton-Keeton line will consist of eight models, built on three chassis of 30, 45 and 60 horse-power. The 45-horse-power cars will be practically duplicates of the two Jewel cars which passed creditably in the Glidden tour. The smaller chassis will be particularly adapted to town-car use, and may possibly be built as a taxicab.

The Croxton-Keeton Company will produce 600 cars in 1910. It has purchased the factory which it has leased for the past three years, and, although the capacity has already been doubled, is designing another additional building 160 by 380 feet, of saw-tooth construction. Work will be begun during the next month. The company has also secured an option on seven acres of ground across the street from the present factory for future enlargements. Distributing branches have already been established in New York, Pittsburgh, Pa., Cleveland, Chicago and Boston, and in the near future Minneapolis, Minn.; Kansas City, Mo.; Portland, Ore.; San Francisco, and Atlanta, Ga., will also be covered. The car made by the Croxton-Keeton Company will be known as the Croxton-Keeton, instead of the Jewel.

COMMERCIAL CARS USED IN INDIANAPOLIS

During the present season the commercial side of the automobile has been given much attention in Indianapolis, and it is estimated that 25 per cent. of the city's delivery work is accomplished by automobiles. Within the last few months the collection of milk by means of gasoline cars has gained great headway. One company is now operating two trucks in this work, covering the country within a radius of twenty miles. Much better time is made in this way than by the interurban cars. Another company operates a truck between Indianapolis and Plainfield, making one round trip a day. The route is through a rich farming district, and much milk and other produce is handled. Still a third line runs to Smith's Valley, Glenn Valley and Waverly.

AMERICAN SIMPLEX NEEDS MORE ROOM

Mishawaka, Ind., Aug. 16—The American Simplex Motor Car Company of this city has completed plans for a 172 by 240-foot addition to its plant, to be built of brick and concrete. The new structure will be a duplicate of the one at present occupied, thus doubling the capacity of the plant. This move was decided on at a recent meeting of the stockholders. Work will be rushed, as the additional space is badly needed to assist in putting out the cars which the company has already contracted to deliver. The design of the 1910 cars has been completed, and nearly the entire output has been disposed of to agents.

RIDER-LEWIS OCCUPIES NEW FACTORY

Anderson, Ind., Aug. 16—The Rider-Lewis Motor Car Company has occupied its new factory at this city and has begun to turn out its 1910 product, which was described recently in The Automobile. The first of the 1910 cars appeared in the streets within fifteen days after the occupation of the plant, and work will be continued in the same energetic way.

OAKLAND TO GREATLY INCREASE OUTPUT

Detroit, Aug. 16—The Oakland Motor Car Company, at Pontiac, is the latest to get caught in the wave of prosperity sweeping over the automobile industry. So great has been the demand for Oakland cars that announcement is made of changes whereby the company's manufacturing facilities will be increased to 12,000 cars a year. The property of the Pontiac Buggy Company has been acquired, and, in addition, several large buildings will be erected, giving a greatly increased capacity.

For 1910 the Oakland Motor Car Company will put on the market a new model, to be known as the Oakland "30." It will have a 100-inch wheelbase with a four-cylinder 4 by 4-inch motor, developing approximately 30 horsepower. The car will be made in two styles, touring car and runabout. The Oakland "40," which has proved so popular, will be continued, 3,000 of this style being manufactured in touring-car, runabout and toy-tonneau styles.

ALUMINUM COMPANY IN COMBINATION

Syracuse, N. Y., Aug. 16—One of the largest transactions ever made in a trade affecting the automobile industry has been executed by the Aluminum Castings Company. This concern has acquired the property and business of the following firms: The Allyne Brass Foundry Company of Ohio, the Allyne Brass Foundry Company of Michigan, the Allyne Brass Foundry Company of New York, the Syracuse Aluminum and Bronze Company, the Eclipse Foundry Company and the foundry department of the United States Aluminum Company. It is the announced intention of the Aluminum Castings Company to continue these plants under the present management and with the same attention to details as heretofore. They will be equipped with improved appliances, and particular attention will be paid to the scientific and technical features of the business.

OVERLAND MAKES A BIG AGENCY DEAL

Charles E. Riess & Son, of East Orange, N. J., signed an agreement last week to take the metropolitan agency for the Overland and Marion, and contracted for 1,500 cars for the coming year. The territory of the new agency will include Greater New York City and Long Island, extending as far north as Poughkeepsie. Salesrooms and a garage will be opened in the building at present occupied by the Stoddard-Dayton agency, at Broadway and Fifty-seventh street. Although a newcomer to automobile row, Mr. Riess has had the New Jersey agency for the Overland and Marion for the past two years. The Overland Company has already contracted with its agents for the delivery of 14,500 cars during 1910.

WINCHESTER ARMS CO. TO ENTER FIELD

New Haven, Conn., Aug. 16—With the enlargement of the charter of the Winchester Repeating Arms Company comes the announcement that the concern will soon enter the ranks of automobile manufacturers. It is expected that work in this direction will not be started much before the completion, within the next six months, of two large concrete buildings. Heretofore the charter of the company would not have permitted it to construct autos, but the legislature has removed the obstacles. In view of the Winchester Company's experience and reputation, further announcement of its plans will be awaited with interest.

WILL BRING OUT NEW GASOLINE MOTOR

South Bend, Ind., Aug. 16—At the annual meeting of the stockholders of the Wood Electric and Manufacturing Company the following officers were elected: W. E. Wood, president; D. M. Wood, vice-president; W. G. Crabill, secretary; C. H. Harper, treasurer. The company has perfected a gasoline motor that is attracting considerable attention and comment from the trade. The capital stock of the company has been increased to $50,000.

RIKER DISCUSSES TENDENCIES IN RACING AND DESIGN

BRIDGEPORT, CONN., Aug. 16—Automobile racing, tendencies in 1910 design, and constructive features of new models are pertinent subjects out at the big plant of the Locomobile Company of America. The cars for the approaching season are well under way, and the new buildings are now up to the second floor, so that before long a great increase in capacity will result. It is interesting to know the opinion of this concern in regard to the points chiefly concerning automobilists, as discussed by A. L. Riker, the chief engineer, and a well-known authority on these matters.

Mr Riker says: "It seems to us that automobile racing has had its day as far as manufacturers are concerned. The support of the makers is not likely to continue much longer, for the expense is too great and the returns often too small. The races have shown the makers how to build better, stronger, and, at the same time, lighter touring cars, and there seems to be little left to discover in that line. From a sporting standpoint it is likely that automobile racing will continue, as handled by promoters, for this manner of amusement is evidently very popular. Perhaps regular circuits will take the place of the present events here and there, aand those backing them will have several makes of cars. As to the action of the Locomobile Company with regard to the fall stock car races, it is problematical as to whether we shall enter, the matter has not been definitely decided one way or the other. Our inclination, however, is to withdraw from participation in the contests, as we see nothing to be gained by them, and they just upset factory routine.

There is really greater activity at present in engineering and constructive departments of the industry, and we are keeping in close touch with them. For instance, we have given considerable attention to the Knight motor, but I do not think that the sliding valve engine will revolutionize the tappet methods generally employed, at least at present. The new type has proven its efficiency in tests, but the life of an automobile motor must be long, and that is our aim with the tappet valve type. Another motor tendency which we have taken up thoroughly is that of the six-cylinder engine, but we have not found them necessary, or, indeed, they are at all superior to the four cylinders. It has been our experience that the six does not warrant its substitution for the four-cylinder type, especially when the engine is running over at a reasonable speed. Of course the six will pull more evenly on high at very low engine speeds, but with a well designed transmission, in regard to its ratios, there is no inconvenience in shifting. In fact, it has seemed that the necessity for shifting is less than the extra cost of maintenance and trouble to keep the car with the extra cylinders. At higher speeds we hold the four-cylinder preferable to the six or equal area.

"A most important feature of the industry lies in the commercial fields, and these lines are being seriously considered. The Locomobile Company has gone into the matter very deeply, for there are already a great many of our chassis used for business purposes, and in municipal fire and police departments. There is evidently a great future for this kind of motor-driven vehicle.

"I have noted with pleasure that there is a tendency among manufacturers at present towards longer stroke motors, for that is a type which we have advocated for a long while, at least for chain-driven cars. I believe, however, that the square cylinder is better for the shaft drive mechanism. In the latter case there is but a single reduction in gearing between the engine and the rear axle on high speed, that in the rear axle housing. Now, inasmuch as the housing must be made relatively small to give ample road clearance, it is evident that the bevel gear is rather small for the strain upon it, and the pinion is very small to give the required reduction. I think that with a long stroke engine the torque strains upon the gear teeth are greater than they should be subjected to, even with the use of strong alloy steels—that is, when the square motor of the same horsepower will give equal results with less strain. This can be proven mathematically and with the indicators.

"Our line for 1910 will show some refinements but almost no changes, and announcement of them will be made later."

The Locomobile Company has constructed nearly a thousand cars during the last season. At present it is working day and night, employing about 1,200 men in the two shifts, and still is shipping as fast as the cars can be completed and thoroughly tested. The new building, which is well under way, will give enough extra floor space to materially increase the output. It will be ready for occupancy by October 1. Then it is probable that architects will draw up plans for an extension of 300 feet to the main building, using some of the ground that has been reclaimed from the harbor flats. When this is completed, if the entire plant were on one floor it would cover a space 4000 feet long by 52 wide, according to Advertising Manager Kingman.

FIAT FACTORY ON THE HUDSON WILL BE UNIQUE

THE new plant of the Fiat Automobile Company, which is to be erected at Fairview, just outside of Poughkeepsie, N. Y., will embody many European ideas, and will resemble in many respects the present Fiat factory at Turin, Italy. It is needless to state that the Italian style of architecture will be employed; special consideration will be given to the harmonizing of the building with its background, which is one of the most picturesque spots along the Hudson River.

It has not been decided whether steel and brick or reinforced concrete will be used, but the general layout will be along the lines of the best practice in factory construction. One of the distinguishing features will be the tower, 105 feet high, centrally located on the main building, which will contain all the offices and draughting rooms. This will be a point of attraction to boats plying the Hudson and to trains passing on either the West Shore or the New York Central tracks.

The main building will be 363 by 140 feet. The first floor is to be used as a machine shop and assembling hall; the second floor will be for machines of a lighter character and the third floor for wood-working. The ceilings are high, and the side walls consist principally of immense windows, giving ample light and ventilation. From the main building extend a series of one-story wings 70 by 140 feet, five in number.

The future extension of the factory has also been taken into consideration. It is generally to be noted that factories are constructed for immediate requirements only, and when any extensions are necessary there results a conglomerate mass of buildings with no architectural connection. For the Fiat plant, however, extensions have already been designed in conformity with the style of architecture which will fit properly in the general scheme of construction.

Full attention has been given to all the practical requirements of factory design, especially with regard to sanitation and ventilation. An elaborate stand-pipe and sprinkler system will make the fire risk a minimum. Electricity will be the motive power. The high voltage of the alternating system will be transformed into low-voltage direct current, thereby making the power which is placed in the workman's hands perfectly safe.

The exterior of the building will be treated in light stucco, with roofs of red terra-cotta tile.

SOME LATE NEWS FROM TIREVILLE

Akron, O., Aug. 14—The plant of the Buckeye Rubber Company, with the exception of the vulcanizing and finishing departments, was destroyed by fire this week. The loss has been estimated between $100,000 and $150,000, according to General Manager S. S. Miller, all covered by insurance. The main building, which was destroyed, contained the offices of the Buckeye Company, the manufacturere of Kelly-Springfield tires, and of the Consolidated Rubber Tire Company, of New York, the selling agent. The plant was working overtime to fill orders, and the officers announce that arrangements will be made to fill the accounts with little delay. The factory will be rebuilt.

Two new concerns have recently been organized and are beginning operations. The Akron Pneumatic Tire Making Company is manufacturing machines for stretching the fabric in the formation of the tires, and will either lease the machines or sell the rights on a royalty basis. The officers of the firm are: President, Charles A. Ley; vice-president, M. B. Kuhlke; secretary and general manager, James W. Meeker; and the officers, with E. T. Willams and H. C. Squires, form the directorate. The machine was invented by Mr. Squires and Mr. Meeker. The other newcomer is the Fall Rubber Company, of Cuyahoga Falls, which will produce automobile and buggy tires.

The annual picnic of the B. F. Goodrich Company was an immense affair, over 15,000 people attending. The company spent over $4,000 to make the affair a success, and was amply rewarded by the enjoyment of its employees and their numerous friends.

PIERCE BRANCH FOR TOURISTS ABROAD

Paris, Aug. 12—The Pierce-Arrow Motor Car Company's branch has recently been transferred to 22 Avenue de la Grande Armée, where much better accommodations are available. The change was made necessary by the constantly increasing numbers of Pierce owners who tour abroad every year and make their headquarters here. The branch was originally established for the purpose of providing parts for Pierce cars used abroad, so that the owners might not be forced, in case of accident, to wait for a shipment from the factory. However, the establishment of the agency soon caused many owners who previously had rented cars in Europe to take their own cars with them, feeling secure in the knowledge that they could obtain spare parts as quickly as if they were using foreign cars. Since the early days the scope of the branch has grown until now it acts almost primarily as a bureau of information for Pierce owners and as an agent for them in the many formalities of entering cars, becoming a member of touring clubs, securing licenses and obtaining correct and detailed information regarding routes. Complete data can thus be obtained before sailing.

ATLANTA TO NEW YORK IN NINE DAYS

First to test the new touring route between New York and Atlanta, Ga., was R. E. O'Donnelly of the latter city, who arrived in the metropolis one morning last week in his Packard car after nine days on the road. He reports the journey a most delightful one. Mr. O'Donnelly's experience is especially interesting, as it demonstrates the practicability of the route for the ordinary tourist. For the first four days out of Atlanta it rained almost constantly, and the Southern roads, which are mostly of dirt or clay, became at times axle-deep in mud; but in spite of this handicap the party had no difficulty in making the thousand-mile trip in about seven days' actual running. Half a day was taken to enjoy the beauties of Roanoke and the Natural Bridge, Va., and another for the run to Gettysburg. The worst roads of the journey were encountered between Rock Mount, Va., and Greensboro, N. C., and between Greensboro and Salisbury, N. C. These could probably have been avoided by a cut-off through Winston-Salem, N. C.

The trip was made in Mr. O'Donnelly's 1908 Packard "30," which already had about 2,800 miles of touring to its credit. The car was driven hy T. B. Dial, and came through without any troubles except a few punctures incident to the rough roads.

"MILTOUN" APPOINTED U. S. CONSUL

Francis Miltoun Mansfield is the complete name of the facile writer who has contributed such interesting European touring stories to the columns of The Automobile. Mr. Mansfield has been appointed consul for the United States at Toulon, which is France's greatest marine arsenal.

American manufacturers who are looking for a foreign source of distribution can make an effort in that direction by sending catalogues to Mr. Mansfield, who will be pleased to keep a quantity on file. Incidentally, autoists touring in that part of France will be able to obtain timely information by calling upon Mr. Mansfield at the American consular agency in Toulon.

FOR TOURISTS IN CENTRAL NEW YORK

Buffalo, N. Y., Aug. 16—The touring department of the Automobile Club of Buffalo says that owing to the building of new roads between Avon, Geneseo and Mount Morris the regular route to Elmira is closed to traffic. The most satisfactory way at present is to take the Big Tree road from Batavia, through East Bethany and Peoria to Mount Morris, and thence to Danville by taking the splendid road past Craig Colony. The road from Geneseo Village to the cross-roads leading to Mount Morris and Groveland is closed, and the road further up the hill should be taken.

Newly Located Paris Branch of the Pierce-Arrow Motor Car Company—Foreign Headquarters for Pierce-Owning Tourists

CONCERNING CASTOR OIL LUBRICATION

Editor THE AUTOMOBILE:

In a recent issue of "The Automobile" a question was asked regarding the advisability of using castor oil for lubricating the cylinders of high-speed gasoline engines, and it was somewhat surprising to learn that such use of castor oil is considered the very highest practice.

It is not exactly clear upon what such a claim is based. The best lubricant to meet the severe conditions found in a combustion motor is one that in addition to being unctuous to a high degree does not possess more body than is consistent with fluidity; is free from any tendency to oxidize or gum; is free from acids or other corrosive ingredients and which has a high temperature of vaporization. Now, a vegetable oil does not satisfy these requirements, and castor oil is a vegetable oil. Brannt states: "By long exposure to the air castor oil becomes thick and forms a viscous mass, and even acquires poisonous qualities." Castor oil has a high viscosity and specific gravity and contains from 7 to 14 per cent of free, fatty acids. If admitted into the combustion chamber glycerine and fatty acids would be formed by the decomposition of the oil at the high temperature encountered and a heavy carbon deposit would be left behind.

This much has been acknowledged by even the most enthusiastic friends of castor oil and they admit that this oil gives the best results only in cylinders in which the pistons and piston rings fit unusually tight. For it cannot be denied that castor oil is poor stuff to be found in a combustion chamber, and therefore should not be allowed to pass the piston.

Since it is practically impossible to make rings so tight but that some oil will get by them into the combustion chamber, glycerine and fatty acids will be formed as pointed out above and an undue amount of carbon will be deposited. If the oil is not allowed to pass the piston rings the head end of the cylinder will of necessity be insufficiently lubricated. In any case its use would seem to be a choice between two evils.

Most authorities favor a light mineral oil for the lubrication of internal combustion motors. Castor oil may be satisfactory in some special cases, but any temporary results which could be obtained by the use of castor oil would be accomplished by flake graphite, by putting the graphite into the crankcase mixed with oil in the proportion of a teaspoonful of graphite in a pint, or by removing the spark plug and squirting a little graphite through the opening by means of an insect gun. By its use lasting results would be obtained instead of a merely temporary effect.

The function of flake graphite is to form a smooth, veneer-like coating over all bearing surfaces with which it comes in contact. It is therefore possible to not only use a lighter oil, but less of it, and should for any reason the oil supply fail there is always the assurance that the parts may run for a long time without serious cutting or bound pistons. By the use of graphite a higher compression is obtained, the engine runs easier and more power is available.

JOSEPH DIXON CRUCIBLE COMPANY,

Jersey City, N. J. L. W. Brooks.

GROSSE POINTE TRACK FOR CHALMERS

DETROIT, MICH., Aug. 16—When the work now under way is completed, the Chalmers-Detroit contest department will have facilities superior to any other automobile concern in the country, if not in the world. Just to the east of the Chalmers plant is the old Grosse Pointe track, known as the scene of some of the most famous trotting and pacing events in the annals of the harness world. A few years ago the track was sold to a western syndicate which purposed holding running meets, with bookmaking as the big feature. The Michigan law put a crimp in the plan and the track fell into disuse with the advent of the State Fair Ground course. Now the Chalmers-Detroit racing crews have been established in commodious quarters at the Grosse Pointe track, and where once the steppers held full sway, the bark of open ports and the whirr of automobiles clipping seconds off records on the fast mile track, furnish a new diversion.

CONNECTICUT'S TOLL BRIDGE FREED

HARTFORD, CONN., Aug. 16—The one remaining toll bridge across the Connecticut River in this State, that at Thompsonville, has been opened to free use. The stockholders accepted the offer made by the State for the structure, and the event was duly clebrated. Representative H. R. Coffin, known as the father of the free-bridge idea, was the first to cross in an automobile, using his 29-horsepower Columbia.

Where Packard Ignition Cable is Made at Warren, O.

PLANT OF PACKARD ELECTRIC COMPANY

WARREN, O., Aug. 16—One of the largest and most substantial factory buildings in this city is the plant of the Packard Electric Company, the well-known manufacturers of ignition cable and other automobile accessories. The latest addition to this plant is the two-story brick building shown in the illustration. Part of the floor space is devoted to offices, part to the company's transformer department, and the rest to insulating and ignition materials. This cable has been on the market for the last eight years and has made an enviable reputation for itself. Its increasing popularity has necessitated doubling the capacity of the plant three separate times. The accompanying bird's-eye view shows the plant as it stands to-day.

SPOONER TO BE A PARTIAL DETROITER

DETROIT, MICH., Aug. 16—The biggest automobile colony in the world has received another accession of note, F. Ed. Spooner, veteran auto photographer, having decided to open an office in Detroit. Spooner will take personal charge of the local office, his partner, Wells, remaining in New York. The matter of location has not been determined, Spooner at present being quartered at the Pontchartrain. The local field has long been regarded as good picking by those in touch with the situation, owing to the great number of factories and the constant demand for fast camera work. Local men who failed to cultivate the business will now probably have occasion to repent at leisure.

AUTO FIRE ENGINES FOR BALTIMORE

BALTIMORE, Aug. 16—Chief Horton, of the Baltimore Fire Department, has recommended the use of horseless fire engines for the suburban sections of the city, with the result that two of these will be placed in commission in the fall as a test. If they work as expected, several more will be ordered. The Chief thinks they are just the thing for fighting fires in the outlying districts. He asserted, however, that as yet these machines have not yet developed enough power for practical fire work in the congested business districts.

ONE-LUNGER DISPLACED TWO-LUNGER

ATLANTIC CITY., Aug. 16—Charles Hinckleman, the local agent, some time ago closed a deal with the post office people here to put a little "one-lunger" Brush on the job of collecting and delivering mail. The bustling little car has been at work for over a week and has been making good with a vengeance, the former horse-drawn rig being miserably slow and inefficient in comparison.

MOTOR TRUCK CARRIES REVIVALISTS

WILMINGTON, DEL., Aug. 16—A large and heavy motor truck, used by the Charles Werner Company in the delivery of coal, has been pressed into service as a passenger-carrying vehicle between Wilmington and Brandywine Summit campmeeting, a distance of eight miles, and is making several round trips each day. The car has been provided with comfortable seats and a cover.

On a New Jersey Automobile and Motor Club Run in Midsummer

New Types of Storage Battery—The Westinghouse Storage Battery Company, which was incorporated July 12, has acquired all the plant, patents and equipment of the storage battery department of the Westinghouse Machine Company and of the General Storage Battery Company, and will manufacture, at Boonton, N. J., both the Westinghouse and Bijur types of batteries for those classes of service in which each has proven superior. The Westinghouse Company enters the field with greatly increased manufacturing facilities and the best engineering talent available, and will maintain thoroughly equipped testing laboratories to insure uniformity of materials and product.

Why Name Has Been Changed—The Thermoid Rubber Company explains that it changed its name from the Trenton Rubber Manufacturing Company in order to avoid confusion in the trade. Thermoid brake lining, such as this company has made for some years, has brought it into prominence, not in the automobile business alone, but in almost every business in which friction materials find a use. The Thermoid Company attributes this popularity both to the merit of its product and to the fact that the company has never made a claim for it which was not based on fact.

Auto Show Near New York—An automobile exhibit will be one of the features of the Queens-Nassau Fair at Mineola, L. I., to be held September 21-25. The fair is within a stone's throw of Krug's corner, made famous by the Vanderbilt races, and but 20 miles distant from New York via the Queensboro Bridge. Manufacturers and agents who wish to exhibit may make application to C. G. Miller, Hempstead, L. I. The fair is largely attended by automobile owners, and there are miles of good Long Island roads on which to demonstrate cars.

Motor Buggy Champions—The Holsman buggy again won its class in the Algonquin hill-climb this year, and the Holsman Company says that it was the only car competing that negotiated Perry Hill from a standing start entirely on high gear. The Holsmans were equipped with their special four-cylinder all-ball-and-roller-bearing motor, the only one, so far as is known, in existence, and its success demonstrates its utility.

Atlas Taxis for New York—The Atlas Motor Car Company, of Springfield, Mass., has just received an order from the Kayton Taxicar & Garage Company, of New York City, for 40 taxicabs, in addition to the 26 already in use by that company. If this order is shipped complete by October 15 it will be followed by another order for 34, completing an even hundred Atlas cabs for this one New York company.

Black Company Buys Crow Output—The Black Manufacturing Company of Chicago, makers of the Black high-wheeled automobiles, has arranged to market the entire output of the Crow Motor Car Company. The latter concern is a new one, located at Elkhart, Ind., and its first machine made its appearance a few days ago.

Another Win on New Departure Bearings—The Apperson Jack Rabbit which won the recent 202-mile road race at Santa Monica, Cal., was mounted upon New Departure ball bearings. This car established a new American record, its average time over the 8.4-mile course being 64.45 miles per hour, as against the 64.3 in the last Vanderbilt.

Enlargement for Thomas Factory—The E. R. Thomas Motor Company has arranged for a large addition to its factory in Buffalo. A two-story building 104 by 167 feet will be erected at a cost of about $16,000.

Bosch Magnetos for Winton Cars—Announcement has been made that the new Winton cars will have Bosch magnetos as equipment.

IN AND ABOUT THE AGENCIES

Grabowsky, California—A representative of the Grabowsky Power Wagon Company, of Detroit, who recently made a trip alon gthe Pacific Coast, made agency arrangements with Hawley, King & Company, of Los Angeles, Cal., and with Waterman Brothers & Company, of Fresno, Cal.

Walden W. Shaw Company, Chicago—The Walden W. Shaw Company has given up the agency for Thomas cars and will in the future handle the imported Berliet and the Columbia electric.

Haynes, St. Louis—The Haynes Automobile Company of Missouri has temporarily located at 4530 Delmar avenue.

RECENT BUSINESS CHANGES

Banker Brothers' Company Changes Name—The old Banker Brothers' Company, which has been a pioneer in automobile matters in Pennsylvania, now located at Pittsburgh, will hereafter be known as the Pioneer Motor Car Company. The officials will be the same as previously and the cars handled will be the Chalmers-Detroit, Hudson and Lozier.

Queen City Garage, Battle Creek, Mich.—Don Cole, who has for some time been connected with the Olds Motor Works, of Lansing, has purchased a half interest in the Queen City Garage, of Battle Creek. A partnership has been formed with F. W. Ellis, the former proprietor. The agency for the Jackson will be continued and a repair department added.

Ajax Expansion—To accommodate a great increase in business the Ajax-Grieb Rubber Company has moved its executive offices from Broadway and Fifty-seventh street, New York, to a large suite in the Thoroughfare Building across the way. The former offices will be a New York salesroom. A new three-story building is being added to the Trenton factory.

Meridan Place Garage, Indianapolis, Ind.—The Meridan Place Garage, recently opened at Meridan Place and Twenty-second street, has been purchased by A. W. Allison and A. L. Duggan from its builder, J. C. Lazarus. In the future it will be known as the Twenty-second Street Garage.

PERSONAL TRADE MENTION

Lewis M. Crittsinger has joined the R. L. Morgan Company, of Worcester, Mass., as purchasing agent. Mr. Crittsinger is one of the youngest and at the same time best-known men in the trade, and to take up his work with the Morgan Company resigned from the Chalmers-Detroit Motor Company. He has also been connected at times with the purchasing departments of the E. R. Thomas Motor Company, of Buffalo, and the Ford Motor Company, of Detroit.

Lewis M. Crittsinger

Fred C. VanDerhoof has been appointed manager of the Olds Motor Works Branch in Philadelphia, handling the Oldsmobile and the Oakland, both products of the General Motors Company. Mr. VanDerhoof is one of the best-known men in the industry, having been associated with it for a number of years, first in the branch department of the Ford Company, and then with the Bergdoll Company in the Quaker City. He managed the Ford branch in that city for several years and was general manager of the Bergdoll Company when it had the agency for the Chalmers-Detroit, Thomas and a number of other makes. He has already taken charge of the Olds branch house in Philadelphia and will have an extensive territory along the Atlantic coast to the South.

R. B. Van Dyke has been appointed manager of sales of the automobile department of the American Locomotive Company. Mr. Van Dyke has been with the company for a number of years and with the automobile department since its inception. His headquarters will be at the New York office, 1886 Broadway.

Frank H. Bowen has joined the sales force of the Simplex Automobile Company at the new headquarters, 1860 Broadway, New York City. Mr. Bowen has been connected with the automobile trade for eight years and was recently with the Harry S. Houpt Company in selling Thomas cars.

P. C. Chrysler has been appointed manager of the new Chicago branch of the General Vehicle Company, of Long Island City, N. Y. He will be remembered as formerly connected with the Rainier and American Locomotive.

R. S. Ireland has been appointed sales manager of the Ajax-Grieb Rubber Company and will be hereafter responsible for the distribution of Ajax tires. He was formerly Eastern sales manager of the company.

C. E. Reddif has been appointed designer of the Columbia Motor Car Company. Mr. Reddif served in a similar capacity for the Electric Vehicle Co.

P. A. Williams, Jr., sales manager of the Atlas Motor Car Company, started August 17 for an extensive visit to Bermuda.

OBITUARY

Arthur E. Adams, manager of the Algonquin Motor Car Company of Boston, died in that city on August 11. Mr. Adams was well known throughout the automobile trade, for he had been associated with it for many years, starting with the Mobile Company in 1899. Some years later he went to Boston with the Pope branch and at times was associated with agencies until he took hold of the Algonquin Company, the agent for the Oldsmobile. A large delegation of the trade attended the services on Saturday.

TAXICAB AND TRANSIT

Lebanon, Ky.—Great success has attended the new automobile stage line between this place and Springfield. The distance is 20 miles, but the train connections are so roundabout and infrequent that nearly a day is necessary to go between the points by rail. Two automobiles have been purchased—one for reserve—and two round trips are made daily, one in the morning and the other in the afternoon. The car has been full on each run so far. Louisville capital is behind the enterprise, and other lines are contemplated where necessary.

Washington, D. C.—Rock Creek Park will probably be opened to a line of buses to make access to the grounds easier. One of the capital sightseeing companies has asked for permission to operate six machines, with a seating capacity of from 30 to 40 persons, on a regular schedule from the traction terminals. They would run on a two or three-mile circuit, tapping convenient points, and a 10-cent round-trip fare, with stop-over privilege, is planned.

WHITE IN MILITARY MANEUVERS

BOSTON, Aug. 16—White steamers are playing a prominent part in the military maneuvers this week. First of all, a White car is being used by General Wood, who is the umpire in the big war game which is being played between the Massachusetts militia, on the one side, and detachments from the National Guards of New York, Connecticut and the District of Columbia, on the other side. In addition, three White Steamers are attached to the headquarters of General Brigham, who commands the Massachusetts troops, and is in charge of the "defense" of Boston. Furthermore, the White ambulance, belonging to the Massachusetts National Guard, will be in active service, as will the White car of Quartermaster Sergeant Hathaway. The latter car will be run on kerosene and will be used in traveling about the powder magazines and other places where the military regulations prohibit the storing of gasoline in any shape or form. Finally, Colonel George Harvey, editor of *Harper's Weekly*, has sent his White touring car to the front for the use of the war correspondents and photographers assigned to cover the maneuvers for his paper.

NEW AGENCIES ESTABLISHED

Overland and Marion: New York—Charles E. Riess & Son, East Orange, territory including New York, Brooklyn, Long Island, Staten Island and as far north as Poughkeepsie. Quarters secured at Broadway and Fifty-seventh street.

Studebaker: Trenton, N. J.—C. P. Weeden, the Valentine-Weeden Company, 432-438 Princeton avenue. Including Studebaker-E-M-F and Studebaker-Flanders 20

Detroit Electric: Nashville, Tenn.—Southern Electric Car Company, temporarily located with the Tennessee Automobile Company.

Hupmobile: Atlanta, Ga.—E. D. Crane & Company, for the northern district of the State, in addition to the Regal.

Oldsmobile and Oakland: Wilmington, Del.—Pennsylvania Garage, Pennsylvania avenue and Clayton street.

Reo: Houston, Tex.—Guilliaumo Auto Company, 707 Rush avenue, for South and East Texas.

Chase: Cleveland—E. P. McGollier, 1926 Euclid avenue.

Hupmobile: Louisville, Ky.—Fulton Mandeville.

Oakland: Philadelphia—Fred C. VanDerhoof.

Lozier: Trenton, N. J.—J. B. Gundling.

RECENT INCORPORATIONS

International Aerial Navigation Company, Galveston, Tex.—Capital $1,000,000. To establish airship service for freight and passengers to all parts of the United States, Mexico and other countries. President, Dr. F. J. Field; treasurer, Dr. Fred Terrell; secretary, V. P. Brown. To use 12-passenger machines, constructed in St. Louis, beginning operations on January 1, 1910.

Falls City Automobile & Garage Company, Louisville, Ky.—Capital $50,000. To act as wholesale and retail traders in automobiles, motorcycles and other vehicles and to operate garage and repair shop. Incorporators: W. J. Day, H. J. Hogan, H. C. Shanks, B. B. Bales.

Husson Motor Company of America, New York—Capital $12,000. To manufacture gas engines, motors, machines, automobiles, aerial vehicles, motor boats, etc. Incorporators: John Husson, J. J. Hogan, W. E. Young.

Tygard Engine Company, Plainfield, N. J.—Capital $250,000. To manufacture Tygard engine, automobiles, carriages, etc.; Incorporators: G. M. Neagley, W. E. Buhl, F. C. Tygard, E. E. Tygard, A. F. Randolph.

C. F. Splitdorf, New York—Capital $500,000. To manufacture electrical machinery, ignition apparatus, automobile parts and sundries. Incorporators: Charles F. Splitdorf, John Splitdorf, P. J. W. Kelley.

Linkroum Automobile Company, Newark, N. J.—Capital $20,000. To manufacture and deal in automobiles, motors, etc. Incorporators: Courtlandt Linkroum, William H. Linkroum, C. R. Erith.

Instantaneous Lighter Company, Columbus, O.—Capital $30,000. To manufacture automatic lamp lighters for automobiles and other purposes. President, F. C. Barger; treasurer, L. B. Barger.

Automobile Rim Securities Company, New York—Capital $150,000. To manufacture automobile and vehicle parts and accessories. Incorporators: Henry W. Goddard, Robert H. Gay, Edward Weck.

Essex County Overland Company, Newark, N. J.—Capital $100,000 To manufacture and deal in automobiles and motorcycles. Incorporators: L. F. Crocker, R. D. Crocker, H. H. Poole.

Union Motor Car Company, Newark, N. J.—Capital $125,000. To manufacture automobiles, locomotives, etc. Incorporators: P. Broderson, A. Broderson, F. C. Stowers.

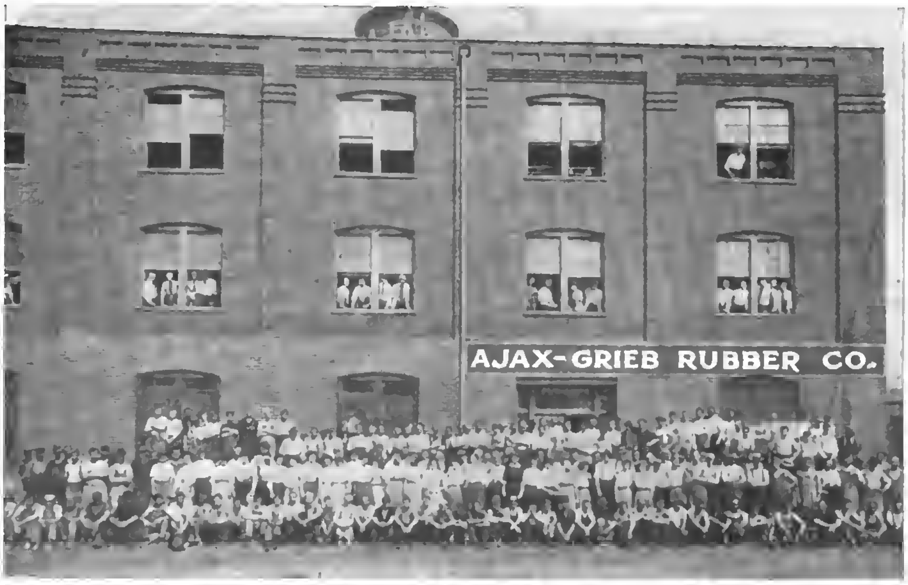
Pope-Hartford Company, Newark, N. J.—Capital $30,000. To manufacture and deal in automobiles. Incorporators: C. C. Pilgrim, Mary E. Lane, J. M. Hulbert.

Hall Car Company, New York—Capital $20,000. To manufacture engines, cars, locomotives and vehicles. Incorporators: T. M. May, B. H. Howell, H. P. Hall.

Metz Company, Waltham, Mass.—Capital $500,000. To deal in automobiles. President, J. C. Robbins; treasurer, C. J. Spiegleberg.

Continental Motor Manufacturing Company, Muskegon, Mich.—Capital increased from $225,000 to $500,000.

Trackless Trolley Company, New York—Capital $150,000. C. E. Barrett, A. L. Newman.



Factory Forces of the Ajax-Grieb Rubber Company, Trenton, N. J.

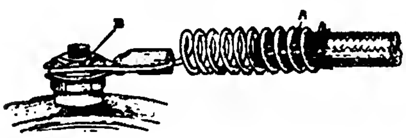
Information for Auto Users

"Red Rib" Ignition Cable—Accessory jobbers and dealers are pleased to find that the "Red Rib," which has been so cleverly advertised with a running fire of questions in the trade journals during the last few weeks, has turned out to be a line of popular-priced ignition cable of American manufacture. The cable will be handled by the National Sales Corporation of New York, which also originated the "Red Head" spark plug, and is noted for the quality of its products as well as of its advertising. The company will endeavor to minimize the selling and distributing expenses incidental to the launching of a new article, and maintain a schedule of popular prices. The cable will be made with both rubber and braided insulation, in primary and secondary and all intermediate sizes. Both the rubber and braided types will be listed at the same price, as it is the intention to simplify this business, as was done with the "Red Head" spark plug. A high standard of manufacture has been set and the cable had to undergo severe tests under the eyes of ignition experts before receiving the final approval.

A New Idea in Terminals—A terminal for the prevention of trouble as caused by a broken electrical circuit has been brought out by Read, 37 Kingston avenue, Brooklyn, N. Y. This is not only useful as a preventive of trouble along this line, but where used with a spark plug or other binding post, having nuts to screw on or off, it forms an efficient nut lock as well. In substance, it is sim-

READ TERMINAL HAS AN EXTRA WIRE

ple in the extreme, being merely a coil of brass wire soldered with the ordinary terminal end of copper. This coil of wire may, however, have one or two diameters, according as it is intended for use with small primary wires or large secondaries. In addition, there is soldered in another short piece of wire, which is bent over and lays flat parallel to and about 1-16 inch above the copper terminal. It is this latter portion that forms the nut lock, or it may be used as the connection proper, when the spark



SHOWING HOW THE LOCK WORKS

plug binding post has a hole through it, the wire slipping through this hole.

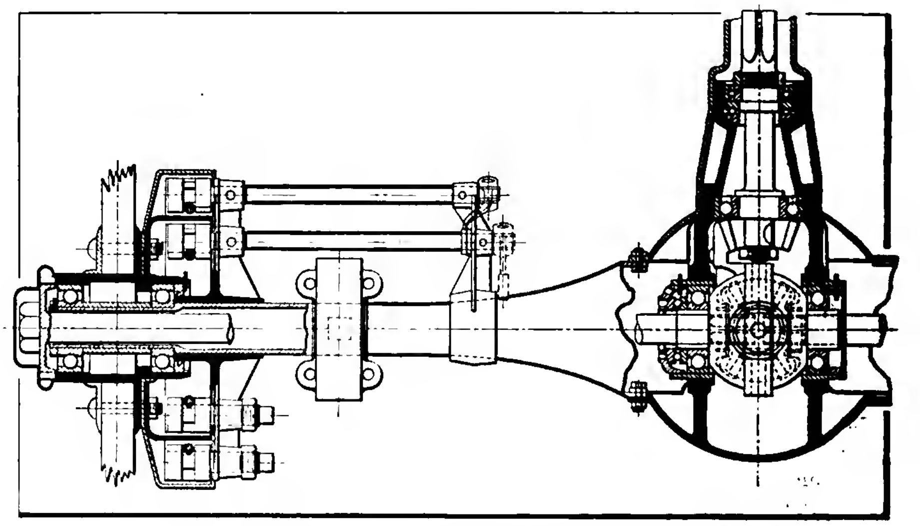
To connect these spring terminals to the wires, the insulation is cut away for half an inch, and the fine wires spread out and turned back over the outside all around. The terminal is then jammed or screwed on over this, the contact being sufficient. The coil of wire will absorb all vibration, so that with this device the danger of broken circuits due to this cause is eliminated.

Kurtz Alternating-Current Magneto—The Hercules Electric Company, of Indianapolis, already favorably known through its direct-current magnetos for stationary engine use, has brought out an alternating-current machine of the usual type for automobile use. For this

KURTZ MAGNETO IS LOW TENSION USED WITH SEPARATE COIL

purpose the company selected as the most desirable the low-tension design with separate coil, which allows ample space for insulation of the high-tension winding and also permits the use of a battery circuit through the same coil and distributor. Much attention has been given to the design, with the view of having the necessary functions carried out by the fewest and simplest parts. It is stated that the total number of parts is one-third less than on most magnetos. At the same time there is nothing freakish in the construction. The entire circuit-breaker box may be removed by simply releasing a spring with the fingers, no wrench or screw-driver being required. The points of the contact-breaker can be adjusted with a nail or bit of wire. The points are of iridium-platinum. Heavy bronze bearings are used, and insulation of the best vulcanized rubber. All gears are enclosed and practically noiseless. The magneto frame is cast in a solid piece, and the pole pieces are riveted in, making a construction extremely strong and adapted to stand excessive jarring and vibration. The magneto was thoroughly tested before being offered to the trade, and the Hercules Company feels that it will prove a worthy member of the Kurtz line.

Attractive Live-Axle Design—A live rear axle which embodies several good features and shows evidence of careful designing has been brought out by the McCue Company, of Hartford, Conn., and is illustrated in the accompanying line drawing. The axle proper is of pressed steel welded laterally, with openings front and back. Apparently the two halves of the axle are exactly alike; this, of course, greatly simplifies the manufacturing. The propeller shaft is designed to be of the one-joint type, enclosed in the torsion tube; the rear end of this tube is expanded and bolts over the front opening in the axle, and the front end carries a forged steel yoke, to be hinged to the cross member of the frame. Thus none of the torsion strains are carried by the universal joint. The differential and bevel gear and pinion are carried on a frame inserted through the rear opening of the axle. The axle shafts are full floating, with hub clutches integral. Annular ball-bearings of ample size are used throughout, with separate self-seating thrust bearings. The spring seats may be made either to key on or to swivel. The rear hubs carry two sets of brakes, both internal expanding, on concentric drums of ten and fourteen inches diameter, respectively. The brakes are operated by means of camshafts, easily adjustable, and these are extended so as to bring the brake connections inside the frame. The axle is made in two sizes, for cars above and below 2,500 pounds weight. The design is very attractive and the manufacturers state that they use only the best materials.



EXCELLENT DESIGNING IS AT ONCE APPARENT IN NEW MCCUE REAR AXLE

VOL. XXI NEW YORK—THURSDAY, AUGUST 26, 1909—CHICAGO No. 9

THE AUTOMOBILE

INDIANA SPEEDWAY PREMATURELY OPENED

WITH A DEPRESSING FATALITY LIST

INDIANAPOLIS, Aug. 23—The plain facts of the case are that the Indianapolis Motor Speedway was opened before completion—such completion as meant safety to those participating in the contests and safety to those who watched the racing. The management had entered into a double contract, one with the entrants and the other with the public, to open the speedway on August 19, 20, and 21. Only through almost superhuman exertion was it possible Thursday during the noon hour to start the first race and thus fulfill the announced obligations. There were the impatient drivers and the insistent spectators, the former ready to respond to the starter's pistol and the latter eagerly surging through the gates, anxious not to miss the opening event.

Certainly the drivers knew that the course had not received anywhere near its finishing touches, but while a few were questioning the advisability of competing, the greater number had no contrary thoughts and seemed unduly exercised in wanting the races to begin. Chances were numerous that accidents would punctuate the sport; and accidents marred the opening day in the form of a double fatality, Bourque and Holcomb of the Knox team being the sacrifices to the god of sport. Opinions are not in accord as to the exact cause of this catastrophe, but a ditch and a tile-strewn stretch of ground supplied conditions which added to the fearfulness of the happening. Some have it that Bourque must have been physically exhausted, for it is known that he had not been feeling over well. The distance of the race on such a course was too much for a single driver, unless endowed with extraordinary powers of endurance. Furthermore, as the race progressed. the surface of the track disintegrated and added to

The Crowded Grand Stand Attested the Interest Taken by the Public in the Contests—Finish of Friday's 50-M

the difficulties of the task. Built at high speed, the work could not be done with the thoroughness requisite to insure a reasonable degree of permanency in the track's surface.

Friday the thousands came again, and there was a feeling of decided relief when the sport concluded without any additions to the killed and injured list. Perhaps some were disappointed.

But Saturday supplied a distressing culmination, when in one accident mechanician Kellum and two spectators were killed, and another onlooker was seriously injured. This was the result of a right front tire puncture, Merz losing control of his National which dashed through the fence and turned over in the crowd near the bleachers stand. Not long after, Keene and a Marmon car met with disaster at the bridge opposite the bleachers, and it was then that Referee S. B. Stevens and President L. R. Speare of the A. A. A. decided that there had been enough for one day. Just before the announcement of this decision, the managers themselves, Messrs. Fisher, Newby, Wheeler, and Allison, had discussed and decided to ask the officials to stop the 300-mile race then in progress. At the time, the Jackson car piloted by Lynch led by over a lap, the Fiat handled by DePalma running second, with Stillman and a Marmon third.

With evident desire to leave the scene, the 25,000 spectators started homeward, some questioning the desirability of sport at the cost of human life, and others morbidly appreciating that they had seen something which they had feared might happen.

To-day there was a meeting of the directors of the speedway, when its future was carefully discussed. Taking all facts into consideration, it was decided that the track could be surrounded with safeguards, for drivers and public, which would permit a continuance of the racing, even if the expenditure totaled a hundred thousand dollars.

In commenting upon the situation, Carl G. Fisher, president of the speedway, said: "We feel there should be no more long events, longer than 100 miles, without new rules. In the first place we feel that drivers should be changed each 100 miles, as well as the tires, and we believe that drivers should be subjected to a physical examination. Loss of life must be prevented at all cost."

Merz, who survived the Saturday casualty, is quoted as not believing in limiting events to 100 miles. Said he:

"I do not think that it is necessary to limit future races to 100 miles. Drivers can go 300 miles all right, but the track should be in good condition. I had a bad experience, but I shall drive again. At the short stretches at either end of the track too much oil had been applied and the track was slippery near the pole. During the early part of the race I kept well in, but one lap I skidded dangerously, and after that I tried it near the outer edge. It was not so slippery there, but rather rough, and severe jolting, I think, caused my tire to explode. Then it was all up with me. Even the long stretches were far too rough; all the drivers complained of it. It was really a road race."

KNOX COMPANY IS APPRECIATIVE

SPRINGFIELD, MASS., Aug. 23—So many telegrams and letters of sympathy have been received by the Knox Automobile Company that its officials have found it necessary to acknowledge receipt of same by issuing a letter, the text of which is given herewith:

Knox Automobile Company,
Springfield, Mass., August 23, 1909.

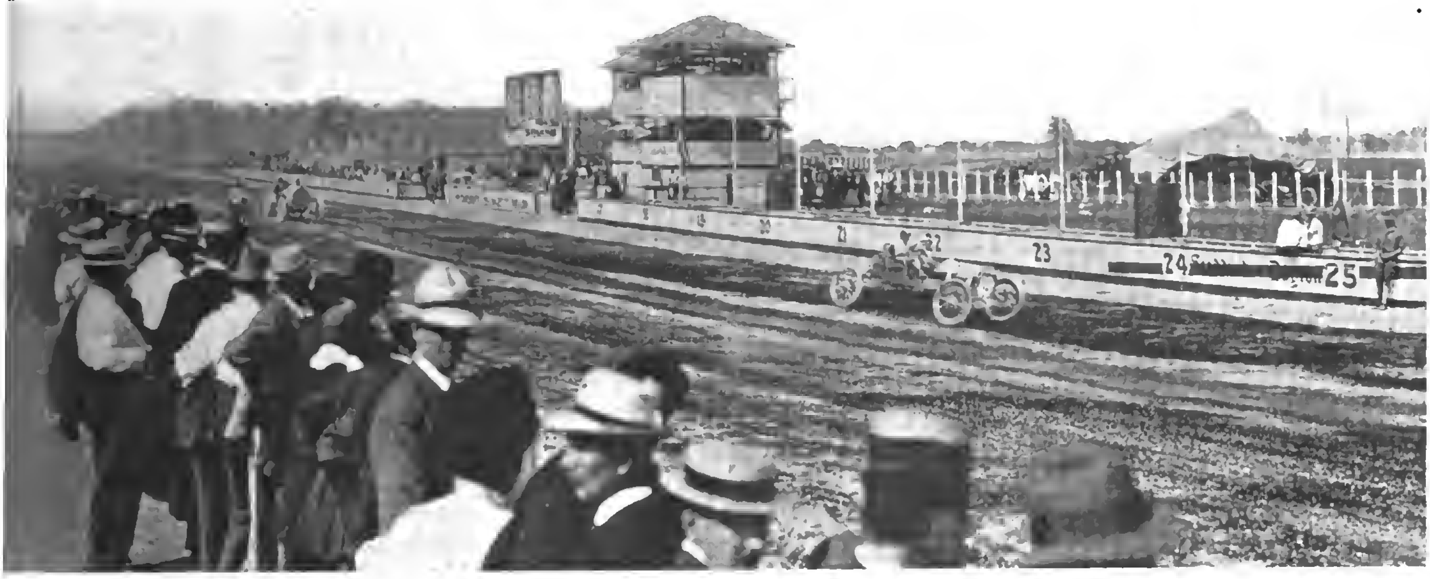
Agents, Customers, and Friends:—

We have received so many expressions of sympathy and inquiries as to the probable cause of the most deplorable accident at Indianapolis, August 19, sacrificing the lives of two of our most deservedly esteemed and trusted employees, we have delayed acknowledgment until we had been privileged with an opportunity to gather as many facts as possible from our own men who were present at the time the accident occurred, and while the exact cause will never be known, we are convinced after a careful consideration of all the particulars obtainable that Mr. Bourque's strength failed him and that he most probably lost consciousness and control of the car before it left the track.

He was not enjoying the best of health and the uncomfortable climate and track conditions demanded more than he had strength to give. He was faithful unto death and to the end enjoyed the support of a faithful helpmate.

All expressions of sympathy are fully appreciated and copies of same have been forwarded to the families of both Mr. Bourque and Mr. Holcomb.

Most respectfully yours,
KNOX AUTOMOBILE COMPANY.



Which Was Won by Stoddard-Daytons, Both First and Second Places Being Captured by These Cars

STORY OF THE FIRST DAY

INDIANAPOLIS, Aug. 19—A Stoddard-Dayton, driven by Schweitzer, achieved the honor of capturing the first race run on the Indianapolis speedway when it finished first this afternoon in a five-mile event for stripped chassis, in the 161-230 cubic inches class, which opened the initial card before a crowd of 15,000 people.

Five races had been carded, and every one produced fast time, although the condition of the track was none too good; in fact, the drivers complained so much about it that, following the accident which resulted in the death of Bourque and Holcombe, Referee Stevens ordered the promoters to improve the circuit before there could be another day of racing. Following this order, Director Moross prepared for a big gang of workmen laboring all night with the steam roller, and also ordered that the track be oiled at least half of its circumference because of the dust clouds raised by the flying wheels.

Prest-O-Lite Trophy Race the Feature

Of course the feature of the day was the 250-mile race for the Prest-O-Lite trophy, the cars being limited to a piston displacement of from 301 to 450 cubic inches, the field including the unfortunate Bourque in the Knox, Kincaid in the National six, and Merz in the National four; Strang, Chevrolet and Burman in Buicks; Miller and Clemens in Stoddard-Daytons, and Ellis in the Jackson.

Chevrolet led at the 10-mile post, and still had it 20 and 30 miles, Burman chasing him. In the fifteenth lap Burman forged to the front, and Chevrolet had to trail. At 50 miles Burman was but 11 seconds ahead of Chevrolet, while Kincaid was two minutes back of the leader, with Bourque, Ellis, Miller, Clemens and Strang following.

Strang was not a factor because of a sensational incident that occurred just as he was finishing his second lap. As he approached the pits it was discovered his car was afire and a hasty stop was made. A fire extinguisher was needed to put out the flames. Then Strang wanted to resume, but an objection was raised, it being claimed that he had received outside assistance in the shape of the fire extinguisher. Strang claimed, though, that as his mechanic had put out the fire there was no outside assistance. Finally, after considerable argument, he was allowed to resume under protest, it being understood the A. A. A. would thresh it out if he did anything.

Burman and Chevrolet had things their own way until the thirty-second lap, when Chevrolet dropped back, and Kincaid, Ellis and Merz passed him. Chevrolet, however, caught Merz. At 90 miles Strang had enough and retired. Passing the first century Burman had Ellis by more than five minutes. At 110 miles Chevrolet had worked back into second place, while Ellis had fallen to fifth place. No change in the order occurred until the fifty-third lap, when Chevrolet again lost his grip on second place and fell to fourth. Bourque began to look dangerous in the fifty-fourth lap, and at 140 miles was second, 28 seconds ahead of Kincaid. Burman at that time was five minutes to the good and going easy.

It was not long after—in the fifty-eighth lap—that the accident occurred which killed the Knox crew, and at the same time Chevrolet retired from the race. At 150 miles Burman was 11 minutes ahead of Kincaid, while Ellis was three minutes back of Merz. Ellis went to second place in the sixty-seventh lap, and at 175 miles he was some five minutes behind the leader, while Clemens had advanced to third. This order was maintained to the end of the eighty-first lap, and then the Jackson deposed the Buick having nearly 14 minutes' lead over Burman at 210 miles, and being 16 minutes 13 seconds to the good at 220 miles. Then came a sensational incident that put the Jackson completely out of the running.

Ellis had just passed the judges' stand, entering his eighty-ninth lap, when his engine stopped and his car coasted to the south pits, whereas, the Jackson box was in the north section. Ellis and his mechanic went to work with feverish energy to resume the race. Victory seemed certain with only 30 miles to go, if only the motor could be started. They cranked and cranked and didn't get a wheeze; then they discovered magneto trouble. But by this time the mechanic had collapsed and was

Where the Cars were Parked

The overflowing Grand Stand

As the Crowd Surged in.

Crossing the Tracks Bridge

carried off the track by Ellis, who was all in himself. The exertion told on him, and he, too, fainted. Thereupon Referee Stevens granted permission for a relief crew to go on, and Tom Lynch undertook the job of piloting. But he also failed to get the engine started, and the dead Jackson stood by the pits while Burman continued on to victory, Clemens being runner-up, while Merz, in the No. 7 National, went into third place when his team mate, Kincaid, failed to get to the tape because of a broken gasoline feed on his last round.

Oldfield Benzed Mile Mark

Despite the roughness of the track, Barney Oldfield, in the Benz, set a mile mark that is likely to stand for some time, doing an exhibition in :43 1-10. Of course these figures have been excelled in road and beach trials, but it is the best ever made on a track in this country.

Wright and Schweitzer in Stoddard-Daytons, De Witt and Ryall in Buicks and Stickney in a Velie were the starters in the opener. Ryall went out the first lap and the Velie was not a contender. The three cars that did fight it out went at a good clip, the time of the winner being 5:13 2-10.

Poor "Billy" Bourque scored his last victory in the five-mile stripped chassis race for cars in the 301-450 class when he showed the way home to Clemens in a Stoddard-Dayton and Merz in the National, his time being 4:45 1-5. In this an attempt was made to use a flying start, but there was so much trouble in doing it this way that Starter Wagner went back to the standing start.

Harroun, of Chicago, driving a Marmon, won the 10-mile free-for-all handicap, in which a good field started. He had a 1:45 handicap.

STORY OF SECOND DAY

INDIANAPOLIS, Aug. 20—The G & J trophy at 100 miles and a 50-mile event furnished the attractions to-day, and six events were run off without accidents of any sort. Proceedings began at noon, and by 1 o'clock there were at least 20,000 spectators. By working all night the management had put the course in better shape than it was on the first day, the surface having been oiled half way around, while the work of the steam rollers was easily noticeable. Zengel in the Chadwick six clipped off 10 miles in 8:23 1-10 as against the 9:12 3-5 made by Oldfield in his Peerless Green Dragon as far back as 1904. Aitken in the National six ran 5 miles in 4:25 as against DePalma's

4:26 in a Fiat at Providence last year. Strang also participated in the feast, clipping the old marks in the G & J trophy race at 100 miles, the century being turned in 1:32:48 5-10.

The fight for the G & J trophy was the feature of the afternoon.' Some of the officials wished to cut the distance to 50 miles. Most of the contestants, however, lodged a strenuous objection. The grind resolved itself into a battle between the special Indiana trophy Buicks and the stock Marmons, the conditions limiting the field to cars of from 231 to 300 cubic inches piston displacement. As it turned out, Strang won and put up a new set of records, the feature of his race being the fact that he ran from start to finish without a stop either for repairs, supplies or to change tires. His time showed he had averaged 2:19 2/10 to the lap, a remarkably consistent performance. The runner-up was De Witt, also in a Buick, who was about 9 minutes back. Two others finished within hailing distance of the winner—Harroun in No. 15 Marmon, in 1:42:37 6/10, and Stillman, also in a Marmon. All three timed got inside the Burman record made at Columbus The Marmons ran consistently all the way through the century and are entitled to considerable credit for their work.

Chadwick Six Takes a Free-for-All

When the field lined up in the ten-mile free-for-all great things were expected, for Barney Oldfield had trotted out the big Benz for its first bit of competition work at Indianapolis. Opposed to him were Zengel in the Chadwick six, Aitken in the National six, Heina in a Lozier, de Palma in Hearne's stock Fiat and Cameron in a Stearns six. Oldfield set a merry clip for the first lap, and had a fine lead at that time. Then he was seen to slow, and in the back stretch the Chadwick went to the front, while the Benz dropped out. It later developed that Barney had met with an accident in the handicap preceding, in which he had driven his "Old Glory" National. He had had to stop in the backstretch, and while cranking the motor the hood came off and struck him on the arm, making a bad cut. This pained Barney, and in the big race he was greatly handicapped. Also a footboard on the Benz had loosened and got under the clutch pedal, so that Oldfield was in sad straits.

After Oldfield had been eliminated there was nothing to it but the Chadwick, which was let out to the limit. The distance of the race was soon covered, and Zenzel came home about

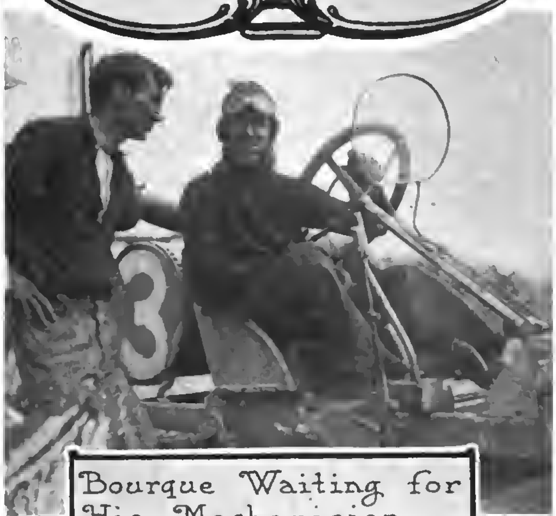
Bourque's Demolished Knox.

Just before Lytle's Disaster

Ambulances, Available and Required

After Merz's Fatal Crash

Incidents in Bourque's Last Ride



Bourque Waiting for His Mechanician.

The Final Change of Tires.

His Concluding Circuit.

an eighth of a mile ahead of Aitken in the National, having covered the ten miles in 8:23 2/10, which amply demonstrated the speed possibilities of the track.

Another speed feature of the afternoon was the mile trial. Yesterday Barney Oldfield, in the Benz, went an exhibition in :43 1/10, and to-day he drove against this mark. The consistency of the Benz was shown by the fact that Barney duplicated his figures of yesterday. Zengel also shot at the mark with the Chadwick, doing :49 3/10. De Palma, driving a stock Fiat and not his Cyclone, got a mark of :48 6/10.

The speed trials opened the afternoon's sport, and following came the 231-300 class race at five miles, in which Strang and Chevrolet, in Buicks, had everything to themselves, third place falling to Stutz in the Marion.

Aitken and National Were Star Pair

Aitken, in the National six, again came into prominence in the ten-mile race for 301-450 class of stripped chassis, in which the runner-up was Chevrolet, in a Buick. De Hymel, in a Stoddard, was third.

Aitken followed this with another victory in the ten-mile for cars that will run for the Wheeler & Schebler trophy to-morrow. In this he trimmed Lytle in an Apperson, having nearly 10 seconds the advantage as the tape was crossed, while Heina, in a Lozier, was third. In the five-mile handicap it was a case of the National being one, two, Aitken in his six getting the decision over Merz, the finish being so close that some disputed the decision of the judges. It probably was one of the most hair-splitting decisions ever turned out at a motor meet, the timers deciding there was only 1/200 ofa second between the two Nationals.

Stoddard-Dayton Ran One-Two

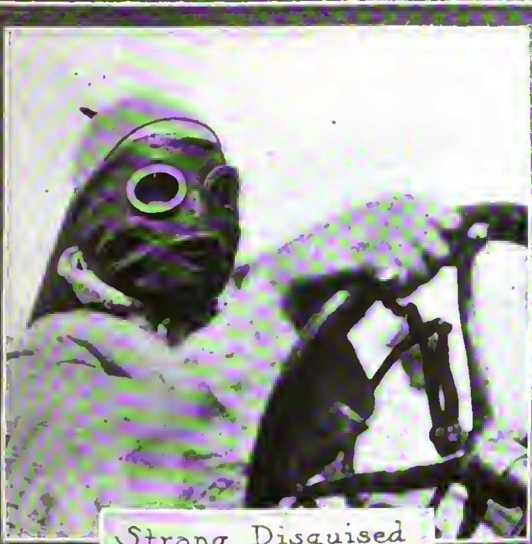
The fifty-mile race shared honors with the century as one of the attractions of the afternoon, and it resolved itself into an easy victory for Stoddard-Dayton, which took both first and second. Ryall and De Witt, in Buicks, and Stickney, in the Velie, were the other starters. The Stoddards were in front at twent miles and stayed there, although De Witt at one time threatened to be a factor, only to fade away.

STORY OF THE THIRD DAY

Indianapolis, Aug. 21—Just when prospects looked brightest for the successful completion of the meet, two accidents brought racing to a sudden end this afternoon and prevented a winner being evolved in the Wheeler & Schebler cup race at 300 miles. Merz, in the National, ran off the bank near the bleachers, and the accident resulted in the killing of two spectators and the death of Kellum, the accompanying mechanic. Before the horror-stricken crowd had time to recover from the effects of this, Keene in a Marmon skidded and hit a pole. His mechanic suffered a fractured skull, and thereupon the officials decided to stop the race, it being evident that the drivers were greatly fatigued and that if the event went the full distance there might be more accidents. At the time the race was stopped, 235 miles, the Jackson was in the lead and seemed to have a good hold on first place. But Referee Stevens would not give it the race, and in the evening, after a consultation with his fellow officials, he issued the following statement:

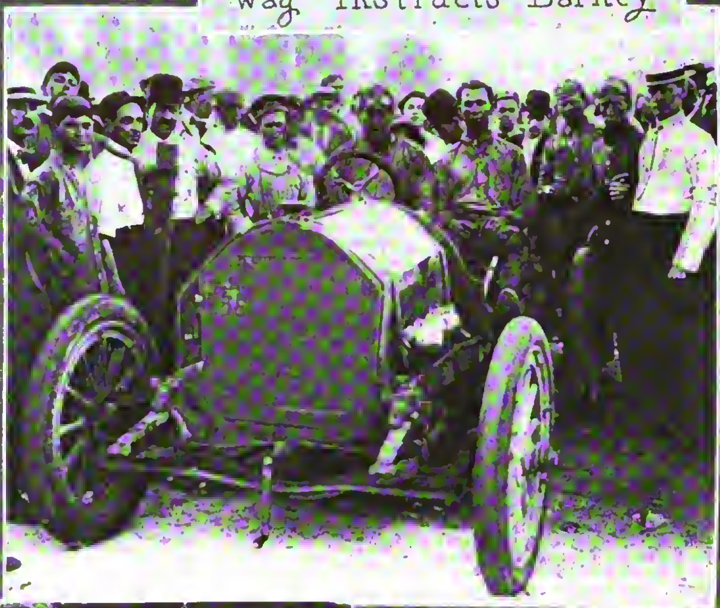
> Owing to the physical condition of the contestants who had been subjected to the strain of a three-day race meet under trying climatic conditions, I deemed it to the best interests of the entrants and spectators to abandon the race, therefore I rule no race and no awards. In conclusion, however, I recommend to the management of the Indianapolis Motor Speedway and to the donors of the trophy that suitably engraved certificates of performance be presented all contestants in active participation in this event at the time of its abandonment, and that they be signed by the management of the speedway, the donors, and the referee.

At the time the race was stopped Lynch in the Jackson had completed 235 miles, his time for that distance being 4:13:51 4-10. De Palma in the Fiat, was second, and Stillman in the plucky


Strang Disguised


"Wag" Instructs Barney


Christie Interested


Lynch, The Jacksonite


Rounding the Turn


Marmons consult Stillman


Bourque and Holcomb

Time-Keepers Baker and Warner

F. H. Wheeler

One Contestant and Some Officials

A. G. Candler, Jr., and E. M. Durant of Atlanta.

Busy Moross

The Gold-Plated Overland

Referee Stevens

A. L. Riker, C. W. Kelsey, Mr and Mrs. H. E. Coffin

Technicist Beecroft

First Lap of the 300-Mile Race for the Valuable Motor Speedway Trophy

little Marmon third. Harroun in a Marmon, and De Hymel in a Stoddard, were also running—five out of eighteen starters.

The race itself was replete with sensational incidents. At the very start Johnny Aitken in the National six jumped out and beat it. He soon had a good lead over his fellows, with Lytle in the Apperson being closest. The half-century showed Aitken more than three minutes to the good.

Lytle Figured in the First Accident

The first scare of the afternoon came in the twenty-fourth lap when Lytle escaped a serious accident by his skillful driving. He had just passed the pits when a steering arm broke and left Lytle almost helpless. The car made a wild dive for the fence, but Lytle with control only over one front wheel managed to pull it away and run up the bank. He had slowed by this time and from the top of the bank he slowly drifted to the pole, just escaping being hit by one of the cars following him. When the bottom was reached the Apperson struck a pile of dirt, the mechanic was thrown clear and Lytle stepped out unhurt. The car had been moving so slowly that no damage was done. Lytle went to work and repaired the damage and resumed when the race had reached 175 miles. He was so far behind, though, that he hadn't a chance in the world of doing anything.

Following the Apperson incident Aitken continued to burn it

250-MILE RACE FOR THE PREST-O-LITE TROPHY, VALUE $1,000—301 TO 450 CUB. IN. PISTON DISPL.—AUGUST 19

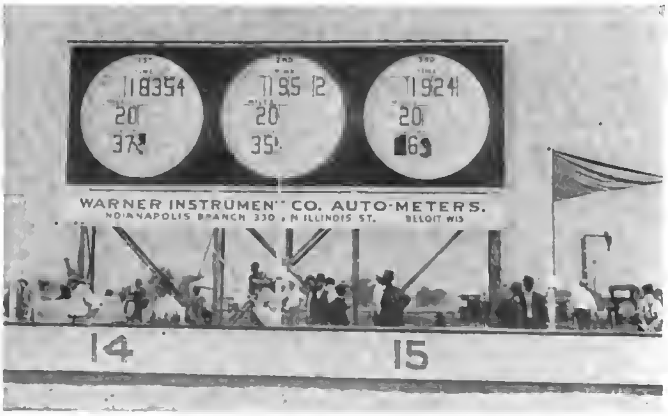
No.	CAR	Driver	Bore	Stroke	10 M.	50 M.	75 M.	100 M.	150 M.	200 M.	250 M.
35	Buick	Burman	4	4½ x 5	9:40	47:05	1:10:24	4	2:27:32	3:24:13	4:38:57 4-10
61	Stoddard-Dayton	Clemens	4	4¾ x 5	8	8	9	8	5	3:52:04	4:46:01 8-10
7	National	Merz	4	5 x 5 11-16	6	6	6	1:38:11	4	5	4:57:07 1-10
6	National	Kincaid	6	5 x 5 11-16	4	48:05	1:10:49	5	2:36:30	4	Didn't cross line
21	Stoddard-Dayton	Miller	4	4¾ x 5	5	7	7	7	6	6	
53	Jackson	Ellis	4	4¾ x 4¾	9:52	5	5	1:37:31	2:39:53	3:28:47	
3	Knox	Bourque	4	5 x 4¾	7	4	4	6			
37	Buick	Chevrolet	4	4½ x 5	9:23	46:54	1:09:47	1:32:18			
36	Buick	Strang	4	4½ x 5	9	9	8				

100-MILE RACE FOR THE G. & J. TROPHY, VALUE $1,000—231 TO 300 CUB. IN. PISTON DISPL.—AUGUST 20

No.	CAR	Driver	Cyl.	Bore and Stroke	10 M.	25 M.	50 M.	75 M.	100 M.
33	Buick	Strang	4	4 23-64 x 5	9:75	23:20	46:04	1:09:37	1:32:40.8
32	Buick	DeWitt	4	4 23-64 x 5	10:21	24:52	48:55	1:17:21	1:41:32.3
15	Marmon	Harroun	4	4½ x 4½	4	5	4	3	1:42:37.6
16	Marmon	Stillman	4	4½ x 4½	10:21	4	52:30	4	4
34	Buick	Chevrolet	4		5	3			
12	Marion	Monson			6 D. O.				

300-MILE RACE FOR THE WHEELER-SCHEBLER TROPHY—UP TO 600 CUB. IN. DISPL.—AUGUST 21

No.	CAR	Driver	Cyl.	25 M.	50 M.	75 M.	100 M.	125 M.	150 M.	175 M.	200 M.	225 M.	235 M.
52	Jackson	Lynch	4	10	8	8	7	4	2:39:34	3:05:16	3:32:28	4:03:54	4:13:31.4
24	Fiat	De Palma	4	7	5	1:13:11	1:36:19	3	2:46:14	3:09:35	2	4:05:23	
75	Marmon	Keene	..	18	12	9	9	6	2:46:38	3:20:46	3		
58	Marmon	Harroun	4	16	13	12	11	10	6	6	5		
17	Marmon	Stillman	4	13	11	10	10	8	5	5	4		
9	National	Oldfield	6	15	15	13	13	9	7	8			
62	Stoddard-Dayton	De Hymel	4	6	7	6	6	5	10	9			
23	Stoddard-Dayton	Miller	4	11	10	11	7	7	4	4			
10	National	Merz	4	5	4	4	4	2	8	7			
53	Jackson	Ellis	4	19	17	14	14	12	9				
35	Buick	Burman	4	4	47:49	1:11:54	1:35:50	1					
22	Stoddard-Dayton	Clements	4	8	6	7	8	11					
1	Apperson	Lytle	4	3	47:4	16	..	13					
37	Buick	Chevrolet	4	9	9	5	5						
8	National	Aitken	6	21:27	44:22	1:09:34	1:31:41						
55	Marion	Stutz	4	17	16	15							
76	American	Drach	4	14	14								
36	Buick	Strang	4	2									
2	Apperson	McCulla	4	12									



Warner Scoreboard Recorded the Leaders' Positions

The Teams Used in Construction Numbered Hundreds

Workmen Hurriedly Giving Way to the Racing Craft

Along Automobile Row, Which Proved a Big Success

and had turned the century with a new record to his credit. The National was running so well that even at this early point it seemed as if Aitken's name would be the first engraved on the $10,000 trophy. But in the very next lap a cracked cylinder developed and Aitken had to quit, leaving an opening for Burman to become the leader. The Buick star went to the front and showed first at 125 miles, but soon after he went down and out, leaving the field to Lynch in the Jackson, De Palma in the Fiat, and Stillman in the Marmon.

How Kellum Ran to His Death

Merz in the National four still was in the running and for a few laps after his team mate had quit he had been in front. Trouble overtook him though when he had to stop in the back stretch. He stopped his engine and when he tried to start it again he discovered his storage battery was dead. He and his mechanic, Lyne, were too tired to start on the magneto and so Lyne was dispatched across the infield for a new battery. It was a long run, nearly a mile, and Lyne arrived at the pit in an exhausted condition, collapsing when he reached there, whereupon Kellum was delegated to take his place. Kellum had been mechanic for Aitken until the six had been forced out, but he cheerfully picked up the battery and ran across the field with it, going to his death, as it afterward turned out.

Merz started to recover lost ground and was making good progress. He had passed the double century mark and had swung into the first turn. He had got half way around the bend and was nearing the bleachers when a front right tire punctured. The National shot up the bank and over the edge just where the bridge abutment is located. It posed for a second on the brink, then toppled over, striking a fence on which sat a row of spectators. It was a danger point and there was a huge sign there warning people to keep away, and it is stated that the police had driven them off several times. The crash of the car killed two outright, Ora Joliffe of Trafalgar, Ind., and an unknown man. Kellum was so badly injured that he died soon after. Merz, though, had a lucky escape. He was caught under the car when it turned over but was not hurt, retaining presence of mind enough to turn off the power before he crawled out.

Only three other races were run and there was an attack on the kilometer record which resulted in Oldfield in the Benz going the 5-8 of a mile in :26 2-10. Christie did :28 7-10, and Zengel in the Chadwick :29 9-10.

Oldfield Won the Remy Brassard

A remarkably fast race was run for the Remy brassard, which has been put up by the magneto manufacturer and which carries with it a salary of $75 a week as long as it is held. Oldfield went after the money and got it, leaving behind him a trail of new records. He finished the quarter-century in 21:21 7-10, the Fiat being second in 22:44 4-10, and the Chadwick third in 23:07 8-10.

THURSDAY, AUGUST 19

5 MILES, STRIPPED CHASSIS, 161-230 CU. IN. PISTON DISPL.

No.	Car and Driver	Cyl.	B. and S.	Pos.
19	Stoddard-Dayton, Schweitzer	4	3 7-8 x 4 1-2	1
18	Stoddard-Dayton, Wright	4	3 7-8 x 4 1-2	2
30	Buick, DeWitt	4	3 1-4 x 3 1-4	3
49	Velie, Stickney	4	4 x 4	4
31	Buick, Ryall	4	3 1-4 x 3 1-4	d. o.

Time of winner, 5:18 1-4.

10 MILES, STRIPPED CHASSIS, 231-300 CU. IN. PISTON DISPL.

No.	Car and Driver	Cyl.	B. and S.	Pos.
34	Buick, Chevrolet	4	4 23-64 x 5	1
33	Buick, Strang	4	4 23-64 x 5	2
32	Buick, Burman	4	4 23-64 x 5	3
15	Marmon, Stillman	4	4 1-2 x 4 1-2	
16	Marmon, Harroun	4	4 1-2 x 4 1-2	
14	Marion, Stutz	4	4 1-2 x 4 1-2	

Time of winner, 8:56 4-50.

5 MILES, STRIPPED CHASSIS, 301-450 CU. IN. PISTON DISPL.

No.	Car and Driver	Cyl.	B. and S.	Pos.
3	Knox, Bourque	4	5 x 4 2-4	1
35	Buick, Burman	4	4 1-2 x 5	2
37	Buick, Chevrolet	4	4 1-2 x 5	3
36	Buick, Strang	4	4 1-2 x 5	4
21	Stoddard-Dayton, Miller	4	4 3-4 x 5	5
52	Jackson, Lynch	4	4 3-4 x 4 2-4	6
53	Jackson, Ellis	4	4 3-4 x 4 3-4	7

Time of winner, 4:45 1-10.

10 MILES, FREE-FOR-ALL, HANDICAP

15	Marmon, Harroun	4	4 1-2 x 4 1-2	1:45	1
51	Jackson, Lynch	4	4 x 4	1:45	2
8	National, Aitkin	6	5 x 5	:20	3

Time of winner, 8:22 1-10.

FRIDAY, AUGUST 20

5 MILES, STRIPPED CHASSIS, 231-300 CU. IN. PISTON DISPL.

No.	Car and Driver	Cyl.	B. and S.	Pos.
33	Buick, Strang	4	4 28-64 x 5	1
34	Buick, Chevrolet	4	4 23-64 x 5	2
14	Marion, Stutz	4	4 1-2 x 4 1-2	3

Time: No. 33, 4:45; No. 34, 4:55 4-10; No. 14, 6:31 4-10.

10 MILES, STRIPPED CHASSIS, 301-450 CU. IN. PISTON DISPL.

7	National, Merz	4	5 x 5 11-16	1
37	Buick, Chevrolet	4	4 1-2 x 5	2
20	Stoddard-Dayton, DeHymel	4	4 3-4 x 5	3

Times: Five miles—No. 7, 4:48 2-10; No. 37, 4:58; No. 20, 4:59 4-10. Ten miles—No. 7, 9:16 3-10; No. 37, 9:44 4-10; No. 20, 10:23 5-10.

TRIALS AT ONE MILE RECORD

		Time
27	Benz, Oldfield	:43 1-10
54	Fiat, De Palma	:48 6-10
50	Chadwick, Vengel	:49 3-10
26	Christie, Christie	Not taken

10 MILES FOR WHEELER & SCHEBLER CUP CARS

No.	Car and Driver	Cyl.	B. and S.	Pos.
8	National, Aitken	6	5 x 5	1
1	Apperson, Lytle	4	5 3-4 x 5	2
5	Lozier, Heina	4	5 3-4 x 5 1-4	3
6	National, Kincaid	4	5 x 5 11-16	4

Times: Five miles—No. 6, 4:48 1-10; No. 24, 4:49 4-10; No. 1, 4:55 7-10. Ten miles—No. 8, 9:26 6-10; No. 1, 9:36 2-10; No. 5, 9:42 8-10.

10 MILES, FREE-FOR-ALL

50	Chadwick, Zengel	6		1
8	National, Aitken	6	5 x 5	2
66	Stearns, Cameron	6	5 3-8 x 5 3-8	3
5	Lozier, Heina	4	5 3-4 x 5 1-4	4
24	Fiat, De Palma	4		
27	Benz, Oldfield			

Times: Five miles—No. 50, 4:17 4-10; No. 8, 4:21 1-10; No. 5, 4:28 1-10. Ten miles—No. 50, 8:28 2-10; No. 8, 8:32 6-10.

50 MILES, STRIPPED CHASSIS, 161-230 CU. IN. PISTON DISPL.

No.	Car and Driver	Cyl.	B. and S.	Time
16	Stoddard-Dayton, Bright	4	3 7-8 x 4 1-2	59:23 1-10
19	Stoddard-Dayton, Schwitzer	4	3 7-8 x 4 1-2	1:00:26 7-10
31	Buick, Ryall	4	3 1-4 x 3 1-4	
30	Buick, DeWitt	4	3 1-4 x 3 1-4	
49	Velie, Stickney	4	4 x 4	

5 MILES, FREE-FOR-ALL, HANDICAP

No.	Car and Driver	Cyl.	B. and S.	Pos.
8	National, Aitken	6	5 x 5	1
7	National, Merz	4	5 x 5 11-16	2
22	Stoddard-Dayton, Miller	4	5 1-4 x 5 3-4	3

Handicap: No. 8, 10 seconds; No. 7, 20 seconds; No. 22, 30 seconds. Time: Nos. 8 and 7, 4:25; No. 22, 4:30 1-2.

SATURDAY, AUGUST 21

15 MILES, FREE-FOR-ALL, HANDICAP

No.	Car and Driver	Cyl.	B. and S.	Pos.
6	National, Kincaid	4	5 x 5 11-16	1
23	Fiat, De Palma	4		2
17	Marmon, Stillman	4	5 x 5	3
30	Buick, DeWitt	4	4 1-2 x 5	4

Handicaps: No. 6, 1:15; No. 24, scratch; No. 17, 1:00; No. 30, 2:15. Time of winner, 14:23 5-10.

10 MILES, AMATEUR CHAMPIONSHIP

24	Fiat, Hearne	4	1
47	Buick, Ryall	4	2
29	Thomas, Greiner	6	
66	Stearns, Cameron	6	•

Time: No. 24, 9:44 3-10; No. 47, 9:49 3-10.

25 MILES, FREE-FOR-ALL, REMY BRASSARD

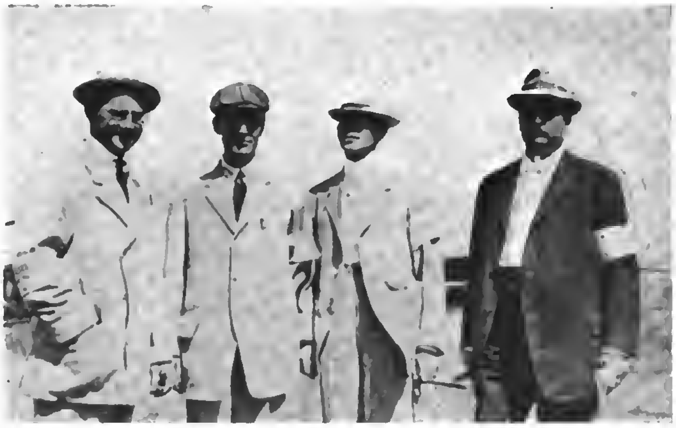
No.	Car and Driver	Cyl.	B. and S.	Time
27	Benz, Oldfield	4	6 1-10 x 8	21:21 7-10
24	Chadwick, Zengel	4	5 x 6	22:44 4-10
50	Fiat, De Palma	4	5 1-2 x 5 1-8	23:07 8-10

HEARD AND HAPPENED AT INDIANAPOLIS

President L. R. Speare, of the American Automobile Association tried his best to have the three hundred mile race at Indianapolis cut down to 100 miles, and then tried to compromise on two hundred. Mr. Speare watched the race with dread, and finally, after the second accident, immediately counseled stopping it. Asked whether the accidents would result in any action on the part of the A. A. A., he said: "The accidents were

In Front of the Pits There Was Action

Merz, the National Driver, Winner and Loser



Speedway Four: Fisher, Allison, Newby, Wheeler

Start of G & J Trophy Race Which Strang Won the result of conditions which may be corrected, and will be. I see no reason now for raising any bars against future contests.

As in the days of cycle racing, the public has grown to believe in the man as much as in the machine, and the cheers are for the men with whom, through past performances, they are acquainted. In the grand stands at events will be heard: "What do you know about that. Barney has just let that fellow go by him. Why don't he hurry up. Barney is not a quitter." These and similar remarks show plainly the feeling of the people and add zest to the sport which was not there in the early days when the feeling was general that it was the machine and not the man that was doing the racing.

"Go out, boys, and do your best to win, but without taking chances," said Mr. Wright of Springfield when Dennison and Bourque left for Indianapolis. "Remember," continued Mr. Wright, "you boys are very dear to us here, and we want no wins at the sacrifice of safety. We merely want you to drive within the safety limit, but finish the contest." Dennison promised, as did Bourque.

"No married men need apply," is the verdict of one maker of automobiles who oftentimes dabs in speed contests. This maker issued the edict before sending his team to Indianapolis, and by a chance a married did get on the team. The man was killed, but not at the track, and the wife, of course, blamed it all to the maker, although the husband had always claimed that he was not married and steadily carried through the deception to gain a place on the racing cars.

BOURQUE WAS TO HAVE BEEN MARRIED

SPRINGFIELD, MASS., Aug. 22—Wilfred Bourque, who was killed while competing in the automobile races at Indianapolis last Thursday, was to have been married September 14 to Miss Alexina Boivin, of West Springfield, and two of their friends, Prosper Dufresne and Miss Eugenie Parent, had planned to make the wedding a double ceremony. Bourque's fiancée was opposed to his racing, and he had promised her that after the Vanderbilt cup event this fall he would not race another car.

Over 300 employees of the Knox Automobile Company met the bodies of Bourque and Harry Holcomb on their arrival from the West and escorted them to their homes. Fully 5,000 persons were at the railroad station when the train arrived.

The funeral of Mr. Holcomb was held this afternoon in the Methodist Church in Granville, the Rev. Philip L. Frick officiating. The funeral of Mr. Bourque will be held to-morrow morning at St. Louis' Church in West Springfield.

STODDARD-DAYTON OUT OF RACING

DAYTON, O., Aug. 24—Charles G. Stoddard, vice-president of the Dayton Motor Car Company, announced to-day that the local company would never again enter in a racing event. The Dayton concern conducted a large excursion to the recent meet at Indianapolis, when 1,800 residents of this city saw the races and accidents which marred the sport.

Mr. Stoddard says automobile races not only cause men to risk their lives unnecessarily, but that the motor car business is damaged every time a man is hurt.

MEETING OF M. C. A. RULES COMMITTEE

INDIANAPOLIS, Aug. 21—The general rules committee of the Manufacturers' Contest Association has held several sessions during the speedway races, and definite plans for another year have been decided upon, though no announcement will be made for the present. The M. C. A., through its advisory committee to the contest board of the American Automobile Association, is going to ask for several changes in the present agreement involving the two organizations. President Benjamin Briscoe and Chairman H. E. Coffin of the rules committee, presided at the meetings, which were well attended.

POSSIBILITY OF 1909 VANDERBILT RACE

H. E. Coffin, chairman of the general rules committee of the M. C. A., has notified the prominent makers of the country that a race for the Vanderbilt cup will be held if a sufficient number of entries to insure the success of the event are pledged on or before September 1. The mails and telegraph are being used in a thorough canvass of the situation. If the makers guarantee the required number of entries the race will be conducted by a new association, formed pursuant to the A. A. A.-A. C. A. peace agreement, which will assume the custody of both the Vanderbilt and the Grand Prize cups.

The actual incorporation of this holding body will take place when the Vanderbilt race of this year is assured. In its membership are automobilists of national reputation.

By a change in the deed of gift the Vanderbilt trophy will become one for stock-car competition, under rules recommended by the Manufacturers' Contest Association, as follows:

1. The Vanderbilt cup race shall be open to cars of classes 1 and 2 of division B, under the classifications of the A.A.A. racing rules for 1909.

2. A cup will be offered for class 3 and another for class 4 under the same division, to be raced for at the same time and on the same course, but at shorter distances.

These classes call for competition under piston displacement, and were recommended as providing a possible race for existing stock cars, as the time was realized to be too short for the building of any new cars for this special event.

The race will be held over the portion of the parkway used in 1908, with probably the same Nassau County roads. A request has been made, however, that the course be shortened, and engineers looking into the matter have found this to be possible. If the short course is finally decided upon, it will probably be about four miles less than that of 1908.

All preliminary details regarding the race have been quietly perfected, and now the situation is up to the makers. If held, the race will take place the latter part of October.

METROPOLIS MAY HAVE A MOTORDROME

NEW YORK, Aug. 24—New York may have an automobile track within a few minutes of the great business district. The proposed location of the course is on the meadows just outside of Jersey City, where the McAdoo tunnels will reach the spot. For some time these meadows have been filled, and a vast area is now ready for factory sites or anything desired. The immense attendance at automobile events all over the country attracted the attention of the McAdoo interests and P. S. Parish and W. M. Jacobus, accompanied by A. A. Alexanded, made a flying trip to Indianapolis. The great crowds and the evident interest, created a most favorable impression, and the trio made a thorough inspection of the track and grounds before leaving. It is said that the venture will tie up two and one-half million dollars.

TEN ENTRIES FOR NEXT BRIGHTON "24"

NEW YORK, Aug. 24—Entries for the 24-hour race, which will be held on Friday and Saturday, on the Brighton Beach track, closed to-day with ten nominees. Eight of these are of American production, one is from Italy and one is from France. The track has been much improved since the last contest and records are expected to be broken. Harlan W. Whipple has been chosen referee. The entrants are as follows:

No.	Car	Drivers
1	Renault	Basle and Raffalovitch
2	Palmer and Singer	Howard and Lescault
3	Acme	Patschke and Van Tine
4	Acme	Dearborn, other not announced
5	Lozier	Cobe and Heina
6	Stearns	Mulford and Laurent
7	Houpt	Robertson and Poole
8	Allen Kingston	Hughes and Lawwell
9	Fiat	DePalma and Parker
10	Rainier	Disbrow and Lund

The entries for the six-hour race for smaller cars, and those for the short distance events, close to-morrow.

Paulham in Voisin Biplane

Arrival of Curtiss Aeroplane in France

Tissandier in the Wright Biplane

CURTISS OPENS RHEIMS TOURNAMENT WITH RECORD

RHEIMS, Aug. 23—Glenn H. Curtiss, the lone American representative at the International Aviation Week, at present holds the record of the course, and is the favorite for the Gordon Bennett race next Saturday. He covered the 6 1-5 miles of the circuit in 8:35 3-5, at the rate of 43.3 miles an hour.

Practice for the meet began in earnest [redacted]sday, and that day saw a most spectacular exhibit of aeronautic skill. For the first time in history three aeroplanes were in the air at the same time. They were Dumanest's Antoinette monoplane, Tissandier's Wright biplane and Curtiss' machine. All were flying rapidly about the field, when suddenly Curtiss saw Dumanest about to cross his course at right angles and on the same level. A collision seemed imminent, but Curtiss easily guided his machine upward and soared over the Frenchman.

A driving rainstorm swept over the field Saturday, and on Sunday, the first day of the meet, the sky remained cloudy and the wind erratic until shortly before dark. Then there was a great rush to the sheds. Latham was first away, and others quickly followed; soon the spectators beheld six aeroplanes in flight at the same time. Latham completed two rounds, Lambert four, and Lefebvre and Tissandier, the other Wright pilots, three each. The work of Lefebvre, who is self-taught, is one of the sensations of the meet; he made the fastest lap of the day, in 8:55 4-5. Curtiss did not appear, as he has but the one machine and cannot afford to risk an accident.

In contrast to yesterday, blue skies, sunshine and only a trace of wind made ideal conditions for the aviators to-day. Most of the day was taken up by flights to qualify for the Prix de la Champagne, which has an aggregate of prize money of $20,000. In these trials Lefebvre, Bleriot, Sommer, Latham, Tissandier, Farman, Lambert, Delagrange, Gobron, Bunau-Varilla, Cockburn and Sanchis-Pesa made flights of from 200 meters to 25 kilometers. Paulham on his Voisin biplane was the only aviator to make a real distance trial. He made two beautiful flights at a very high altitude of 49.5 and 56 kilometers, respectively. Curtiss was the last to appear. The time limit for the trials had almost expired, and the Americans had abandoned hope of seeing him take the field when his machine appeared. After a preliminary run along the ground of 100 yards it rose easily and shot by the stands at a height of sixty feet. He made the last turn under the impression that the finish line was closer, and descended so close to the earth that many thought he touched. However, he discovered his mistake in time, rose quickly and crossed the line. Soon after it was announced that he had established the record of 8:35 3-5 for the 10-kilometer circuit.

David Lloyd-George, the British Chancellor of the Exchequer, is much interested in the Curtiss machine. Although Hart O. Berg, the manager of the Wright company, was in constant attendance on him, the Curtiss shed was the only one which the Chancellor favored with a second visit.

Americans here generally regret the news that the Wrights are suing Curtiss for infringement on their patents. Curtiss himself expressed much surprise. Cortlandt Field Bishop, the president of the Herring-Curtiss company, maintains that the Wright claim of a basic patent is unfounded, and that Curtiss does not infringe on the warping wing principle, which is the distinctive Wright feature.

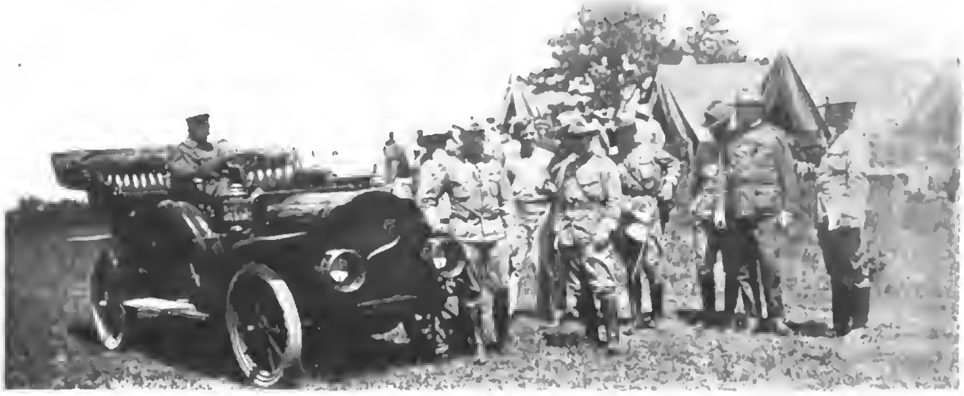
The judges have selected MM. Bleriot, Lefebvre and Latham as the French team for the Gordon Bennett race.

The aviators at present on the field include MM. Paulham, Fournier, Ferber, Gobron, Rougier and Bunau-Varilla, flying Voisin biplanes; MM. Lefebvre, Tissandier, Lambert, Gasnier and Schreck, with Wright biplanes; MM. Latham, Dumanest and Burgeat, with Antoinette monoplanes; MM. Sommer and Farman and Mr. Cockburn, with Farman biplanes; MM. Bleriot and Delagrange, with Bleriot monoplanes; MM. Pelterie and Geoffroy, with R. E. P. monoplanes; MM. Sanchis-Pesa and Fernandez of the Spanish team, and M. Santos-Dumont and Mr. Curtiss on machines of their own construction.

Bleriot Breaks Curtiss' Record

RHEIMS, Aug. 24—Louis Bleriot to-day broke Curtiss' record for the 10-kilometer course by covering the distance in 8:04 2-5, which is at the rate of about 47 miles an hour. The most sensational performance of the day, however, was a 30-kilometer flight by Paulham, part of the time at an elevation of 500 feet. A 20-mile breeze was blowing, and the aeroplane rocked dangerously. As he swept down from this great height at the finish many of the spectators thought he was falling, and cries of horror went up. But he righted himself easily only twenty feet from the ground, and crossed the line on an even keel. The flight was made for the especial benefit of President Fallieres, who came from Paris to witness the meet. Latham also made three rounds at good speed. Lefebvre, the Wright pilot, was fined $4 for his recklessness on Sunday; but the management added its congratulations.

Neither Fighting Nor Touring Is Much Fun in a Pouring Rain



General Leonard Wood (Leaning on Left Front Lamp) and His Staff

"Pathfinder" Advancing with the Red Army of Invasion

Squad of the Seventh Regiment, New York, Awaiting the Enemy

How The Auto Played Its Part

IT is seldom that the tourist has such splendid opportunities for seeing new and interesting scenes as were presented last week in Plymouth County, Mass. Not since the days of King Philip and his Narragansett warriors has there been so much excitement in the region. The Red army, consisting of detachments of the National Guard of New York, New Jersey, Connecticut and the District of Columbia, had effected a landing at New Bedford, with the announced purpose of marching northward and capturing Boston. The National Guard of Massachusetts, designated the Blue army, had been called into the field to check the advance o fthe invaders. The terrain over which the contending forces were scattered was not less than 30 miles square. Obviously, the only possible way of covering this wide stretch of country and of seeing what was happening was by automobile. This opinion, which had brought me to the scene in my White steamer in the capacity of interested observer, was also held in high official circles, for when I made an inspection of the different camps, I found that there were no less than six automobiles of the same make as my own in official service. Most prominent of these users of the motor car was General Leonard Wood, Commander of the Department of the East, who acted as chief umpire and had supervision over the maneuvers. At the conclusion, General Wood said that he had traveled an average of 150 miles a day, and that it was only through the use of the automobile that he had been able to keep fully in touch with what was going on. This is surely a significant statement coming from the officer who is the ranking general of the United States Army. I remember that at the military maneuvers in Pennsylvania, three years ago, General Fred D. Grant declined to ride in an automobile on the ground that it was not dignified for one of his position to travel about the camp except on horseback.

No less than five White steamers formed a part of the military equipment of the Blue army. Three of these cars were attached to the head-

In Mimic Warfare About Boston

By Pathfinder

quarters of Brigadier-General Pew, Commander of the Blue army, and were used by him and his staff almost continuously in carrying orders to his widely scattered forces. There is no doubt that, had it not been for these cars, General Pew would have made a less effective defence of Boston than he did, for his troops were spread out in a thin line from the seacoast to the Taunton River. During the first two or three days all of the camps were in touch with General Pew's headquarters by means of telephone wires rigged by the Signal Corps, but in the later days the Blue army did not have any time for such operations, and General Pew relied entirely upon his White steamers to keep in touch with his scattered forces, for, be it remembered, the rules of the game created the fiction that all ordinary means of transportation and communication were destroyed and the armies were thrown entirely upon their own resources.

Quite as much appreciated by the Blue army was the White steamer ambulance, attached to the division headquarters, and there was no "make-believe" about the work of this car. Although no bullets were flying about to bring injuries to the contending armies, the hospital corps on each side was kept busy, treating cases of heat prostration and the ordinary ailments to which flesh is heir. In the Blue army of 7,000 men, such cases manifested themselves very frequently, and it is not surprising that it was found necessary to have two chauffeurs for the automobile ambulance, as it was in practically constant service. The driving of this ambulance was by no means confined to the public roads. On more than one occasion I saw it making its way through the fields to reach the side of some citizen-soldier who had collapsed from sheer exhaustion while maneuvering with his company.

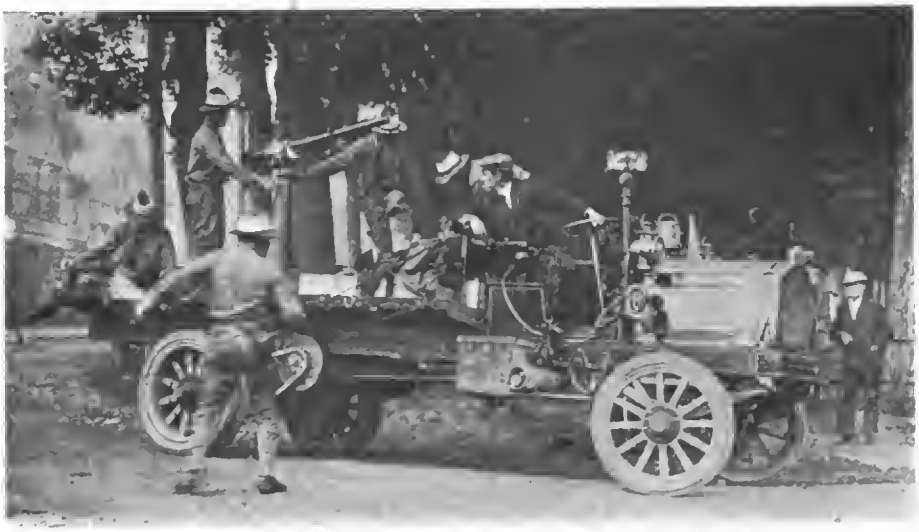
The above does not completely catalog the extent to which steamers were used by the Blue army. Quartermaster-Sergeant Hathaway drove his steamer, using kerosene as fuel, and, as he was in charge of getting supplies to the division headquarters, it can be readily imagined how useful this car proved itself to be.

Company of Blue Soldiers in Front of Church Where They Spent the Night

General Pew (In Right-Hand Rear Seat) and Staff in His White Steamer

Bicycle Scouts of the Red Army That Rendered Effective Service

Bringing a Wounded Trooper in the Ambulance to the Field Hospital



Packard Truck Successfully Employed in Massachusetts War Maneuvers

One point which was especially made manifest was the feasibility with which a regiment on a forced march could be transported with the aid of a number of motor trucks. A car like the Packard, with a carrying capacity of 40 men with guns and haversacks, could cover in two hours the ground that it would take infantry a whole day to get over. If, in such cases, 30 trucks were available, a whole regiment of infantry and its baggage could be transported between 50 and 75 miles in a single day.

Probably 50 or 60 officers of the regular army were present at the maneuvers, serving in the capacity of umpires, observers, or as advisers to the respective armies, and the work of these automobiles was thus brought forcibly to the attention of some of the most active officers on the roster of the War Department.

Never have I passed a more interesting week in an automobile than when observing the movements of the two armies. By the rules of the game, the fighting and forward movements of the contesting forces were restricted to the hours between 5 o'clock in the morning and 1 o'clock in the afternoon. We chose as our headquarters for the week the quaint old King Philip Tavern, located about 20 miles north of New Bedford, on the shores of the Assawompsett Pond. This hotel was also the headquarters of a number of the regular army officers serving as observers, and the atmosphere pervading the place was decidedly military. Each morning we arose at daybreak and took on board five or six army officers, and were at the scene of action by 5 o'clock. We moved unmolested through both the Blue and the Red lines, and were therefore able to see all the fine points of the game. Occasionally, we would find the roads so blocked with troops and army wagons that advance was impossible, in which case we would detour and get on the nearest parallel road and in this way reach the head of the column. In making some of these detours I took my car through some swampy, sandy roads which would do credit to Southern Georgia. I should say here that in traversing the highways and byways of what was to me an entirely new country, and in keeping posted on the movements of the two armies, I depended entirely upon a set of Pilot road maps of New England and found them accurate to the last degree and absolutely invaluable.

Major-General Bliss, the head of the War College at Washington, was in command of the Red army, and Brigadier-General Pew, of the Massachusetts Militia, led the Blue army of defence. Perhaps it will not be out of place for me to give a brief summary of the maneuvers, because no one, unless riding in an automobile, could gain any comprehensive idea of what was going on. The first position of the Blue army was in an east-and-west line extending from Taunton to the coast. On Monday, General Bliss made such a disposition of his army as to indicate that he intended to attack the right flank of the Blues. Immediately, General Pew started to concentrate his troops on his right. This move on General Bliss' part, however was only a feint, and on Tuesday he sudden shifted his troops and, by forced marches moved against the weakened left flank of the Blue army, which, at the close of the day, he had effectually penetrated. It was a case of the entire Red army massed against a single regiment of the Blues, and there was nothing for the umpires to do but to declare the regiment of Blues annihilated.

Thereafter the advantage was always with the invaders. Their army was concentrated, while the Blue army was spread out. There was incessant fighting at every crossroad, but the northward march of the Reds never halted. A battalion or regiment of Reds would deploy into each crossroad and would engage the attention of whatever Blue troops were in the vicinity, while the main Red army continued their march. When the main body had passed the crossroad, the skirmishers would be drawn in and would continue for the time being as the rearguard of the Red army.

Riding now with the advance guard of the Red army, now in their rear with the skirmishers, and then again visiting the detachments of the Blues, we had a comprehensive view of the movements of both sides, just as though we were seated comfortably in a grand stand watching a football game. Indeed, the analogy between the war game, as we saw it at close range, and a football contest, is a very close one. The Reds, we will say, had the ball and the Blues were spread out protecting equally all parts of their line. The action begins and the Reds mass themselves as if to go around the right end of the Blues. Immediately, the Blue defence rush to that side, when the Reds, changing the direction of their attack, actually get the ball around the left end of the Blues. Thereafter, it is a run for the goal. The Blues, recovering from their surprise, try to head off the runner, who corresponds with the main advance of the invaders; but all they can do is to come up on his flank, where they are held in check by the "interference," corresponding with the skirmishers, which the Red army sent into every crossroad. But before the goal is reached, time is called, just as it was in the maneuvers. The Red players have almost a clear path to the goal, although they are much harassed on the side and from the rear, just as General Bliss had an open road to Boston but found his left flank under constantly increasing attack. The expiration of the allotted time keeps the Red players from scoring, just as the Red army could not accomplish their announced purpose of camping on Boston Common. To the Blue players belong the credit of having fought so valiantly as to seriously delay operations, just as the Blue army in Massachusetts, theoretically, saved Boston from capture by their gallant recovery from their initial mistake in maneuvering.

As in all warfare since time began, the cavalry were of much greater effectiveness than the infantry, simply because they could cover a greater amount of country in a given time, than the unmounted men. Could not a motor corps be even more useful than cavalry for the same reason, namely, because of the greater territory they could cover? There was no time during the maneuvers when a motor corps of, say, 300 men, carried in 50 cars, could not have caused the utmost confusion in the ranks of either side by capturing the supply trains, cutting communications and defeating detachments sent out on scouting duty. This is not simply a layman's opinion, but is concurred in by all the officers of the regular army with whom I discussed the proposition.

Does it not seem that, with the Army experimenting with aeroplanes, and the Navy adding submarines as part of its regular equipment, too little has been done in official circles toward utilizing the motor car for purposes of offence and defence? At any rate, the problem is looked upon with too much equanimity, considering foreign activity in this line.

Practices in Water-Cooling

Chapter III

LIMITING the escape of heat from the cylinder to the water in the jacket limits the requirement of surface of the radiator without in any way interfering with the efficiency of performance of the motor. Having done all possible to limit the work which the radiator must do, the remaining problem is to provide a radiator of adequate ability, which is a matter of radiating surface, in amount depending upon the disposition of the same.

In certain classes of work square-tube radiators are used, and the tubes are about 5-16 x 5-16 inches square, measuring outside, with the walls about 0.008 inches thick. These tubes are made of copper, and the length of the tubes, which measures the depth of the radiator, ranges between three and six inches, depending somewhat upon the power of the motor, which variable is dictated by the nearly constant front area of the cars, without respect to power of the motor used in them.

Ability of Gill-Tube Radiators—When the tubes are provided with gills, assuming that the gills are in actual contact with the metal of the tubes, the results are very good, and in a general way the efficiency will be on a basis as follows:

CONDITIONS GOVERNING TUBE RADIATORS

Number of Tubes Deep	Square Inches of Surface per H.P.
1	34
2	18
3	12
4	9

The above statement depends for its accuracy upon the proportion of the gills, remembering that the radial outside diameter of the gills, if considerable, will reduce the area of the effective surface, on the ground that the internal conduction in the metal of the gills is directly proportional to the difference in temperature and inversely proportional to the radial thickness. In counting all the surface of gills account must be taken of lack of effectiveness of the same relatively to direct radiating surface, hence effective surface must be determined.

In the circulation of water, if cooling is to be effective when the motor is running slow on a retarded spark, which is the worst condition to be encountered, the amount of water which will have to be circulated will be on an approximate basis as follows:

AMOUNT OF WATER REQUIRED TO BE CIRCULATED

Diameter of Cylinder in Inches	Pounds of Water per H.P. per Minute
4	1.10
4.5	1.30
5	1.60
6	1.80

Increasing the rate of circulation of water ceases to do a proportional amount of cooling after a certain speed is reached, and in a general way the following will hold:

VELOCITY OF WATER CIRCULATING IN RADIATOR TUBES

Velocity of Water in Feet per Minute	B. T. U. per Square Foot of Radiator Surface
5	41
10	46.9
15	49
20	50.1
25	50.92
30	51.3
35	51.89
30	52.1

The above is for efficient radiator tubes, and in a general way it may be said that other radiating surfaces are a little less than one-third of the value of the tubes; that is to say, the shell of the radiator and the piping, etc., may be counted upon as being of less than one-third of the efficiency of the tubes, of the right design, properly placed.

Considering Location of Radiators—Almost without exception radiators are located in the front of cars and so set that air currents pass almost unobstructed through the passageways. The square tubes are banked so closely that the water, which is on the exterior, is as a very thin sheet, while the air fills the space within the tubes, passing through, approximately at the rate the car travels ahead, and when the car is not traveling, if the motor is running, it is necessary to induce artificial circulation of the air, at a rate sufficient to answer the same purpose. In a general way it is considered that the speed of the

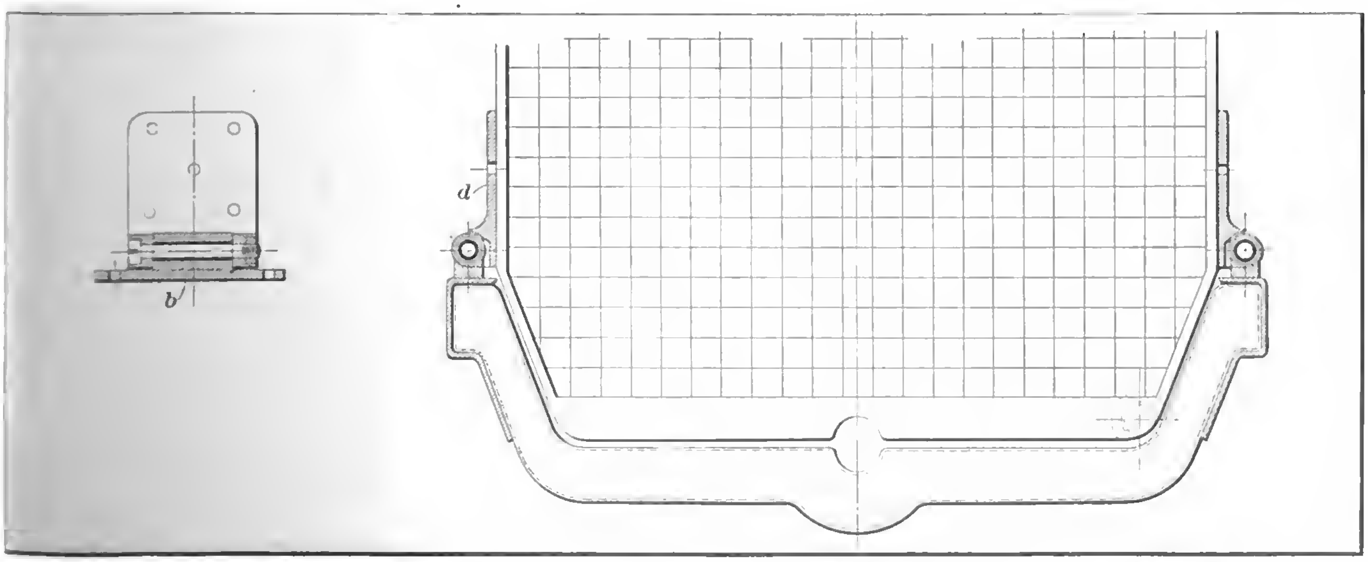


Fig. 8—A method of securing radiators, using the principle which prevents straining by avoiding rigid fastenings

air through the radiator tubes should be about 20 miles per hour (about 30 feet per second) for the best results and fans are frequently designed to displace enough air to render the velocity of the same about 30 feet per second when the motor is making about 400 revolutions per minute.

With square tubes of the size and character as above referred to it takes about 225 square inches of surface, over which the air must brush at the rate of 30 feet per second to keep the water from reaching the boiling point, considering each horsepower actually delivered by the motor. True, there are numerous conditions which will tend to reduce this requirement. The above estimate is for a radiator in which the square tubes are 5 inches long, and as the tubes are shortened within certain limits, the area of surface over which the air traverses may be reduced, but the front area will have to be increased accordingly.

To some extent the amount of radiator surface will change with the size of the motor, it being the case that the escape of heat to the radiator through the water is in direct proportion to the internal surface of the cylinders, measuring all the surface that is brushed by the heated products of combustion, assuming that water is in contact with the external surface. This statement is on the assumption that the temperature of the flame is substantially constant in the several motors and that the temperature of the water in the jacket will be the same in each case, thus indicating a constant difference in temperature; should there be a difference in these particulars, an adjustment will have to be made to suit. Differences in compression, or if the fuel differs from gasoline, will demand special treatment.

If round or other shapes of tubes are used instead of square the surface should be the same, or nearly so, and the ratio of water (thickness of the sheet) to air section in the tubes should be on the same basis. This is assuming the tubes are in the horizontal plane, as given in front elevation in Fig. 8, whereas, if the tubes are vertical, the effective area will have to be determined, which effective area may not be equal to the exposed surface of the tubes, since if the air strikes against one face of a tube it will glide around the same and is prone to glide away without contacting with the surface opposite the contact surface. Radiators made up of flattened (thin) sheets, presenting but a thin edge at the contact, at the front, and with both sides for a considerable distance (perhaps 4 inches) brushed by the

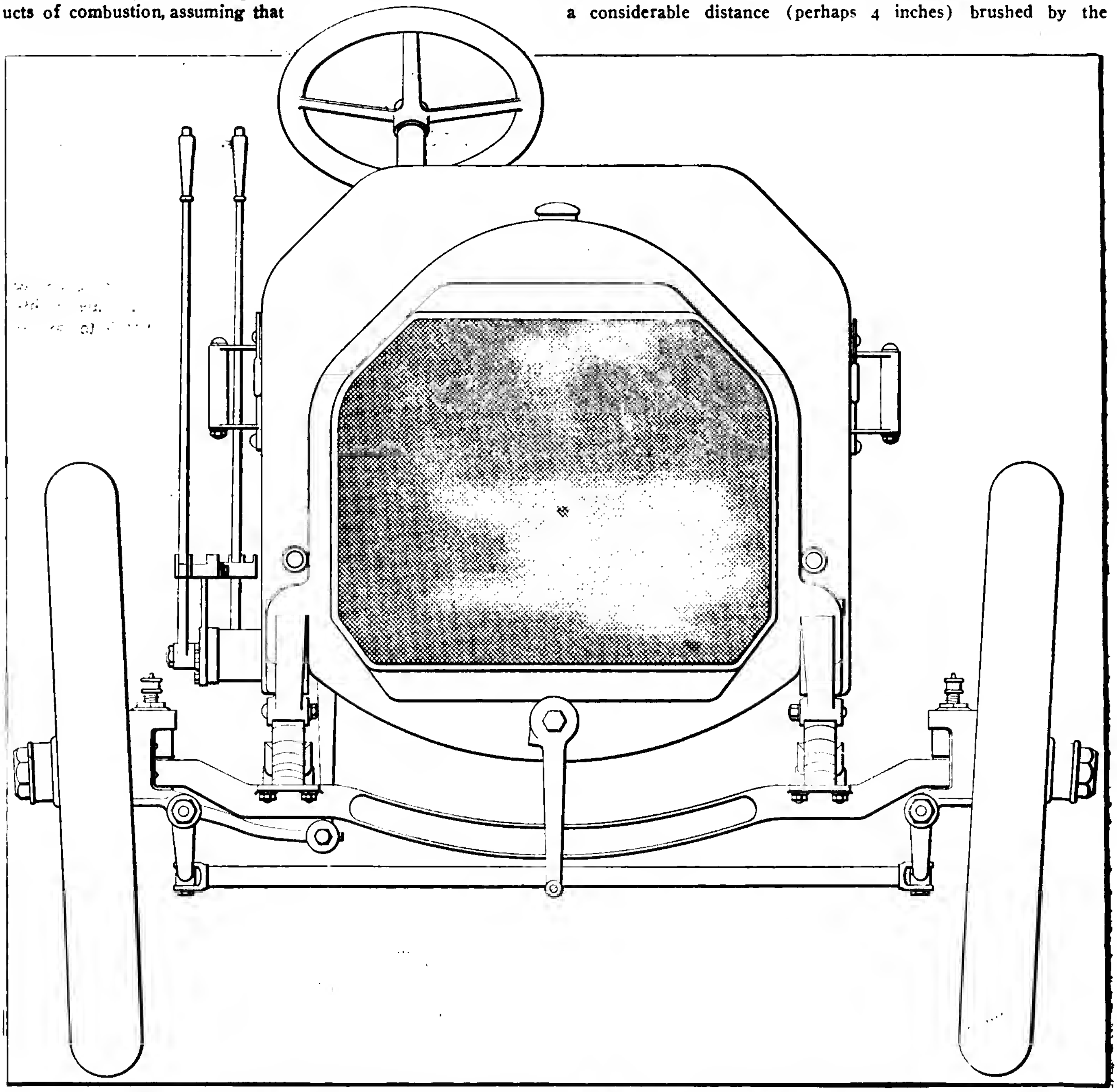


Fig. 9—Front view of a Moore car, showing how the radiator influences the appearance of the car

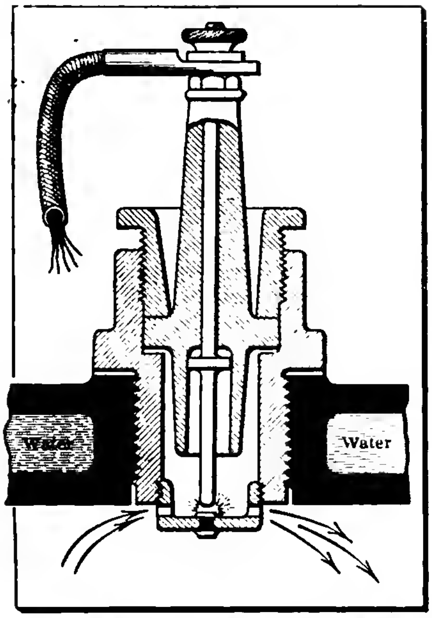


Fig. 10—Section of a cylinder showing water jacketing around the spark plug

current of air are probably quite as efficient as tubes in the horizontal plane, with air passing through the tubes, as in the honeycomb types of radiators.

Centrifugal Types of Water Pumps Are Mostly Used — In this type of pump the height of lift of water will depend upon the tangental force, and not upon the tightness against the housing of the vanes of the wheel. On this account centrifugal pumps can be made of aluminum for the housing, which is light and strong enough to withstand the pressure, but the wheel should be made of a good grade of phosphor bronze. In these pumps, as usually designed, the suction takes place at one side, around the axis of rotation, as shown in Fig. 15, which is a section of a conventional form of centrifugal pump as used in this service, and the suction pipe is made of liberal area, very short, and free from air leaks. The vanes are not fashioned for the highest efficiency, but they are easy to turn up, on centers, in a lathe, which is a matter to be considered.

In this type of pump the quantity of water discharged will be dictated by the area of the discharge pipe, and the head against which the pump will work, within certain limits, depends upon the peripheral velocity. Under the circumstances it is necessary to gear the pump as high as the crankshaft speed as a minimum, and in general practice it is frequently found that the pump shaft rotates considerably higher than the speed of the crankshaft. Considering the lowest speed at which it may be desired to run a motor at which the velocity of the centrifugal pump should be that in view of the diameter of the pump-wheel, which will afford a peripheral velocity of 500 feet per minute as a minimum value.

If the pump is relatively inefficient and speeded to a sufficiently high point to assure that an adequate supply of water will circulate at the lowest speed at which it is desired to run the motor, the troubles of excess water at the higher speeds will be aborted to some extent at any rate. It must be remembered that the head, against which the pump will lift, is as the square of the velocity, and since the most water is really wanted when a motor is running slow, under a retarded spark, centrifugal types of pumps have the fault of lifting the maximum just when it is least in demand.

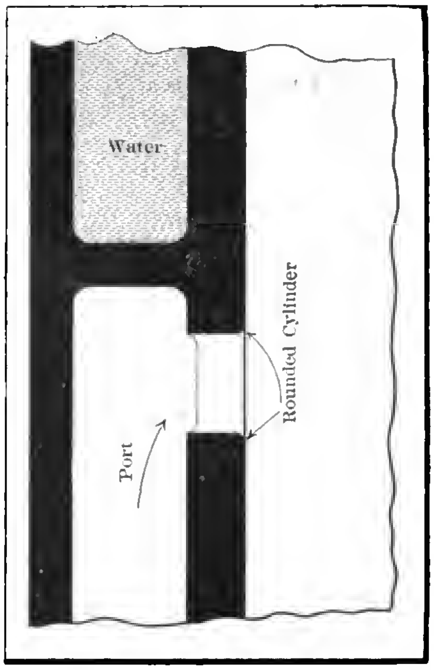


Fig. 12—Defective water jacket around port in a two-cycle motor

In centrifugal pumps there may be any number of arms within certain limits, as, for illustration, six vanes are sometimes used, but as these pumps are used in automobile work it is the general practice to have three vanes, and the curving is away from the direction of rotation, an amount which is not necessarily of great importance in view of the desire for relative inefficiency at the higher speeds.

With gear pumps the situation is quite different, since the capacity is decreasing as the speed increases, and the amount of the decrease in capacity depends upon leakage, which increases somewhat as the speed. This class of pumps should not run faster than the camshaft, which in a four-cycle motor is half the crankshaft speed. If the pumps are run at a higher speed they will give out much sooner, and noise is difficult to avoid. The limit of speed from the noise point of view is 1,000 feet per minute, counting at pitch line of gears just as in gearwork in general.

Reciprocating (plunger) pumps do not seem to have a place in this class of work, due in a large measure to limited capacity, or, better yet, to the space they would occupy, which is at a premium under the bonnet in view of the room taken up by the motors and accessories. There is a series of paddle pumps from which to choose and when they are properly applied, which is a matter of limiting the speed and using a pump large enough for the work, considering limited speed, they seem to do very good work just so long as they remain tight.

Radiator Fixes the Appearance of a Car—There is no one unit in the makeup of an automobile which has such a large

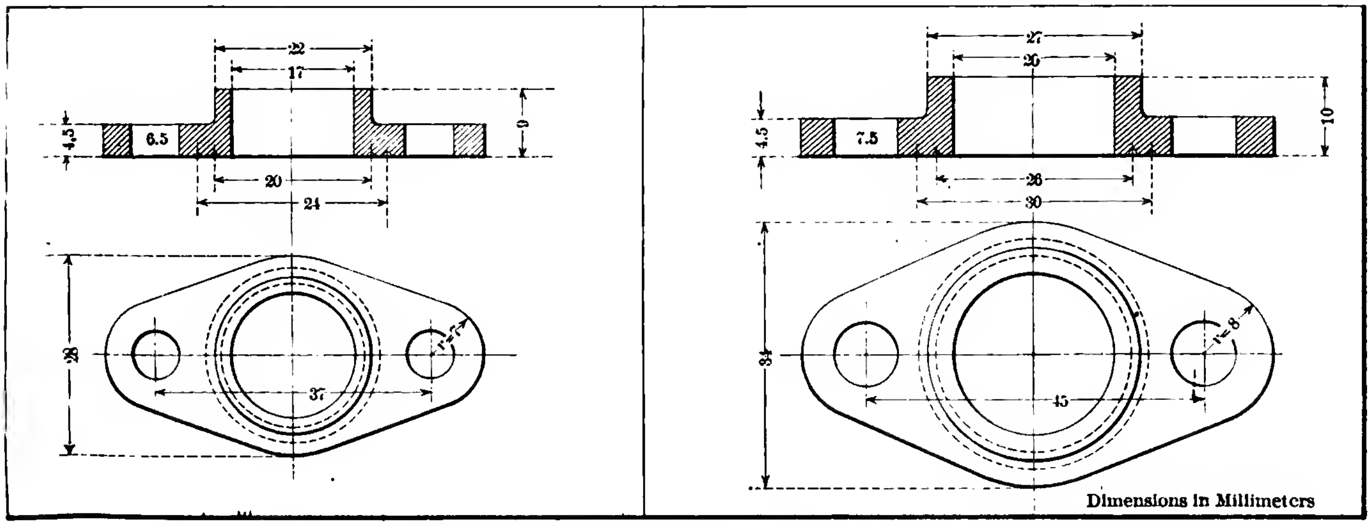


Fig. 11—Design of drop forged steel flanges for use with water piping avoiding heavy and frail castings

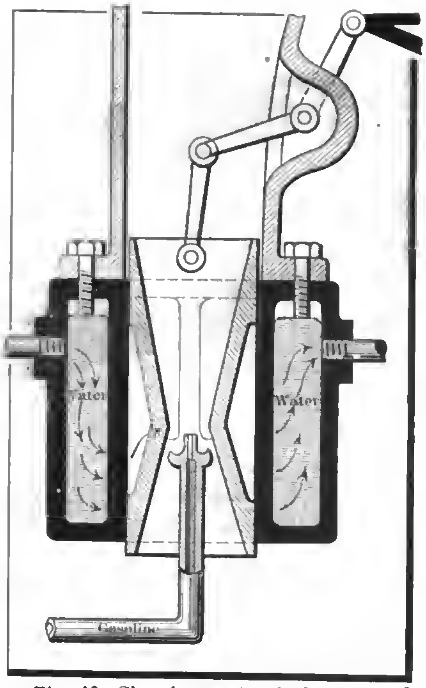


Fig. 13—Showing water jacket around carbureter, indicating a recovery of some of the waste heat

effect upon the general appearance as the radiator. The contour of the radiator is the same for the hood, and since the front end of a car is the most conspicuous, it naturally follows that it is prone to create the first impression. Fig. 9 shows the front of a Moore car, and while there are other and important features of a mechanical character to admire, even so, the radiator, as before stated, fixes the style.

Radiators are rather frail, and unless they are properly cradled they are likely to give trouble in service, due to the effect of road inequalities, first on the chassis frame, which ultimately induces torsional effects in the section of the radiator unless it is properly swung in view of the unstable nature of the platform. Fig. 8 adequately indicates the principle which is free from all such tendencies, and while there are several ways of carrying this principle into practice, the fact remains that the radiator should be free to respond to its individual inclination rather than to answer to the effect of road inequalities on the chassis frame.

Unless the water jacketing is carried well around valves much of the good that is expected from water cooling will be lost; in ports, for illustration, as shown in Fig. 12, the water should be carried all around them in order to afford an adequate measure of cooling. Fig. 12 illustrates a defective method, since the water jacket is stopped off on the upper side. Fig. 10 shows the spark-plug should be cared for in the same way. Flanges, if they are made of cast iron, will be frail, and heavy besides, whereas the drop-forged flanges, as shown in Fig. 11, are not only light, but they are strong and they present a good appearance as well. If the jackets are separate, as when copper jackets are shrunk over the cylinders on flanges, properly fashioned, it is important to make the joints so that they will not leak, as the result of vibration. Fig. 14 shows the method used on the Chadwick cars, in which a cylindrical copper jacket is fitted over a pair of cylinders, and the general appearance is rather good, while the manner in which the task is performed is such that the jackets remain tight in service.

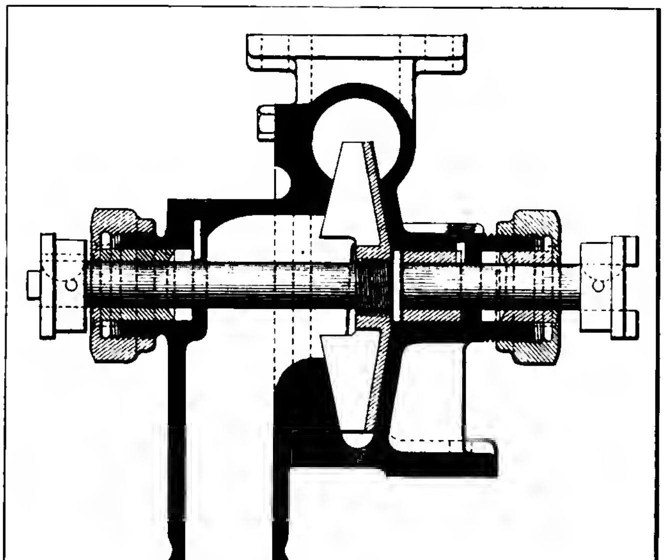


Fig. 15—Section of a centrifugal water pump, showing entrance of water at the side, around the shaft

Much Depends Upon the Ability of Air Propellers—If the fan is in the flywheel, it may be designed on a basis of a true screw, and the results will be very good provided the hood is tight and the motor is so thoroughly enclosed that all the air entering will have to pass through the radiator. This is a difficult condition to establish, and in practice it is generally safe to allow for a leak (around the radiator) of about one-third of all the air handled by the fan in the flywheel. Even with this allowance it is necessary to so design the hood and enclose the under side of the motor, that it will be quite as tight against air leaks as the best display of skill, on the part of the workmen, would seem to indicate. In some cases the vanes are placed on the periphery of the flywheel, and, as might be fairly expected, the amount of air handled will be on an increased basis, due to the greater peripheral velocity, attended, of course, by certain structural difficulties, such as a reduced diameter of the flywheel, hence a marked falling off of flywheel effect; clearance requires this modification, since, in general, considering the location of motors in chassis frames, flywheel diameters are somewhat restricted, even when fans are not placed on the periphery. If fans in or on the flywheel, are designed on a basis of air traveling at 30 feet per second, they will do very good service, and the number of blades to use will depend upon diameter, and the avoidance of over-lapping.

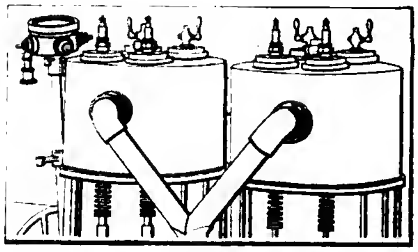


Fig. 14—Depicting a copper jacket over a pair of Chadwick cylinders, so fashioned that the connections come free

In general, it is the practice to use air propellers behind the radiator, even when the main fan is incorporated in the flywheel; this is a safety measure, taken, in view of the great difficulty involved in constructing a tight hood. When the flywheel is not brought to the aid of the air propeller back of the radiator, it is not to be supposed that the amount of air handled will be all that the occasion would indicate, for the reason that small air propellers are far from efficient, and to make up for this deficiency, it is necessary to employ a somewhat more commodious radiator to prevent radiator steaming.

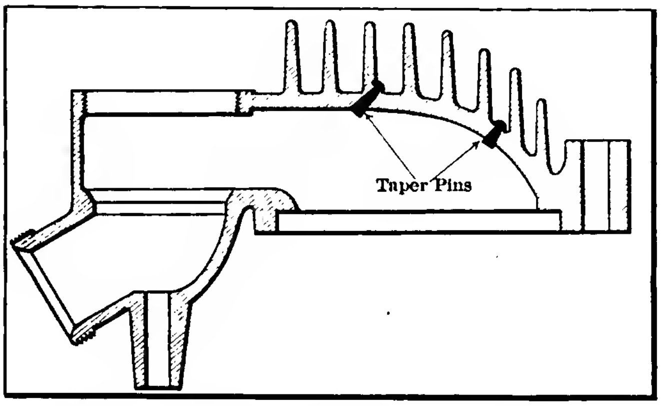
Hot Zones Abound in the Radiator—Unfortunately, due to the relatively small sweep of the fan-blades, when small air propellers are used behind the radiator, the effect is not uniform. If the radiator is approximately rectangular, covering an area of substantially 500 square inches of front (which is not far from the truth), even an 18-inch fan, which is about the largest size used, will only sweep about half of the front area of the radiator. It would seem to be a good idea to enclose the fan in such a way as to draw the air uniformly through all the tubes in the radiator, under the circumstances, but this practice has been avoided, owing to the difficulties involved, which are accentuated when the fan is belt driven. When the fan is in front of the motor, it projects an air current on to the front cylinder, which is of small account since the remaining cylinders are not given the same treatment. With the fan in the flywheel, the air is drawn by all cylinders and the effect is much more beneficial, since it is uniform in its effect on all cylinders.

Extracts from Vol. I, Part V, Chapter III, of a set of books, in preparation, by Thos. J. Fay, covering all phases of automobiling, from the point of view of designers, and in actual service.

INGENUITY IN THE MAKING OF REPAIRS

By Oliver Light

THERE is no trade or profession in which mechanical ingenuity is of greater utility or a more valuable asset to the fortunate possessor than in automobile repairing, where one is often called upon to make repairs quickly, which must be both practical and enduring. When failure of mechanism results through poor design or faulty assembling of cars or components at the factory, it is the repair man who must bear the brunt of the criticism, especially if he be agent for that particular make of machine. The owner can be pardoned for any lack of proper appreciation of difficulties which confront the mechanic, he realizing solely that the derangement will in most cases cause the loss of the services of the car, as well as involving considerable expenditure to make proper restoration.



Method of Saving Cylinder Head with Taper Pins

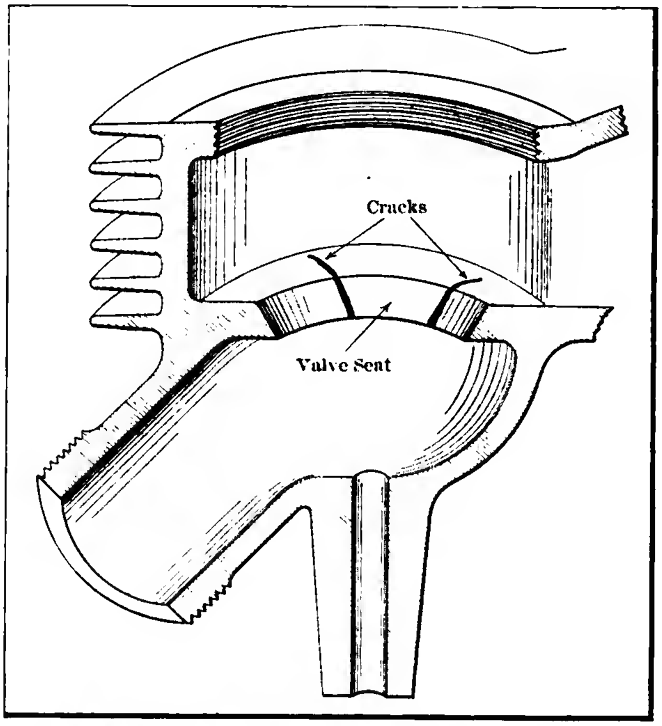
It must not be assumed that the writer means to imply that manufacturers of motor vehicles as a rule are negligent, or that poor workmanship and faulty design are often found in machines of standard make. Where any mechanism is produced in large quantities there will always be some machines that will not be as perfect as others, and with the demand which at present obtains for all classes of motor vehicles there is some excuse for failure to make careful inspection of the product before it is delivered. All motorists are not gifted with mechanical knowledge, their ranks being recruited largely from the business or professional classes, and it seems the irony of fate that the men best fitted by training and knowledge properly to appreciate and care for an automobile seldom possess one.

Then again, the larger proportion of the product is sold in territory more or less remote from the factory. Because of this the automobilist not proficient in mechanical work is dependent upon the factory representative for any attention that the machine may require, and in event of serious derangement the cost of repairs may be much greater than that of hundreds of miles of operation.

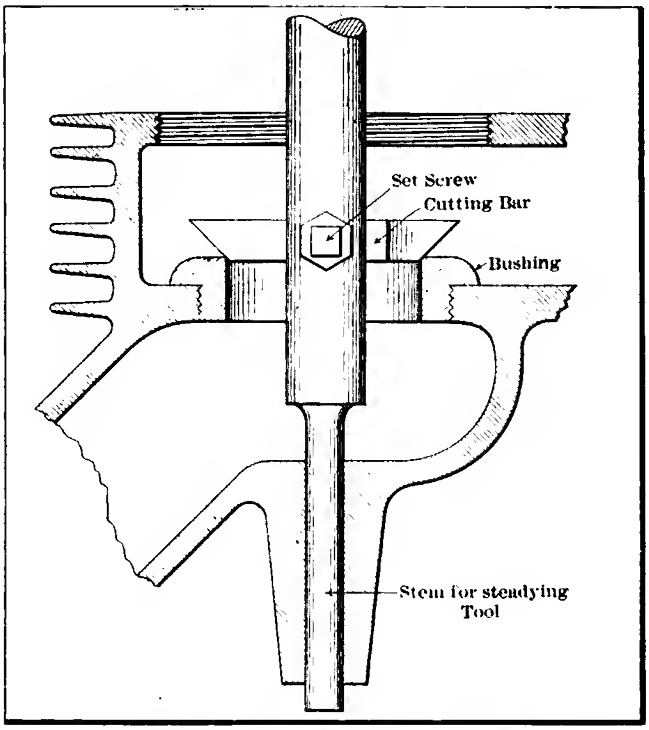
In event of serious derangement the ingenuity of the repairman may effect a substantial saving by repairs which will obviate the necessity of purchasing new parts. It is not that the components are always expensive, but there is necessarily more or less delay in obtaining spare parts from a distant factory. In many instances the parts may be restored to proper condition at small cost, not only eliminating delay, but also meaning a substantial reduction of expense, which is thoroughly appreciated by one of limited exchequer. As examples of what may be accomplished the writer will describe some repairs which were in every respect enduring and satisfactory, and although there is no great originality in the methods employed, the mode of restoration may interest, and perhaps be of some value to those who have to do with automobiles.

Saving a Flawed Cylinder Head—The owner of a machine of reputable make but old pattern was troubled with a mysterious loss of power and defective compression. After all points had been carefully examined and valves, cylinder head packing and piston rings found to be in good normal condition, the trouble was accidently discovered to be due to small blow or sand holes in the cylinder head which allowed a good portion of the gases to escape, especially when the head, of the cooled variety, became heated, the rise of temperature causing the metal to expand and the defects to become more evident and of more serious moment than when cool. The agent for the machine immediately advised the purchase of a new member, but as this was listed at $20, one can forgive the owner of the vehicle for his lack of interest in the suggestion.

The writer having been appealed to for advice suggested the removal of the defective combustion chamber for better examination. This was done and the blowholes discovered by inverting the head and filling with gasoline. One of these extended partly through a flange, while the other was between two of the cooling ribs. Facilities not being available for brazing or autogenous welding, the best method of repair which suggested itself was plugging the holes. A small eighth-inch drill was used to clean out the openings and to enlarge them sufficiently to run a small taper reamer through from the inside of the head. The outer end of the hole was slightly countersunk with a quarter-inch drill, and a standard taper pin of proper length and size was driven tightly into the hole. The portion projecting through the top of the head was riveted over,



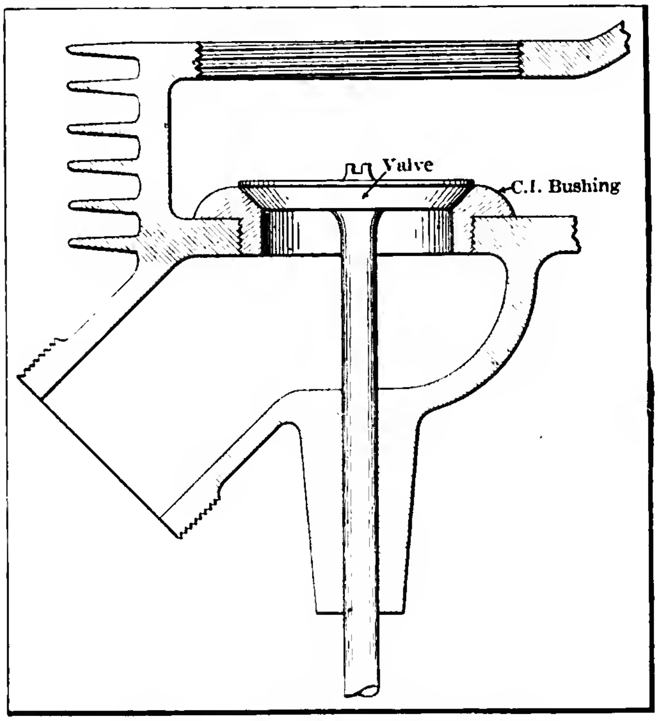
Cracked Valve Seat Eluded Detection for Long Time



Machining New Screwed-In Valve Seat

firmly securing the pin, and insuring an absolutely gas-tight joint. Obviously, every explosion tended to drive the pin more firmly into its seating, and the repair proved satisfactory in every respect. The writer has stopped blowholes by tapping out the enlarged hole and screwing in a small machine screw, but prefers the taper pins because they make a more sound job. The cost of this repair was $1.30, this including two hours' labor and the taper pins. This was just about one-fifteenth part of what a new head would have cost, not to mention the advantage of keeping the machine in commission.

Repairing a Cracked Valve Seat—On still another occasion a little bit of study enabled the writer to repair the cylinder of a motorcycle which at first sight appeared fit for the scrap heap. The trouble was manifested by loss of power, and upon test it was found that the compression, when the engine had become heated, was very poor, though appreciable resistance was offered if the engine was turned over while cold. Following a time-honored custom, the writer started to grind in the valves, and after a good seat had been obtained on the exhaust valve face, a test was made by daubing the seat with prussian blue to determine if the valve was bearing properly. Upon removal of the valve, inspection of the seat revealed the cause of the defective operation, namely, two good-sized cracks in the metal, as shown in the sketch. The valve chamber was integral with the cylinder, and perusal of the spare parts price list disclosed the fact that a new member would cost $15, while the factory was 1,000 miles away.



Showing How Valve Seated After Repairing

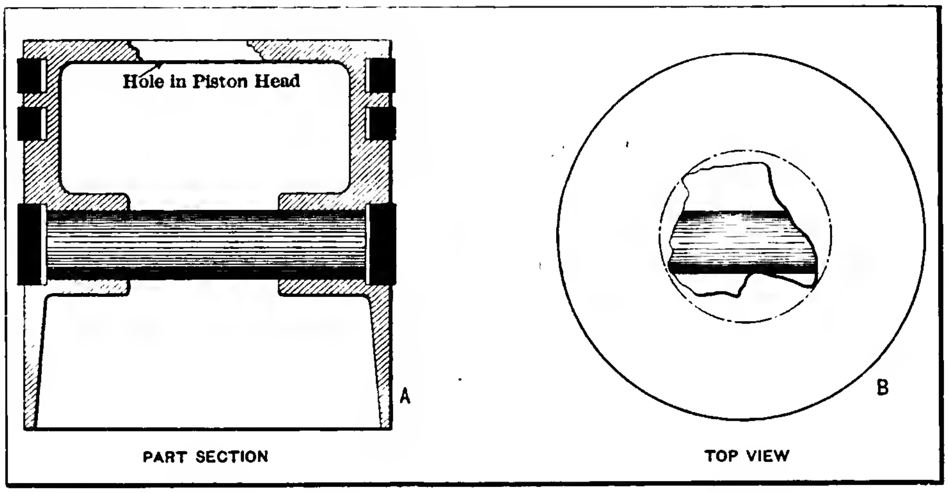
Upon the owner's responsibility, the writer undertook to make a repair, which was largely experimental, though later experience proved it practical. The cylinder was placed on the bed of a drill press, and firmly fastened in position. A special T boring tool, similar to the valve seat facing appliance shown (except that the cutter bar was adapted for boring), was placed in the chuck, and using the exhaust valve stem hole as a guide, the taper portion of the valve seat was turned away, leaving a straight hole a little larger than the over-all diameter of the valve head.

Once again the boring tool was brought into service, and this time, a piece of bar stock upon which a fine thread had been turned was used in place of the cutter bar. This piece was hardened, and placed in the holder, again using the exhaust valve guide as a steady rest for the lower portion of the tool; eight threads were cut into the 1-4-inch thickness of metal separating the combustion chamber from the exhaust port. An iron bushing was then turned up on the lathe to fit the threaded valve opening, and tightly screwed home, the bushing having been left large so that by heating the head it was shrunk in place. As further insurance against loosening, several small pins were driven into the wall of the cylinder seat to prevent the bushing from turning. The shoulder was of sufficient diameter to cover the edges of the cracks, with a small margin to spare.

By fitting a new cutting bar in the tool holder, the exact shape of the center section of the valve head, with the cutting edges at the proper angle for valve seating, it was not difficult to machine up the valve seating on the cast-iron bushing, and replace the valve. The effect of this repair was to raise the valve about one-eighth of an inch higher than the old position, which was easily compensated for by making a longer valve lift plunger, this being simply a three-inch piece of 3-8 cold rolled steel, case hardened. When the bushing was machined up the corner was rounded off as shown, as a sharp edge would doubtless have caused preignition of the charge when heated. This method of restoration was not costly, eight hours' labor at $4.80 and stock at 20 cents, bringing the charge to $5. As this time included making the special tool and the three cutter bars, it will be evident that the actual labor involved in putting in the bushing was very light. To make the cutting tool, a piece of seven-eighths cold rolled stock eight inches long was turned down for four inches to five-sixteenths diameter, this being the bore of the valve stem guide hole. A five-sixteenths hole was drilled through the large portion of the tool, and squared with a file. The stock of which the cutter bars were made was five-sixteenths square Novo steel, the tap being machined from a piece of tool steel bar the same dimensions, afterward hardened. A small 1-4-inch cupped point set screw held the cutter firmly in place in the holder after it had been accurately centered.

When an Overhead Valve Broke Loose—Another of the writer's friends was the owner of a well-known make of automobile the engine of which was fitted with overhead valves, and either through defective material or poor design it was a common thing for the valves to break, separating near the head, which fell directly in the cylinder. This meant one of two things in most cases: Either the top of the piston was punched through or daylight was admitted to the interior by the removal of a portion of the cylinder head, either of which entailed somewhat costly replacement. After several months of very satisfactory operation, one of the exhaust valve heads became severed from its stem, and, in common with those which had gone before, sought access to the outer air. Instead of making an opening through the cylinder head, as was customary, it broke through the top of the piston, leaving a jagged hole.

New pistons could be procured from the manufacturer, who must have done a thriving business in that line at the rate of $10 each. The writer was again consulted, and upon examination the piston was chucked in the lathe, the hole bored out perfectly round, and a fine thread cut therein. A steel plug with a large mushroom head was machined to fit and inserted. The cost of the repair, including the labor of removing and refitting the piston in the cylinder was $2.60.



Two Views of Hole Punched in Piston Top by Broken Valve

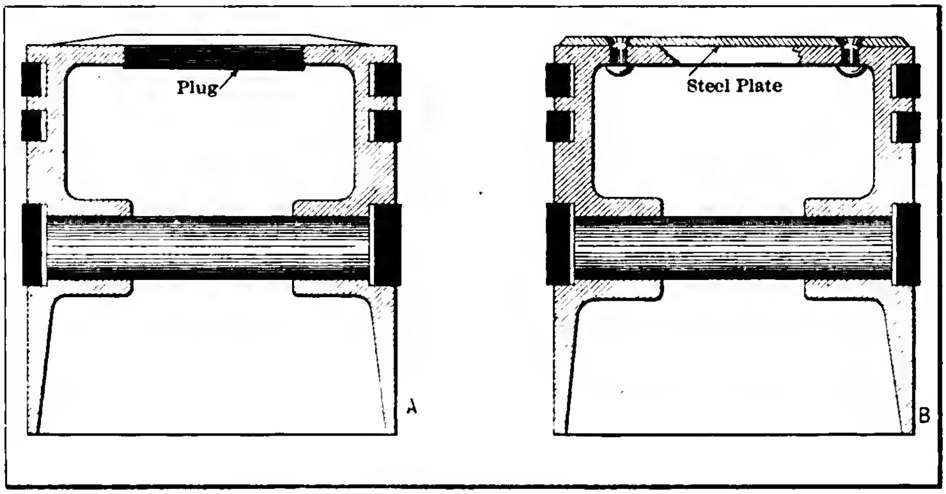
A similar break on another machine was repaired differently. A thin plate of steel one-eighth inch in thickness was cut out and riveted to the top of the piston, which had been surfaced off to receive it. The rivets, of which six were used, spaced equidistant from each other, were put in from the inside of the piston, and the ends upset in a suitable countersink in the steel plate, so that the top of the piston could be filed free of all roughness. The edges of the steel plate or disc were chamfered as shown, being cut with ample clearance to avoid scratching or cutting the cylinder walls. Very small machine screws could be used, these to be put in from the top, if desired.

Although this method of piston restoration has the effect of slightly increasing the compression, and perhaps increasing the piston weight, it is doubtful if the slight increase in length or mass will have any appreciable effect upon the practical running balance of the motor, if of the multiple cylinder form. In the cases which have come under the writer's observation, the addition of the plate or plug made absolutely no difference in engine balance. In fact, the weight of the plate would perhaps be no more than that of the piece of metal knocked from the piston. The advantage of the plate on top of the piston is that it can be applied without machining or boring out the hole, and if the top of the piston is true, there is no occasion for surfacing it. No one will question the strength of such repairs, as steel is several times the strength of cast iron, and for that reason a thin-walled piece will have the same strength as several times the thickness of cast iron.

It is often advisable to make repairs of this nature in preference to buying new parts, not only because of the substantial saving, but because the components which have been used together will have "run in" and be a proper fit. Putting a new piston in an old cylinder (unless it has been accurately machined to fit) gives no advantage, as the rings must find a bearing even if well machined. Then again, if a new cylinder is fitted, as would be thought necessary in event of a cracked valve seating, a new piston and set of rings would be required as well to insure a proper relation of components. Of course there are parts which can be obtained from the factory cheaper than the cost of repairing and before doing any patchwork, as described, the intelligent mechanic will always compare the expense of new parts, freight, express charges and delay, with his estimate on the job of restoration, and follow the course which will save his patron money. A repairer who observes this policy will be in business when his less liberal competitors are long out of the business and forgotten. The sketches presented herewith are not actual forms, being merely to show principle, as obviously it would not be fair to present illustrations which would be detrimental to the interests of the manufacturers whose product has been discussed so frankly.

MIXTURES OF HYDROCARBONS ARE BEST

Kerosene oil, while it can be and is used in motors, does not offer the advantages that follow the use of mixtures of hydrocarbons, such as do obtain in automobile gasoline, for the reason that the lighter and more volatile fractions in mixtures have a certain favorable influence on the heavy and less volatile product. When a light and a heavy fraction makes up the compound, the volatility of the heavy compound is hastened, and its rate of evaporation will be greater than would be the rate of evaporation of the same fraction in the absence of the light and more volatile fraction. True, the lighter of the two fractions will evaporate at the highest rate, and a residuum of the heavy fraction will have to be coped with. Even so, the situation takes on a practical phase, and it is because of this influence of the light on the heavier fractions, that makes it possible to consider a composite fuel, in which fractions can be included that would not burn alone.



Different Ways of Repairing Broken Piston with Plate

LETTERS INTERESTING

DON'T LIKE GRINDING

Editor THE AUTOMOBILE:

[1,988]—Being constant readers of "The Automobile," we were anxiously waiting to see what Mr. Fay would tell us concerning the best method of finishing motor cylinders, which sums up to be grinding, but we here would like to have a few questions answered: Isn't it true that a grinder wheel will wear down to a less diameter from the beginning of the cut to the end, and since it is fed in parallel, will it not leave a cylinder slightly conical? Not to mention the fact that the wheel must necessarily be small, hence will wear fast, and a slight irregularity must be allowed for play of its spindle. We believe a cylinder, if reamed for the finishing cut and then polished with emery cloth on a wooden drum, would make a superior finish, arguing that a reamer will make all cylinders the same size and a slight use of the emery cloth will make a finer finish in the cylinder than a grinder. We would be pleased to hear from some who have used reamers for this purpose.

Denver, Col. PETERSON BROTHERS.

Yes, a grinder wheel will wear down to a less diameter at the end of a long cut, just the same as a reamer will. The writer is familiar with the practice in one automobile shop in particular where the old-fashioned method of which you speak is still in vogue. There, when the reamer wears down below size, it is sent to the tool room and the inserted blades are reset and then reground. In doing this, it is left five-thousandths above size so as to provide in part for future wear. This is used until it wears down to about four-thousandths of an inch below size, which is at the end of about ten reaming operations. That is, in reaming out ten cylinders the reamer wears from five-thousandths large down to four-thousandths small, a total of nine-thousandths wear. This occurs in machining ten cylinders, and the wear may be assumed to be fairly equal and even. In that case the cylinders may be assumed to be about as follows:

Number 1 cylinder, large .005".
Number 2 cylinder, large .004".
Number 3 cylinder, large .003".
Number 4 cylinder, large .002".
Number 5 cylinder, large .001".
Number 6 cylinder, just exactly to size.
Number 7 cylinder, small .001".
Number 8 cylinder, small .002".
Number 9 cylinder, small .003".
Number 10 cylinder, small .004", after which the reamer is trued up and the process started over again.

The above shows about what may be expected from the reaming process, although it doubtless represents extreme practice. In any case, it is fair to assume that by this process not more than half of the number of cylinders are correct to size (above there is but one correct in ten, a percentage of just .10).

In the matter of wear doubtless you have forgotten that emery is harder than steel, the former ranking between 9 and 10 in the scale of hardness, while the steel comes in at about 7. If this were not true it would not be possible to use emery to grind tools of the finest and hardest steel. Since it is true, would it not also be true that the softer of the two (this being the steel), doing practically identical work, would wear more?

Your argument would be very good if it were not founded upon the statement, "a reamer will make all cylinders the same size," which is not true to actual conditions. You will find upon examination that the majority of automobile builders use the grinding process in finishing the cylinders, although its use doubtless requires more skill than does the reamer.

To take up your last statement, if you use emery cloth to give the cylinder a fine finish, why not use an emery wheel (which is what all grinder wheels are) directly and save the work of reaming, obtaining your fine finish equally as well in one case as in the other?

ON HOT ENGINES

Editor THE AUTOMOBILE:

[1,989]—As you know, I have always advocated hot engines. I therefore wish to add a few words to your answer to Mr. Mannheim on page 278 August 12 issue. The Edge tests there given show nothing except the results from his particular engine. Many engines are so badly designed that they get hot in spots. They warp badly, or they do not oil properly. Or the oil used will not stand high heat, and so fails to lubricate. Any of these things would reduce power, and the Edge tests simply show that his engine was not properly designed for high temperature. The high efficiency of air-cooled engines, as shown on more than one efficiency contest, proves without the chance of question the value of temperatures much higher than water-cooled engines reach.

There are two decided advantages in particular to be found in a hot engine. At high speed, it heats the charge thoroughly so it ignites easier and is sure to burn more fully. At low speed, it does not get cooled down by the walls and so the pressure holds up to the end of the stroke much better, making the engine pull more like a steam engine. There are less misfires, less odor, greater economy of fuel and better results generally. After throwing off the spark the properly-hot engine will sometimes fire a charge in three or four, but this does no harm. So long as it is not hot enough to lose power on hard pulls it is not too hot.

Say to Mr. Sargeant that a little graphite will cure his clutch. This will not burn out like oil and stops the fierceness. If the spring is so weak that the graphite causes it to slip, then use a less slippery powder, like chalk, or fuller's earth. The presence of a powder seems to render the gripping gradual and more sweet than the clean leather.

Reading, Pa. CHARLES E. DURYEA.

Exception must be taken to some of the remarks on hot engines. It is hard to see how the walls of the cylinder, whether hot or cold, can influence the pressure at the end of the pressure stroke to a measurable extent, since exhausting always commences with a pressure of not less than 40 to 50 pounds per square inch. It is doubtful if it would be possible to get the cylinder walls so cold as to reduce this and even if it were, this would be an advantage, because lower temperature means lower pressure, and this is a time in the cycle when low pressure is desired; in fact, several prominent air-cooled engines desire it so badly that they add an extra valve with its additional complications for the express purpose of reducing it in a hurry and as much as possible.

CAUSE OF OVERHEATING

Editor THE AUTOMOBILE:

[1,990]—Will you please give me through "Letters Interesting and Instructive" all the possible causes that you think of, which might occasion the following trouble with a 35-horsepower five-passenger car, make-and-break ignition, Bosch magneto.

Going up a long, steep hill about 400 feet climb in a mile and a half (road perfect) about half way up the motor gets hot, the water steams and boils out of overflow pipe, motor slows down, misses, and there are explosions either in exhaust pipe or possibly back-firing in carbureter. The engine finally stops. There is no back-firing, however, upon starting it again, but it takes considerable cranking to get it to start.

Outside of this particular hill the car runs well, and has made runs in stretches of fifty miles without stops, on hot days, through hilly country (Pittsfield to Manchester) without any trouble.

Car is new and has been run about 1,500 miles. Panhard medium oil has been used. Each time I attempted to take the hill on the high gear. I have three speeds.

New York City. SUBSCRIBER.

Since you are using a good grade of oil, and using it freely, your trouble must be one of two things: either your spark is too early or there is something the matter with the water-circulating system. The first is just a possibility, whereas the latter is doubtless your real trouble. Look to the pump first and make sure that it is running all of the time. Yours may be one of the cars built with a weak point in the water-pump-driving system, which is intended to shear when an obstruction enters, thus saving the more expensive pump parts. This cotter or taper pin may have sheared without your knowing it. Running slowly, this would not be noticed, as with liberal water passages the engine would run thermo siphon. But when the engine is made to work hard the difference is noticed and, as you describe it, "the water steams and boils out of the overflow pipe." It may be that there is a screen somewhere in the water system which has become clogged up so that very little water passes through it. At slow speeds, again, this would have little effect, but when hills are climbed the engine needs more water, and the lack of it is seen.

It is just barely possible that the pump is too small for the engine to which it is fitted, and does not throw enough water to cool it satisfactorily. By connecting the pump to a source of water and pumping into a large tub, measuring the output for some unit of time, you can readily determine this. An automobile engine should have very nearly, for a rough-and-ready rule, a gallon of water per horsepower per minute, which in your case would work out to 35 gallons per minute.

If you don't fix this trouble at once, some time when you are attempting a steep hill on the high gear, your engine will get so hot as to seize, and then will be in for an overhauling and you, for a nice, large bill.

ANSWERED AND DISCUSSED

DIFFERING VALVE LIFTS

Editor THE AUTOMOBILE:

[1,991]—Will you kindly explain the following point in your "Letters Interesting and Instructive." My car has mechanically operated valves, all on one side, with adjustable lifts. These lifts are set with varying amounts of play, so that some lifts raise the valves from their seats almost at once (as soon as the lifts have risen, say, 1-32 inch or less), while others have 1-8 inch or more play. This condition produces a noisy valve action, although the lifts are fitted with spring-controlled buffers. The foreman at the maker's local branch says that this uneven setting of the lifts is necessary for the proper timing of the valves, so that each inlet, say, will open at the proper point in the stroke; and that if he "takes the slap out," the valves will be wrongly timed. Now does not this indicate that the cams are not accurately set? For, with a perfectly accurate camshaft, would not the same setting on all lifts—say 1-32 inch or 1-64 inch play—produce a correct valve action?

Your answer will oblige an interested subscriber. Daily papers are neglected when "The Automobile" arrives each week.

New York City. L. I. W.

If there are more than two settings, one for the exhaust valves and one for the inlets, the repair man was either making fun of you to cover his own lack of knowledge or else the manufacturer does not know very much about building engines. This is self-evident, from the bare statement that what is the right valve setting in one of four cylinders of any given engine is also right for the other three, and no amount of reasoning could make it different. So, if the valves and other parts of the valve-operating system are correctly machined, the proper clearance for number one cylinder valve lifter is also the proper clearance for numbers two, three and four valve lifters, whether this be 1/64, 1/32 or even 1/16 inch, of which more later.

Taking up the other side of the above, if the clearances must be different because the valve-operating parts are not correctly machined, we would advise you to sell the car and get a good one.

You are right about the correctly-machined camshaft. This should be such as to, in correlation with the other parts, call for equal setting for all lifts. Now, as to correct amount of clearance, this should be just as small as is possible and the smallest amount spoken of above, namely, 1/64 of an inch, would be about right for the average motor.

One additional possibility is this: In the past year or so the best or standard practice in valve settings has changed. Now, it is possible that your engine was built several years ago, and that the repair man is trying to give you an up-to-date valve setting with the old camshaft. If this is the case (and even in this the amount of clearance would be the same for all inlets and the same, but different from the inlet, for all exhaust valves; that is, there would be but two settings) have him stop it, as the best way to attain the up-to-date result is to buy from the manufacturer a camshaft of late date and install it in the engine. This would give the desired result without unnecessary noise, due to too much clearance.

FUEL ECONOMY AND HEATING

Editor THE AUTOMOBILE:

[1,992]—Will you please help me out in a little trouble that I am having, this being one of the few cases in which I have been obliged to seek outside aid. For several years I drove an air-cooled car of a popular make, having one of its largest type of four-cylinder engines. This season I bought a car of the same type from the same concern. With the old car I always got the best results from the engine when the gasoline supply was cut down at the needle valve to almost the extreme limit. This, also, as a matter of course, gave me the greatest fuel mileage. With the new car I find that when the valve is closed beyond a certain point, the engine overheats and looses power for hills and hard work, although when thus cut down it will run at a saving of fully one-third of the fuel. While the car will run all day at the hardest kind of work without a sign of overheating when the needle valve is properly adjusted for this result, it will badly overheat within a few miles if the supply is cut down much below this point. All of my former experience has taught me that an engine will work cooler with a thin carbureter mixture. I should be pleased if you would inform me through the department of "Letters Interesting and Instructive" in your journal as to the cause of this and as to whether an adjustment can be made to save overheating when the gasoline supply is cut down to its low economy limit. E. M. MURRAY.

Chicago.

There are two possible sources of the trouble in your case, both worth looking into. It is possible that you are using too late a spark, although the very good fuel mileage record would seem to preclude this. Then, it may be that the exhaust cams on this new car have slipped around so that the exhaust is opening too late. When the mixture is rich you get the required power at slow speeds. In that case, that is, with the engine running slowly, the effect of this is not very noticeable. When the fuel is cut down the thin mixture makes it necessary to run the engine faster to obtain the same power.

If there was a small leak in your fuel-supply system it might have the result you describe. Thus, if there was a pin hole in the inlet manifold casting the loss from a rich mixture would be a very small proportion of the total and would have no noticeable effect on the result. On the other hand, the loss from a very thin, poor mixture would form a large proportion of the total result and would affect the running of the engine so as to cause the overheating.

If, upon examination, you fail to find the trouble, it would be well to communicate with the manufacturers of the car, who, priding themselves upon fuel economy, would go to some trouble to set you right.

CYLINDER PATTERN-MAKING

Editor THE AUTOMOBILE:

[1,993]—I am thinking of building an automobile engine and want to inquire where I can get some knowledge of pattern-making and other information regarding such work. Is there any paper published regarding such matters? If so, would you please inform me of the name of the same. Or, in your judgment, where would it be best to seek such knowledge? I am an interested reader of "The Automobile" and find it a source of constant information. I think that I will try a two-cycle engine first, as that seems to be simpler than the four-cycle form.

Boston. EDWARD W. CARTER.

It is doubtful if pattern-making can be learned from books or other reading matters, for one reason, because very few pattern-makers are able to put their knowledge into words, and thus very little on this interesting subject finds its way into print. If you really want to learn pattern-making, the very best way will be to go into a foundry for about two years, moving around so as to get an opportunity to learn all parts of the trade. Then go into a pattern-making shop, and you will find that the two years spent in the foundry are just as much good to you as the same time spent in the pattern work would have been, or more so.

Many articles have been published in THE AUTOMOBILE lately on this subject. Possibly you have missed some of them. For fear that you have, we are appending a list of them as follows:

July 1 issue, pages 11 and 12.
July 8 issue, pages 53, 54, 55 and 56.
July 15 issue, pages 97, 98, 99 and 100.
July 22 issue, pages 137 and 138.

An excellent work on this subject, just published, may be obtained from the Class Journal Company, 231 West Thirty-ninth street, New York City. This is entitled "Practical Pattern-Making," by F. W. Barrows, and the price is $2. An old but good book on the same subject contains much of merit. This is "Pattern-Making," by Joshua Rose, and the price is about $2.50. If you are interested in books, "Modern Moulding and Pattern-Making," by J. P. Mullin, at $2.50, ought to be worth having, as ought also, "Foundry Practice," by H. M. Ramp ($3), and "Toothed Gearing," by A. Foreman Pattern-maker, the price of which is $2.25.

These trade journals are published which touch directly on the subject, as well as a number of others not mentioned, which touch on it indirectly: *Wood Workers' Review*, Chicago, monthly; *Wood Worker*, Indianapolis, Ind., monthly; *Wood Craft*, Cleveland, monthly; *Foundry*, Cleveland, monthly; *Castings*, Cleveland, monthly.

All of the others are directly interested in the wood and lumber trade, and so only touch upon pattern-making as a specific subject in an indirect way.

They would thus be of less use to you in your desire to learn pattern-making than would another journal devoted directly to this and allied subjects.

The best method and one that will give the most satisfactory results, if you are in earnest, is to go directly into the shop.

MORE ABOUT SKIDDING

Editor THE AUTOMOBILE:

[1,994]—In "Letters Interesting and Instructive" in the August 5 issue of "The Automobile" I read with much interest the letter on skidding and your remarks on same. You say that by turning the steering wheel in the same direction as the road wheels are slipping the skidding will be increased by reducing the resistance at front wheels. Now you seem to forget that while the car is skidding the rear wheels are still propelling the vehicle forward, and that when the front wheels are turned in the same direction as the car is slipping the tendency of the rear wheels is to straighten out with the front wheels, thus overcoming the tendency to skid in nine cases out of ten.

For example, say the car is skidding to the right, the front wheels are in the position they were before the car began to skid. The car is now attempting to describe a circle, the front part of the car going to the left, the rear part to the right; now when the wheels are turned in the same direction as the skid (to the right) the car naturally begins a circle in the opposite direction, the front part of the car going to the right, the rear wheels being thrown to the left; the front wheels are immediately straightened out and the skidding is temporarily overcome. Every experienced driver will tell you that this is the only way to keep a skidding car under control. I do not agree with Mr. Mayer about increasing speed when skidding. I find that by cutting off the current with clutch in and making the car turn the engine over, will in many cases prevent the car from skidding and gradually slow up, where an application of brakes would immediately produce sideslipping.

I notice that Mr. Chelf is having trouble with his Remy magneto, which he describes in letter No. 1,964. This trouble is altogether due to improper adjustment of contact screw of timer. When motor misses at slow speed, as his does, this rubber-covered screw should be turned to the left. Several adjustments should be tried and when he gets it right he will find that his engine will run better on the magneto than on the batteries at all speeds. The screw which holds the timer cover on should be loosened in order that the adjusting screw may be turned; when the proper adjustment is found, it should be again tightened. I. B. G.

Nashville, Tenn.

It is certainly news that when the car is misbehaving, so to speak, this action will be corrected by making it easier. That is, when the car is slipping to turn the wheels as you indicate removes the only obstacle to this slipping action. It is hard to see how this will act as a preventative; in fact, the more thought given to it, the more it seems as if this will increase the slipping action, by, as was said before, removing the only existing obstacle. In the appended figure, an attempt is made to explain this as the writer sees it and as he believes is right. Let A B C be the normal center line of the car proceeding along the street. Then let B D represent the center line of the car when skidding, the radius B E showing how the rear wheels rotate around the front ones as a pivot. In this position, the slight angle which the center line makes with the line of the front wheels, indicated by the angle and which increases with any increase in the slipping action, acts to prevent skidding. Although the action may be feeble, it is on the increase, and may ultimately become large enough to stop the slip entirely and solely of itself, as perhaps the hypothetical case indicated by the third position, F B G would seem to indicate.

If now, the wheels are turned to the right, as shown in the second part of the figure, which represents the same case but with front wheels turned so as to make a right angle with the new or skidding center line. In this case, the obstruction or drag on the movement offered previously by the front wheels is absent, and the wheels, in fact, the whole car, is perfectly free to continue its rotation so long as any impulse to do so remains. Not only is this drag removed, but by turning the front wheels in a direction which frees them, they are liable to start in and participate in the movement by rolling in the general direction of the skid, which then becomes a tangent to the former direction of motion, instead of the circular movement.

If, instead of turning the front wheels in the direction of the slip, they are turned in the other direction, the angle of resistance to the motion, and with it, the resistance itself, is materially increased, as shown by the larger angle B. In this latter case, the motion tangent to the first movement is impossible, since not only the rear wheels but the front ones as well must be bodily dragged sideways, as indicated by the two arrows. The more thought one gives to this question, the more one is convinced of the correctness of the above.

Thus far, the reverse action of the front wheels, rolling to the left for a rear wheel skid to the right, has not been considered, but a moment's thought will convince that this would, like the rear wheel action, only be increased by turning the front wheels at right angles to the skidding direction.

This is self-evident if it is considered that with the wheels left pointing forward, they must, to roll to the left, scrape across the pavement, this action being directly against the side of the tires, and being also such as to pull the tire off of the rim. Now, we know that the latter accident does not happen.

By turning the wheels in the direction of the sliding, even this resistance on the part of the front wheels is eliminated, and they are free to pursue any tendency to roll around to the left. The result of this would be to spin the car around its midpoint, like a top, the front wheels turning to the left and the rears to the right.

Our thanks are due to I B G for his solution of the Remy magneto trouble, and the attention of Mr. Chelf, the writer of letter number 1,964, is directed to this way out of his trouble.

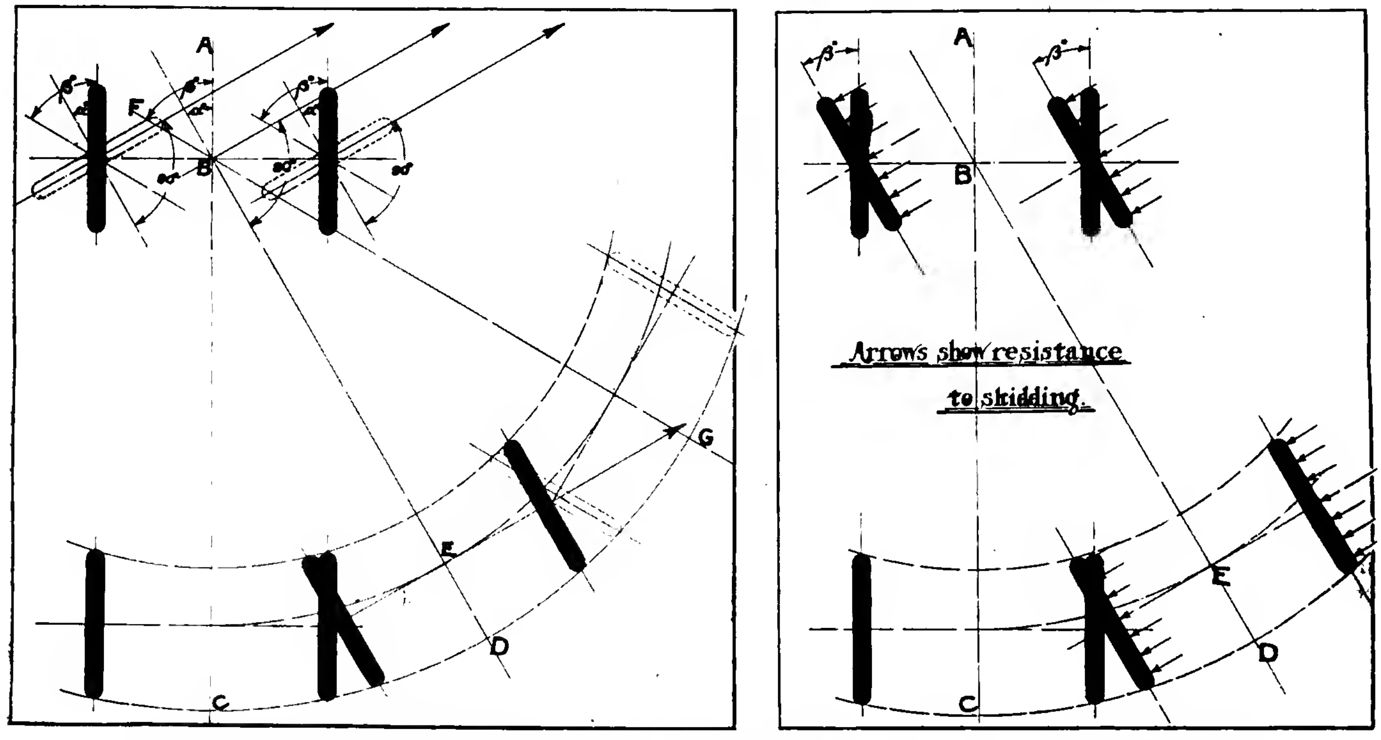
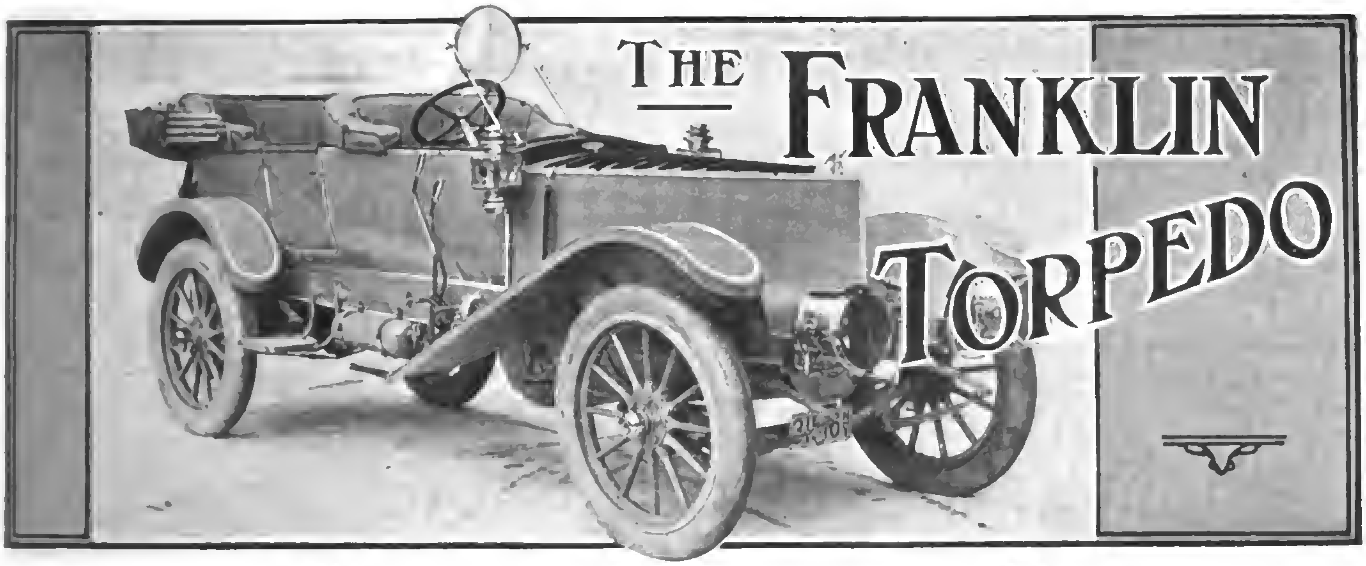
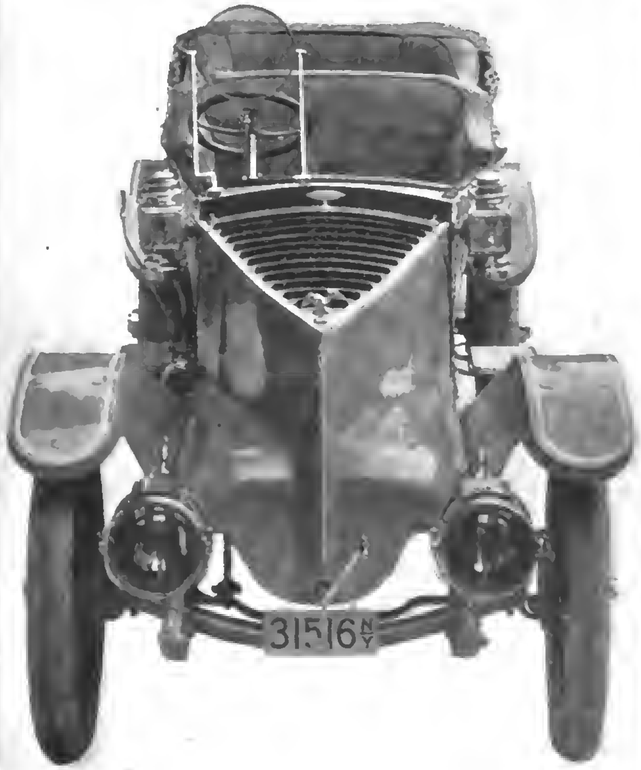


Diagram of Happenings When the Car Skids and (at the Right) the Proper Way to Turn the Wheels to Avoid It

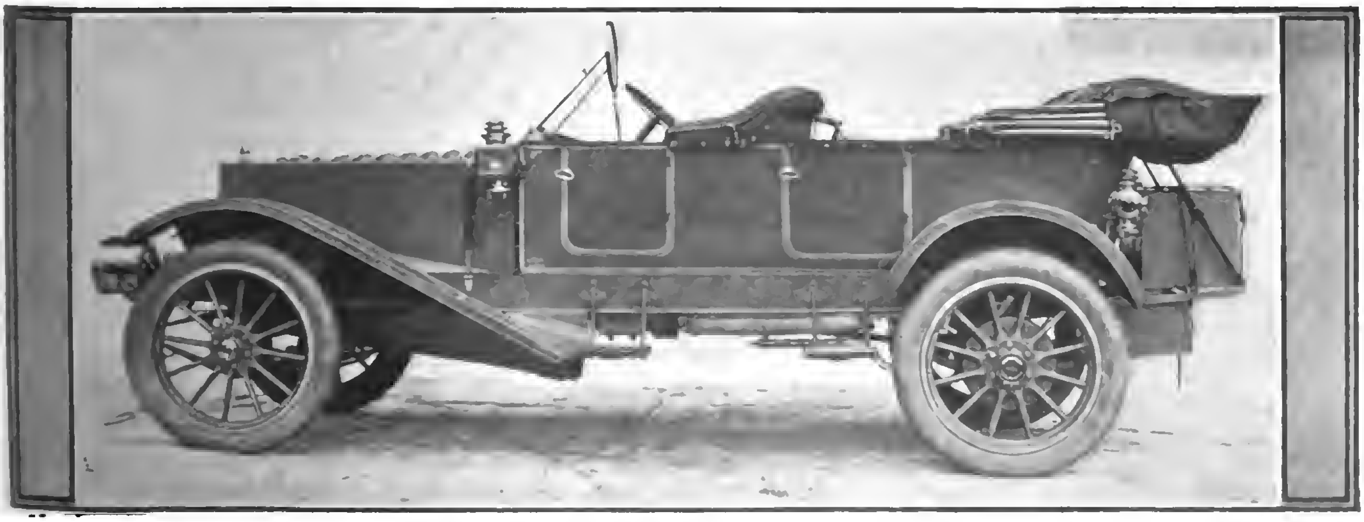
THE FRANKLIN TORPEDO

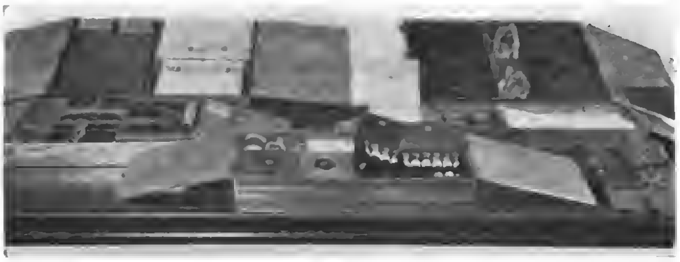


FIRST among the American adaptations of the "torpedo" body designs so popular in England is a special six-cylinder Franklin just completed by the Syracuse, N. Y. factory, for the personal use of H. H. Franklin. This Franklin "torpedo" shows several radical departures from its European models, and in one respect at least, markedly improves on them. The European practice, as has been frequently illustrated in these columns, is to confine the characteristic torpedo effect to the body proper, leaving the hood in its original square shape. The Franklin, however, extends the torpedo idea to its logical conclusion, and makes the hood pointed, like the prow of a boat. This at once brings the whole of the car into harmony; in fact, the hood now gives the keynote of the whole design. The rest of the body continues the boat-shaped lines in a graceful curve to the rear, swinging upward around the tonneau seat. The doors, of course, are full height, both front and rear, two for entrance into the tonneau, and one, on the left side, for the front seat. Thus an unbroken line, emphasized by a molding, sweeps around the car like the gunwale of a boat.



This Franklin body is built on the regular six-cylinder 42-horsepower chassis of the 1910 model. The car has a special bevel gear ratio which enables it to attain a speed of from sixty to seventy-five miles an hour. The novel design of the hood is made possible by the 1910 Franklin air-cooling system, which eliminates the fan formerly





Some Things the Franklin Torpedo Locker Contains

necessary. Admission for the cooling current is provided by louvres in the top of the hood. The body is of aluminum, finished in battleship gray striped with pearl; instead of the usual high polish it is given a simple rubbed surface, very businesslike in appearance. Mr. Franklin's monogram appears on the doors. The seats are low and deep, with ample leg-room, and are upholstered in chocolate-brown goat-skin. The same material is used for the rest of the interior. The folding top, instead of the regular black, is in a rich dark blue. The windshield is of a type never before seen on a touring car, though often used in Europe on racers. It is designed to afford protection to the driver only. The glass is circular, about a foot in diameter, and is held on an adjustable standard, close in front of the driver's face. All exposed metal work has a nickel finish.

The equipment of the car is unusually complete. It includes an electric speedometer light and small electric auxiliaries to the oil side and tail lamps. The rear construction provides lockers and drawers for stationery, toilet articles, a first-aid-to-the-injured outfit, caps, goggles, gloves and maps. The name "Franklin Torpedo" is displayed on a silver plate on the Circassian walnut dashboard, where it extends above the hood, and the extreme "prow" is surmounted by a small silver eagle.

Not by reason of its unusual body construction alone is the Franklin "Torpedo" of interest, but also as an example of the growing tendency among men of means to give their cars an individuality lacking in the ordinary factory product. When a man has his yacht built to order and christened with a distinctive name, he does not wish to have his automobile, sometimes representing an equally great investment, resemble other men's cars, like peas in a pod. This tendency in turn reveals another, namely, that the automobile is not now regarded as the plaything of a single season, to be used a few months and then cast aside for a newer, but rather as the companion of many tours, whose usefulness will endure for many years of pleasurable and economical driving.

COMPANY FORMING IN OSWEGO, N. Y.

Oswego, N. Y., Aug. 23—A group of financiers in this and neighboring cities has about completed plans for the formation of an automobile manufacturing corporation. It is expected that papers will be requested within a few days, and work upon the new plant being built for the Ontario Industrial Company, at the foot of West Albany street, is being rushed. One car has already been finished for experimental purposes, with a four-cylinder motor, an extra long wheelbase, and other modern features, and others are to be manufactured for 1910 delivery. The following appear as backers of the concern: Col. John T. Mott, C. C. Place, H. A. Wilcox, John P. Miller, D. W. Pell, T. P. Kingsford, A. N. Radcliffe, George E. Farrell, A. H. Mowry, James Dowdle, L. W. Mott, B. S. Adler, H. J. Wilhelm, T. A. Clarke and E. B. Powell.

WILLYS PREDICTS GREAT YEAR FOR EUROPEAN INDUSTRY

NEW YORK, Aug. 21—Contrary to the prevalent opinion in this country, that the European automobile industry has perhaps reached the zenith of its progress, are the ideas expressed by John N. Willys, on his return this week from a round of foreign factories. Although traveling ostensibly on a vacation trip, his connection with the automobile industry in this nation, as president of the Overland Automobile Company and the Marion Motor Car Company, of Indianapolis, led him to give the situation across the Atlantic a serious study. For two months he watched the wholesale and retail business, the work of the various factories, and the trend of the general activity in England, France, Italy, Belgium and Switzerland. His impression is that 1910 will unquestionably be the greatest year in the history of the European automobile industry, based not only upon the work in connection with pleasure vehicles, but even more so with the commercial and taxicab departments.

"The automobile industry in Europe held many surprises for me," says Mr. Willys, "for I had the opinion that it was declining, but I believe that the opposite is the real situation. The entire effort of the factories, however, is being directed only along the lines of taxicabs, commercial vehicles, and high-priced pleasure machines. The development of the low or medium-priced automobiles has been almost neglected. Paris, London, and other large centers are fairly alive with taxicabs. In New York, Boston, Chicago, and other American cities we think that a great quantity of these machines are in use, but the numbers being employed cannot compare with those in the English capital and on the Continent. Roughly counting, I do not believe it exaggeration to state that there are at least 5,000 automobile cabs in Paris and 2,000 in London.

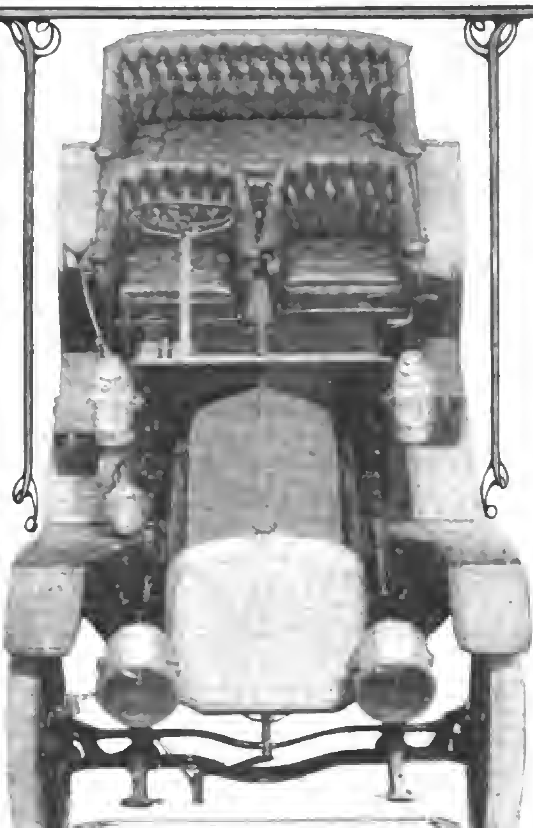
"The same applies to the business in commercial vehicles, in which there has been great progress. The last five years have made wonderful changes in traffic conditions abroad, and it is hardly conceivable that in such a short time so much of the horse-drawn movement could have been supplanted by the motor-driven machines. There are hundreds of auto-buses in London and Paris, and scores in all large cities, some double-decked, but usually with a single deck, to facilitate handling. I was greatly impressed by the prevalence of limousines, landaulets, and other types of high-priced European cars, as compared to the general use of these machines in this country, including those of domestic make, of course. The surprise was induced, probably, by the absence of the low-priced or medium-priced class, for but few of this kind are made, due principally to the fact that the manufacturers have confined themselves to the powerful and expensive output.

"In my opinion there is an excellent field abroad for medium-priced American machines of good quality, and it is the intention of our concerns to enter that business as soon as we are able to care for the American demand for Overlands and Marions. Just when this will be is indefinite. The European automobile public is gradually coming to believe in the American production, and is about ready to purchase imported goods, providing that the models are successful, and not the over-production. The business should be started conservatively, however, so as not to antagonize the foreigners with reports of a so-called 'invasion.' The success of the moderate size cars in this country has influenced the designers on the other side to give attention to this type; but, as yet, their small cars cannot compare with ours. They concede the American superiority, and I believe that it will take them some time to be able to construct machines that will equal our own. They do not have the up-to-date machinery to give large output, unless they have gotten it from America. It was noticeable to me that the manufacturers with whom I spoke do not consider the American small cars sneeringly, as they once did. Rather they gaze upon our industry with respect, and perhaps with fear.

CORBIN APPEARS IN 1910 FORM

SLIGHT modifications in the motor, a lengthened wheelbase, a heavier frame and additional equipment are the principal changes in the "Full Jeweled" Corbin for 1910. The model which was so successful during the passing season has been retained nearly in its entirety, the only details altered being characterized as distinct refinements. Produced by the Corbin Motor Vehicle Corporation at New Britain, Conn., associated with other large manufacturing establishments, the cars have been the results of splendid engineering skill and knowledge, and it is the announced intention of the factory that the same standards shall be maintained throughout the immediate as well as future seasons.

As in the past the efforts of the entire force will be concentrated upon a single model, giving the experiences gained in five years of making Corbins, and some of the constructive details proven in the models in which they were pioneers are important still. With one type of chassis will come two motors, either water or air-cooled, though the latter will be made only on special order, and the two engines are interchangeable, of course, with their individual fittings. The success of the 1909 season was so marked that the prospects become bright for an even more flourishing one ahead and orders for material sufficient for 600 automobiles have either been let or are pending. It is planned by the officials to turn out that number of cars during the 1910 period and already deliveries have been going on for a month.



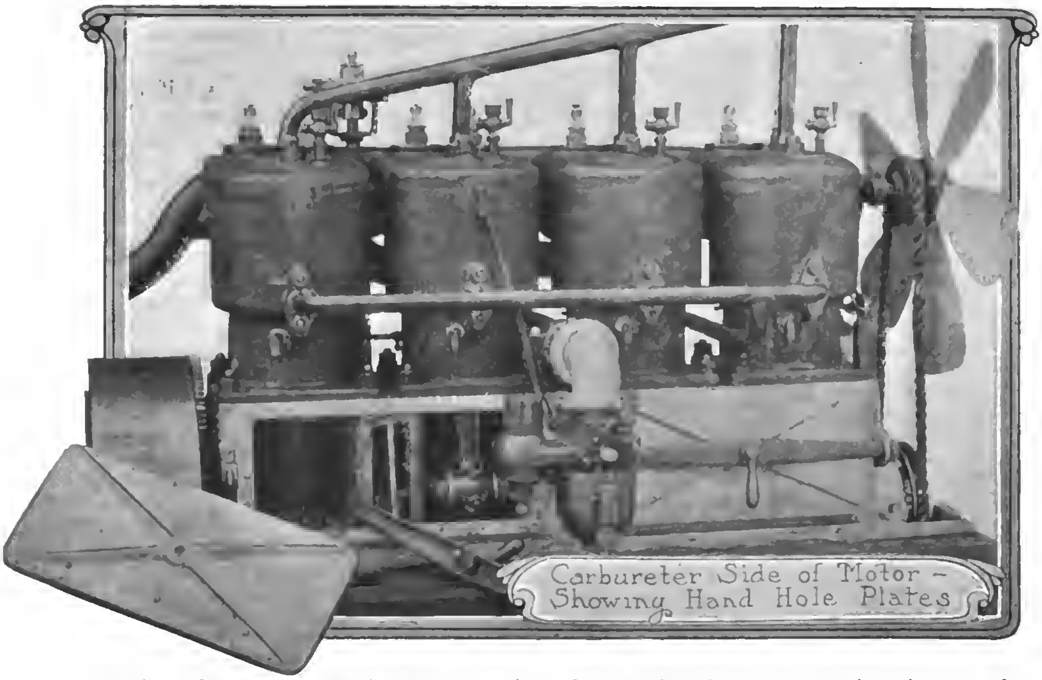
Baby Tonneau Body

Details of the Changes in New Models—As has become somewhat general among the stable members of the industry, standardization has been attained to such a degree that few deviations are necessary. In the new Corbins this will be well illustrated, for the variations from previous practice may be counted upon the fingers of one hand. In the motor itself the principal ones include enclosed timing gears, a new type of oil pump and a changed location, and the moving of the magneto from the front inlet side to the rear exhaust side. The oil pump was formerly mounted midway on the exhaust side and driven directly from the camshaft, but now it is further back on the same side and is driven by the same helical gear which operates the distributor. The pump is now a centrifugal one instead of plain-gear and forces oil from the reservoir, under the foot-boards, through dash sight feeds to the four cylinders and thence to the crankcase for splash. The two-to-one or timing gears remain at the forward end of the case and are enclosed in an aluminum oil-tight case. A Bosch magneto is now regular equipment and this is placed at the rear of the exhaust side and driven by aluminum to fiber gears from the camshaft. In previous models this has been extra equipment and provision was made to drive it from the timing gears at the front next to the carbureter. The change keeps all moving parts on one side.

In the chassis the frame has been lengthened 2 1-2 inches and this put into the wheelbase to insure greater comfort in riding. To make this possible the frame members have been made 1 inch deeper in section. Looking toward the same end, that of ease, the tires are now 4 inches in diameter all around instead of 3 1-2 front and 4 in the rear. Hartford universal joints are used in the driving mechanism and the driving shafts in the rear axle are made of vanadium, instead of nickel, steel. A slight change has been made in the engine support whereby a lighter steel beam is introduced to transmit the torque reaction from the engine to the side frame members. The engine is supported as previously, but the steel beam takes the place of a deeper and heavier one of aluminum.

Arrangement of the Corbin Motor—No departure has been made in the type of water-cooled motor used in 1909, it having four cylinders cast separately with the valves all on one side—the left looking forward. The bore is 4 1-2 inches and stroke 4 1-4 inches. The exhaust and inlet manifolds are held in place by a series of four yokes, the exhaust pipe going directly to the rear, while the inlet takes a turn between the second and third cylinders to the carbureter on the other side. The single camshaft is driven from the enclosed gears at the front, operating not only the cams, but also the water and oil pumps, the distributor, and the magneto. The fan is mounted upon the front cylinder and driven by a rope belt which is held under tension by a spring and lever arm. The water enters the pump at the bottom, is forced to the jackets from the opposite side, the piping passing between the first and second cylinders, and is returned to the honeycomb radiator through a copper tapered manifold on the top. By the use of single cylinder castings a five-bearing crankshaft is permitted with plain bearings of Parsons white brass between the cylinders and the two end supports are of the annular ball type.

The aluminum crankcase is divided, the lower half being held by through bolts which at the upper end hold the cylinders down on the upper half. This is a construction which secures great simplicity. To inspect the interior of the case there are two very large hand holes on the carbureter side of the upper crankcase half and the connecting rod bearings may be taken up through these. Their size makes the operation very easy and an entire piston and connecting rod may be removed without disturbing the rest of the motor. Another point of accessibility is secured in the manner of holding the cam rollers. These are pinned in such a way that with the withdrawal of a cotter pin and by sliding the bolt to one side the roller may be removed through the crankcase hand holes from the opposite side. The hand hole covers are retained by a yoke and single turn screw, so that they can be removed in a twinkling. A relief cock is placed in the head of each cylinder. Inspection of the timing gears is facilitated through the use of a separate casting cover held in place by three cap screws. The entire water system is so designed that it can be taken off or put on with no difficulty, the former operation being confined to the un-



clutch with three springs is used to transmit the power from the flywheel through a keyed shaft, with a sliding joint to allow vertical freedom. The clutch is held in the flywheel by three powerful seating springs and the thrust taken up in a ball bearing. A long lever arm on the foot clutch-pedal makes the operation of the clutch easy and the disengaging mechanism is as simple as possible, ball bearings being employed on the end of the fork.

Three forward and one reverse speeds are secured in the compact selective sliding gear transmission. This is placed immediately at the rear of the clutch-engaging assembly with the shifting rod entering it at the top just under a removable cover plate. The case itself is of aluminum in halves so arranged that the gears, slide bars and operating levers all act in oil. The gears are made of high-grade steel, case-hardened and

coupling of two unions and the unloosening of a castellated nut to remove the pump and then the regular process of taking off two manifolds. These arrangements aid in caring for the car.

The addition of the magneto to the list of regular equipment now gives the Corbin a double set, the one with the Bosch magneto and a one-point Connecticut coil and the other with a Connecticut coil and distributor, using a storage battery or six dry cells as source of current. The magneto, as has been explained, is driven directly through gears and is readily accessible. The wires are led between the second and third cylinders, a guide being arranged on the top of the inlet manifold, to the fiber cable-lead and thence to the spark plugs. The magneto plugs are placed over the inlet valves, inasmuch as most of the running will be done with this system, while the batteries have a set over the exhaust valves, but in the same pockets. The distributor is controlled from the lever on the steering wheel through bevel gears at the base of the column and a rod passing between the third and fourth cylinders.

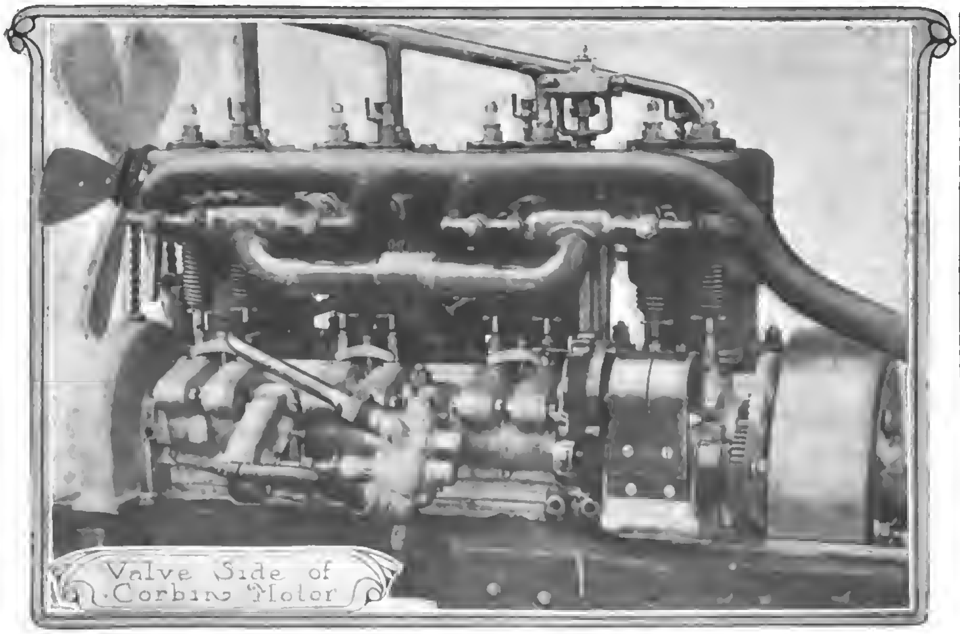
A water-jacketed Schebler carbureter is used, controlled also from the top of the steering column and a single rod. A foot throttle is also connected, operated by a piano-type push pedal.

Clutch and Transmission Assembly—A leather-faced cone

ground, and the shafts are supported on F & S imported annual ball bearings. The final drive is by shaft through two Hartford universal joints to a semi-floating rear axle. The shafts are of nickel steel, heat-treated and mounted upon annual ball bearings with a special bearing to take care of the thrust. There are seven annular and two thrust bearings in the rear construction, making this expensive, but being conducive to longer life and less wear. The driving pinion itself has three of the annular and one of the thrust bearings. The torsion strain is taken from the rear axle by a long tubular rod extending to the cross-frame member just at the rear of the transmission and its end is there held between spring bumpers. The spring seats are oscillating to give an easier motion to the body of the car and to place less strain upon the rear construction. The gears and differential can be removed without removing the axle from the car, by taking off the upper half of the housing.

Two complete sets of double-acting brakes are placed upon the rear wheels, one set—the external—is operated by the foot pedal, and the other by a hand lever at the side, as is general practice. The former brakes are floating bands lined with camel's hair, and a flat spring on the outside keeps them from dragging upon the drum when not engaged. Bronze shoes acting upon the steel drum constitute the internal system and both are so arranged that the pressure upon them from either the foot or the lever is very great. The springs are all long, of the semi-elliptic type, and the rear ones have a scroll turn at the rear with a spiral spring tending to give easy-riding properties.

Steering Gear—A worm and sector irreversible steering gear is used in the new models as in those in the past in which it gave great satisfaction. The teeth are cut by the Hindley process which gives long bearing surfaces thereby preventing quick wear, and the sector and sectorshaft are made in one drop forging, mounted on bearings of bronze. The wheel itself is made of wood with a finish which protects it from water and keeps the color constant. The spark and throttle operating levers are placed upon a stationary quad-



rant in the center of the steering wheel. Ball thrust bearings above and below the steering worm tend to reduce to a minimum all wear, and together with the ball bearings in the pivot heads, make the steering remarkably easy.

The I-beam front axle is a one-piece drop forging of alloy steel properly tempered, with large jaws at each end to receive the pivots and with the spring seats integral. The pivots have large ball bearings at the top to take both the load and the steering strain. A distinctive feature of the Corbin front axle construction is seen in the fact that no through bolts are used to hold the pivots in place, but the forging is so made that the pivots cannot be forced out except by removing a bushing in the lower jaw of the axle. The bushing is held in place by two cotter pins. The steering cross rod is placed at the rear of the axle, thus being protected from any possible damage from road obstructions. All nuts in the system are castellated, and due provision is made for adjustments to take up the ordinary wear in the joints. The cross rod is dropped in the center, conforming to the shape of the axle, and to obviate any chance of its hitting the dust pan under the engine.

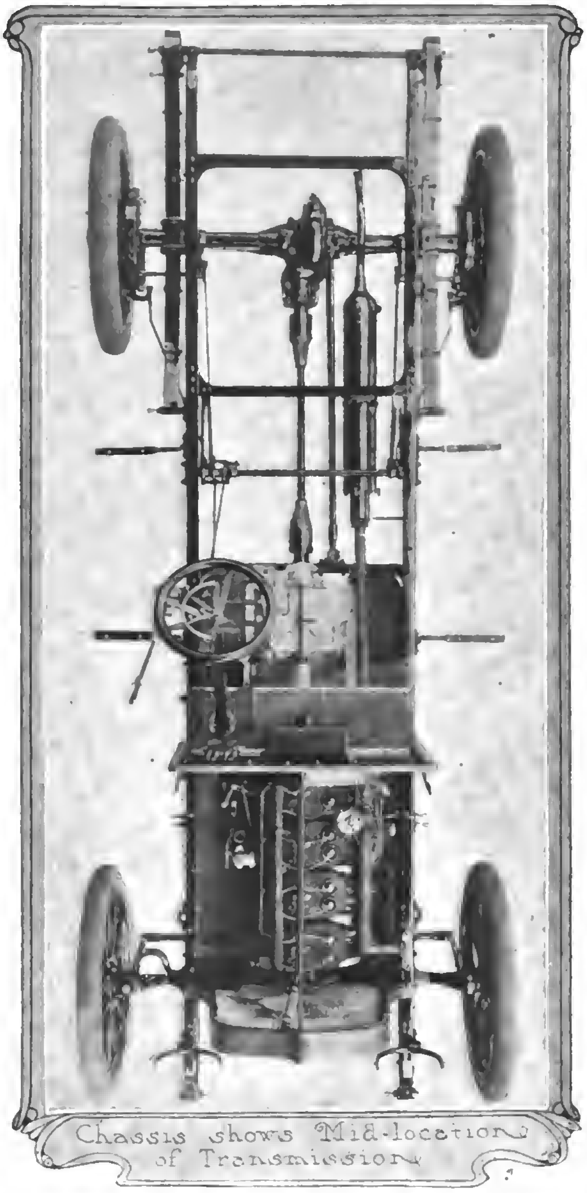
The air-cooled motor will this season be installed in cars only on order, but the construction is such that there is no difficulty in making the change when the car is purchased or built. The method of attaching the engine to the frame is the same in both cases, as is the ignition, oiling and transmission connections. The cylinders are of the same size as the water-


Dash Board and Control Mechanism

cooled ones, but are different in the essential construction aside from the difference in cooling. Their bore is 4 1-2 inches and the stroke 4 1-4 inches, but the valves are in the head, operated by push rods and rocker arms. There is but one camshaft and this works both valve tappet rod sets, the exhaust directly above it and the inlet through a set of rocker arms in the crankcase. The valves are located in cages in the head of the cylinders. Cooling is effected through a series of sheet metal flanges set spirally in the cylinder walls and the wavelike shape gives the air a better chance to touch the entire surface. The coming season will be the third for this type of air-cooled motor.

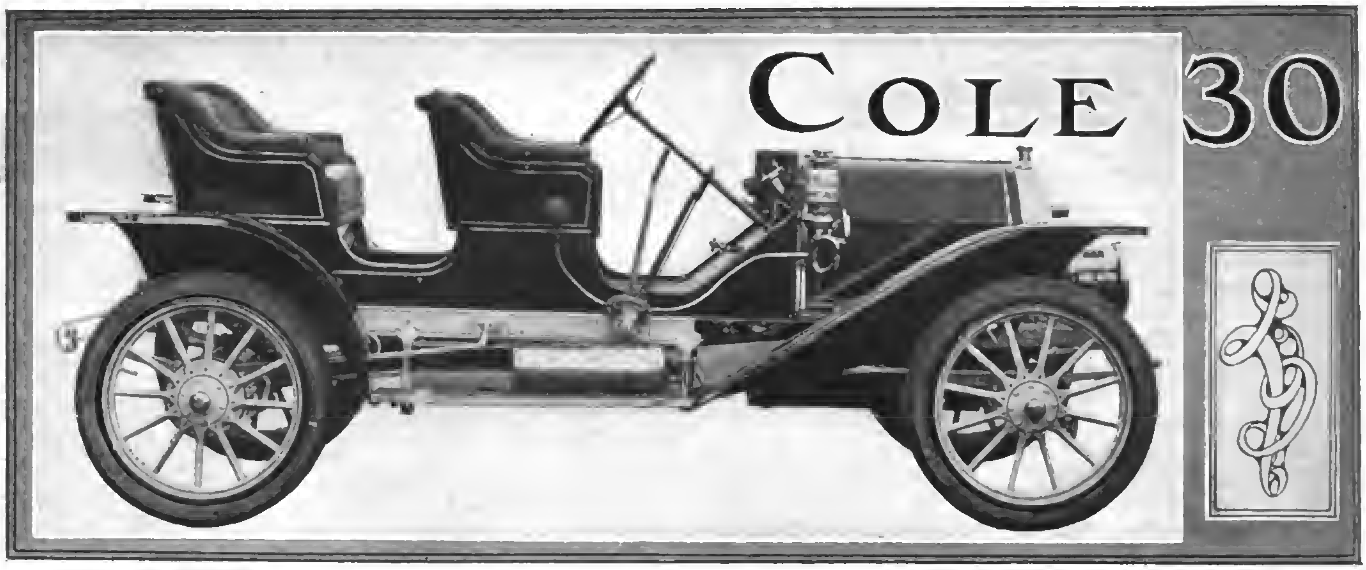
Four Body Models—The Corbin Company, while concentrating its attention upon one chassis, will give an option of four different styles of bodies—the five-passenger touring car, the four-passenger roadster, the four-passenger baby tonneau and the limousine. The only appreciable difference necessitated in the chassis by any of these is that the wheelbase for the limousine is 6 inches longer than for the others. The standard length is now 110 inches and the enclosed model will be 116. For the roadster and baby tonneau cars the steering column is given a slightly increased rake and the gear ratio may be altered if desired. Inasmuch as the equipment now includes the magneto, the Prest-O-Lite tank and the cape top, the price has been raised from $2,500 to $2,750, with the enclosed cars, of course, proportionately more, but the increase is less than that to which the purchaser was put in equipping his car heretofore. The color finish of the cars will be to some extent optional, for a number of choices are offered in the new catalogues. Another wide range of choice is seen in the fact that any make of American tires will be placed upon the car, according to specifications. Body lines on the 1909 cars were so well liked that the alterations are minor ones, the fenders, general appearance, and finish being of the same character, with just sufficient variations to distinguish them as new models.

The familiar trademark, "Full Jeweled," will also be among the features retained, for the cause of its first application is still found in the large number of annular bearings used. There are 20 of these, distributed as follows: four in the front


Chassis shows Mid-location of Transmission

wheels, two on the crankshaft, five in the transmission, seven in the rear axle, and two in the clutch. These enable the car to be moved with the minimum of frictional resistance, consequently reducing the loss between the motor and the road wheels, and at the same time increasing the efficiency of the entire machine.

Throughout the spring the extensive factory of the Corbin Company has been working steadily upon the output, so that with the completion of the season it was well prepared to enter upon the new orders. Material has been going through for some weeks, and machine work is being done in advance to be ready for the urgent demands. Night work has not been found necessary with the existing facilities, but from present indications it may become imperative very shortly.

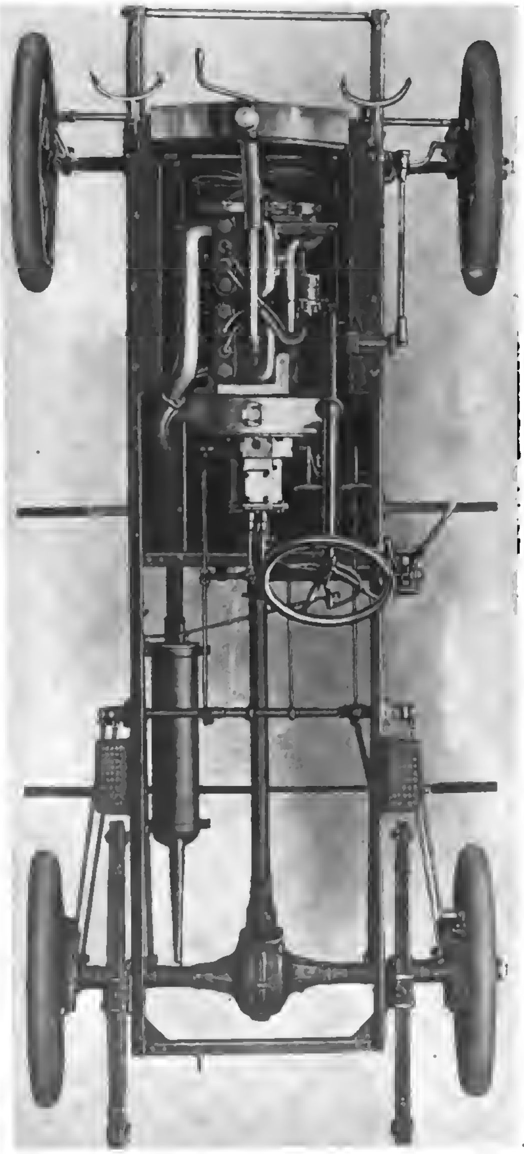


NEW among the cars for 1910 is the Cole "30," which, however, shows no new and untried features but is constructed upon correct and accepted lines, which have shown merit in the past. It is an Indianapolis production, being built by the Cole Motor Car Company of that city, and sold by the Henderson Motor Sales Company. Wisdom is shown in the election to build but a single model, upon which factory and sales effort will be concentrated, this being named the Cole "30."

In this, the source of power is a four-cylinder motor, comprising part of a unit power plant located at the front end of the chassis, driving back through a slightly inclined shaft to the live rear axle. The engine has the 4 by 4 cylinders cast in pairs, with the valves all placed on the left side. This form of construction makes the engine very simple, for there is but one camshaft, one set of cams, and all valves being located close together, repairs or adjustments are more easily made. To avoid complicating the motor, the magneto, a regular part of the equipment, is placed on the right side, as is also the water pump.

Connected to the motor as an integral part, is the clutch, which is of the cone type. This is of the direct cone variety, the removable clutch leather surfaces working directly on the flywheel proper. In it, as in the whole power plant, and in fact, throughout the car, simplicity has been sought and attained. As few parts are used as will actually do the work, which means a great deal to the prospective owner, since fewer parts means fewer sources of wear, lesser number of joints to wear loose and a smaller number of parts to be repaired, in case of accident.

Not only is the clutch made one with the engine, the cases of the two being rigidly fastened together, but the transmission case, also, is joined to the other two. This form of construction, combined with the suspension which it allows, keeps the bearings, the vital parts of any piece of mechanism, in constant and perfect alignment. Not only does this make for easy assembling at the factory, but in the hands of the user, in daily service, the same alignment may be confidently counted upon. The whole thing spells ease of operation and increase in the power delivered to the rear wheels, which after all, is the desideratum. The transmission affords three speeds and reverse, operating on the selective plan, with a positive locking device which prevents two gears being used at once.



Chassis of Cole "30" Viewed from Above

A self-contained oiling system of this motor makes all other oilers unnecessary. The oil is filled in through the breather by removing the cap of same, the oil gauge just to the left of the carbureter clearly indicates by the rise and fall of the aluminum ball the amount of oil in the reservoir, a full supply of oil is indicated when the ball is near the top of the open slot, and time to put oil into the motor is indicated when the ball is at the bottom of the open slot. A plunger pump connects the oil reservoir with the crank case proper and circulates the oil continually, depending upon the speed of the motor, and maintaining at all times proper level. All excess of oil overflows to the reservoir. A pet cock on the outside, near the top of the pump, when opened will indicate whether or not the pump is operating.

Full floating describes the rear axle, which is mounted upon Hyatt flexible roller bearings, while the I-section front axle has ball bearings to carry the load. Two sets of brakes are fitted, one internal expanding, the other, band brakes on the outside of the brake drum. The wheelbase is 108 inches and the wheels, 32 inch, equipped with 3½-inch tires all around.

FRENCH SPEEDOMETER SHOWS SPEED, TIME AND DISTANCES

By W. F. BRADLEY

PARIS, Aug. 19—Perhaps the only objection that can be brought against an accurate modern speedometer is that it is ephemeral. It gives the speed at which the car is traveling while the car is in motion. When the car stops the pointer drops back to zero, and nothing more is to be learned from the clock-like dial. On certain instruments the maximum speed remains permanently recorded, but even this is a meager record compared with the one supplied by a new European instrument.

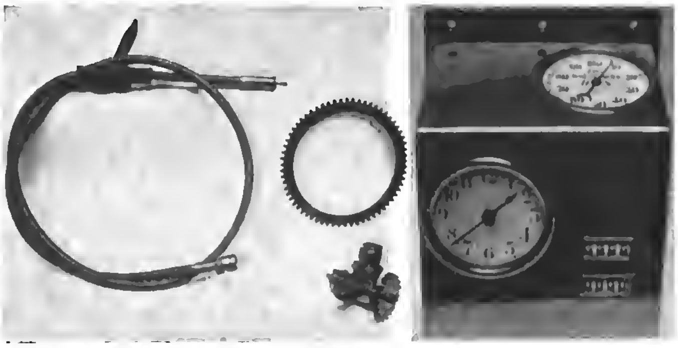
The O.S. register shows the speed at which the car is traveling, in the same way as the usual type of speed indicator, and at the same time prints, on a narrow strip of paper, an account of all that has been done by the automobile from the moment it is taken out of the garage to the instant it is brought back again. If it is desired to know, for instance, what the car was doing between 3 and 4 in the afternoon, it is only necessary to look up the band and everything will be found in black and white: the speed minute by minute; the exact minute when each stop was made, how long the stop lasted, at what time the car started, etc.

The matter is really simple, although it may at first sight appear to be too complicated an operation to be connected with simplicity. Within the brass box containing the speedometer is a roll of paper about one inch in width, which is unrolled from one spindle to another at a determined rate. The paper bears horizontal and vertical lines, these latter representing minutes, fifteen minutes and hours. The band is driven by clockwork mechanism, the passage of each one of the vertical bars representing one minute. The horizontal bars represent each ten kilometers, and run up from ten to 100 kilometers.

As soon as the car is put into motion and the speedometer, operated in the usual way by flexible cable from a front wheel, starts to act, a stencil begins to trace a line on the moving band of paper, passing under it at the rate of one vertical space a minute. Where the diagram crosses the horizontal lines it shows the speed, and at the vertical lines, the hour that speed took place.

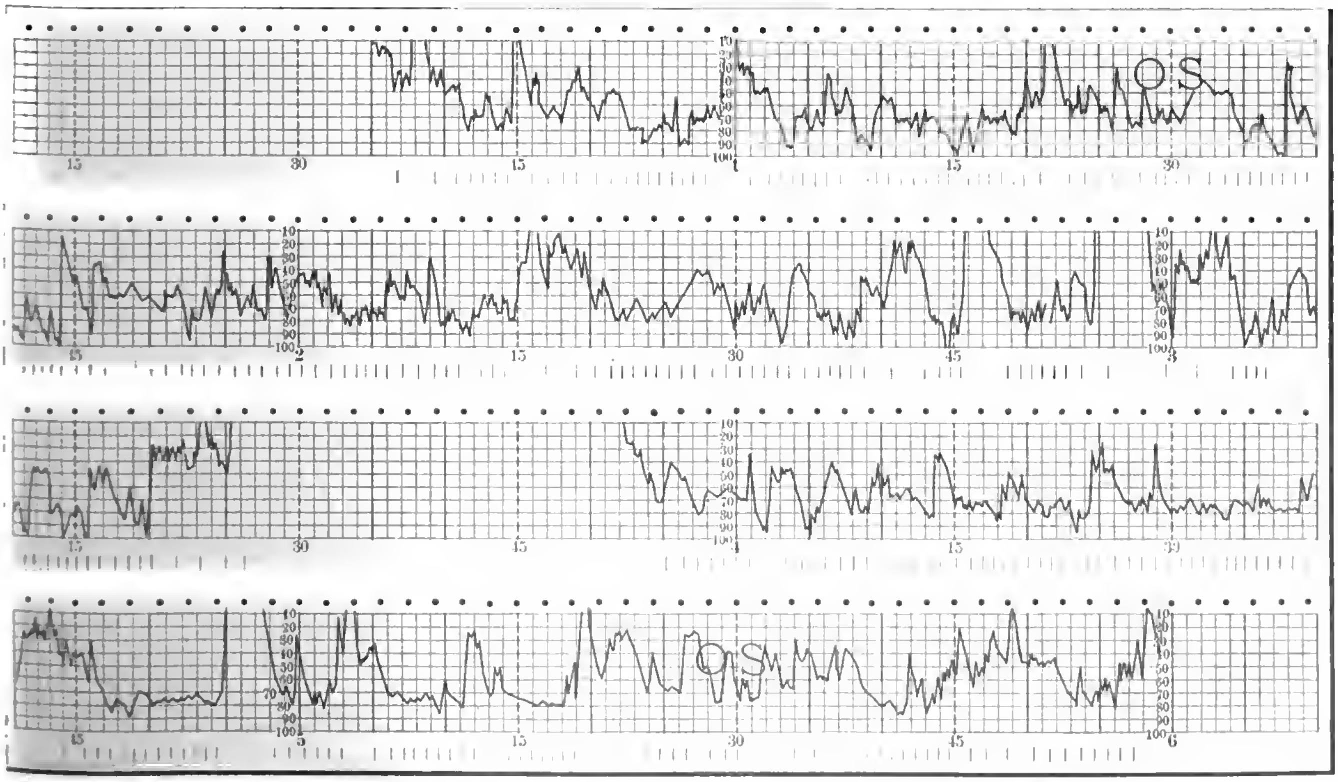
The following is an example of the reading taken on a trial run with a fast touring car fitted with this apparatus. Car started at 12.35. After two minutes the speed rises to 50 kilometers an hour. After three minutes grade crossing and stoppage of one minute. The speed gradually increases to 80 kilometers an hour, with one or two periods where it drops back to 60 kilometers. At 12.45 stop of half a minute, and at 12.59 stop of 45 seconds. At 1.04 the speed is 93 kilometers; at 1.09 it is 95 kilometers; at 1.15 it is 100 kilometers.

The recording bands are supplied in lengths for 12, 18 and 24 hours' duration. They are very easily put into position, and once placed the door of the instrument can be locked, making it impossible for the driver to tamper with the record. So long as



Driving Shaft, Gears and Enclosed Box of O.S. Speed Register

the speedometer is doing its duty the permanent record will be made. From a sporting standpoint it is interesting to be able to keep a permanent record of what has been done by the car each day, and for the private owner it is valuable to have some check on his driver when the car is out of his sight. If the instrument can be produced at a sufficiently low price to make it accessible, it should have a great future on commercial vehicles, where a moderate speed and the reasonable use of the brakes are both absolutely necessary for the long life of the car. At present, the cost is rather above the means of the average owner.



Sample Chart as Spoken of in Text, Showing How the Recorder Indicates Time, Speed and Distance

BOURDREAUX-VERDET BALL-BEARING MOTOR

INGENUITY is rarely so well displayed as it is in connection with the application of ball bearings to motors, and that the automobile industry has heard the last word is scarcely to be taken for granted. Some motors lend ease to the application of ball bearings, and the one as here illustrated is in this class. This application, as presented by Henry Hess—Hess-Bright Manufacturing Co.—shows how nicely the Hess-Bright (D.W.F.) type of bearings work in, and it happens to be the case that the motor, aside from the question of ball bearings, is of more than passing interest as a type.

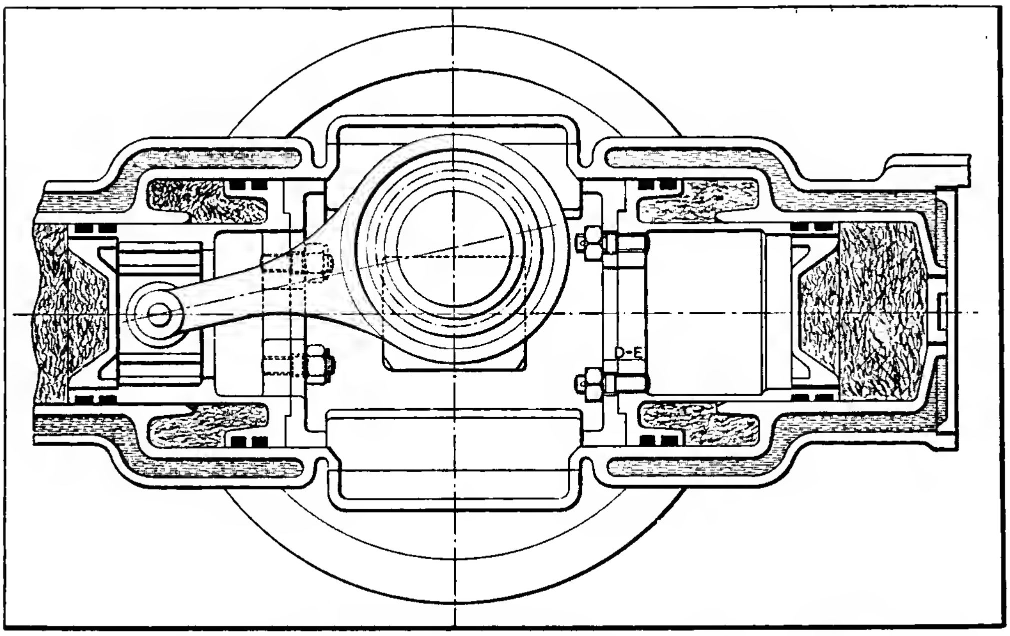


Fig. 1—Cross-section through cylinders, showing concentric piston and thicknesses of walls

As will be observed, the motor is of the concentric-piston type, designed to operate four-cycle, giving results such as the two-cycle motor is supposed to afford, in that there is one explosion for each revolution. With the small piston having 10.2 square inches area (the concentric piston having the same area) and a stroke of four inches, the compression is 80 pounds per square inch, giving seven horsepower, at 1,100 revolutions per minute, for a single cylinder.

But this, in the abstract, is not so much to be wondered at; what is more to the point is the constant torque reported for this motor and the fact that the power increased with speed as follows:

INCREASE OF POWER WITH INCREASING SPEED

Speed in Revolutions per Minute	H.P.	Torque in Foot-pounds
1,100	7	32
1,250	8.5	..
1,425	9.75	..
1,560	10.6	36

The above is for one cylinder, and, as will be observed, the torque was very nearly constant throughout the range of speed, which is a rather unusual performance, especially at the rather high speeds named. The power, in view of the nearly constant torque, increased with the speed almost in proportion, and the weight efficiency of the motor, in view of its lightness, is very good indeed.

Among the mechanical features, as clearly depicted in Fig. 1, and further indicated in Fig. 2, is the connection between the two systems of pistons, and the use of a common connecting-rod. Then, as the same figures show, the crankshaft is short, strong and well balanced, considering the type of motor. The piston construction is a little heavy, which is a matter of moment in motors in general; but in this case, owing to the rigidity of the parts and the great ability of the ball bearings selected, the results are not marred by the weight of the reciprocating parts, and the test, as reported, shows adequately the ability of the bearings, crankshaft and connecting parts.

The cylinders are properly water-jacketed, and the ports, which do not show in the section are sufficiently large to adequately serve the purpose. The construction in general is on a rather high plane, and, on the whole, this is a good illustration of what can be done outside of the conventional; and in view of the present uneasiness among designers, as evidenced by the many new examples which are constantly being presented, it may prove of more than a little interest at this time not only to show the trend from the point of view of ball bearings, but in the direction of the increase in weight efficiency of motors, which is a matter of increasing the number of power strokes, in a given time, without increasing the number of cylinders or the total weight of the power plant.

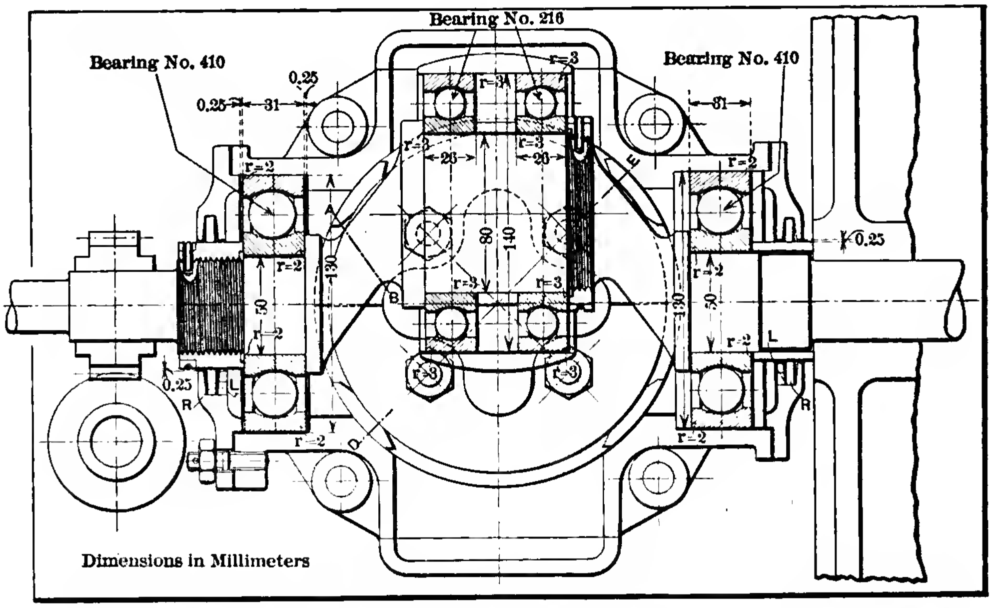


Fig. 2—Cross-section through crankshaft, depicting the manner of applying ball bearings

Regal Completes Its Transcontinental

Ames Monument over 8,000 feet above Sea Level

Along the Cliffs, Weber Canyon Utah

Crossing Desert Sands Western Utah.

Fording a Wyoming Stream

SAN FRANCISCO, Aug. 22—Thirty days out from New York, running time, and with the odometer reading 4031.5 miles, the Regal transcontinentalist ended its strenuous journey at the Regal agency on Golden Gate avenue, in the best of condition and ready to duplicate the trip. The experiences of the party as far as Rawlins, Wyo., have already been described. The final stretch may best be left to the fervid and flowery rhetoric of George D. Wilcox.

"It is a wise provision of Nature," begins the tale of the Regal Xenophon, "that we poor mortals may not know what the future holds in store for us, else our gay start from Rawlins on that bright Sunday morning would have immediately changed into a feeling as of one going forth to slaughter. Heading westward along the tracks of the Union Pacific road we found ourselves in a rough, rolling country of steep ascents, but fairly good road surface." Here he pauses to relate a coyote story in the Seton-Thompson style. Continuing: "Wamsutter, on the eastern edge of the Red Desert, was the noon stop, and after filling the water bags we tackled the road across this barren waste. How we ever got the car through this hundred miles of country we hardly know.

"Bitter Creek, a sluggish alkali stream, rose to a raging flood and tore into the soggy banks like a steam shovel. For forty-eight hours we waited in the old stone stage house, a relic of the Indian days. Tuesday afternoon we ventured forth, and five miles out came to the first washout. We plunged in; the water rose into the body and over the motor, and we stopped in midstream all awash. We held a council of war and devised methods of extraction, which finally were rewarded with success. Across the Green River and southwest into a mighty canyon we plunged, determined to make Granger, 45 miles away, for the night stop. The road improved somewhat, but with Granger only five miles distant, our searchlight disclosed the walls of another washout directly across our path. Its walls were precipices, its bottom fathomless mud. Scouting parties discovered an opening. The Regal was brought up, rushed the ford and sank in a sickening manner in quicksand just at the moment when a safe passage seemed sure. One look was enough; we decided to camp by the car till daylight.

"In that high altitude the nights were bitter cold, and a sage-brush fire, unless constantly fed, is a failure; so all night long we alternately froze and roasted. Daylight and the sun warmed our blood enough to begin the work of rescue, which we accomplished in due time. At Granger we found that we must run north to Oakley, thence south to Evanston, a detour of 75 miles, to avoid more washouts. Night found us at Opal, and in the morning we were off early for Evanston. However, we took a wrong turn, and after 32 miles of "Seeing Wyoming" we were back again whence we started. Again we were instructed, and hitting the right road south, made a fast run into Evanston, arriving at 6 p. m.

"Who can describe the grandeur of this ride through the great natural gateway that opens before us permitting our escape to the beautiful valley in which Ogden is nested?" Mr. Wilcox gallantly attempts the description: "Range on range of magnificent snow-clad mountains pile themselves to the north and south. The Weber River roaring through the narrow gorge gives scant foothold for the wagon road, which, perched now upon one shoulder, again on the opposite of the cliff, winds under the shadow of the great overhanging rocks. The road is superb. At last, filled with the grandeur and majesty of this wonderful pass, we break through the Devil's Gate and come abruptly into the level and beautiful valley. We were received in Ogden with open arms.

"Ogden is the gateway to the great desert; six hundred miles to the west lies Reno. Saturday afternoon found us again under way after adding to our already overloaded car a supply of provisions, extra water bags and tires. The road led into rough, broken country, and we bumped up and down long hills, thrashing through sagebrush and greasewood wheel high. We crossed the marsh at the head of Salt Lake instead of climbing on the abandoned railroad right of way. Ten miles wide and as white as snow it lies, seemingly as smooth and safe as a cement walk; but the fragile white crust conceals a swamp of pasty, black mud. We hasten on, and finally reach the hills and safety, arriving in Lucin at 9 p. m. Sunday.

Struggles with Sand and Sage-Brush

"We celebrated our entrance into Nevada the next morning with a struggle with fifteen miles of sand. The only possible way that a car could progress was by means of canvas strips on which it must run. We had provided ourselves with several of these, each 100 feet long and two feet wide, and we spent the entire day getting into Montello, 20 miles, in this manner. We left for Wells the following day and again tackled the desert. Don't imagine the Nevada desert a smooth, sandy plain—far from it. It's climb up and down all day long, and the grades are wonders for steepness and roughness.

"On Friday we reached Lovelock at 3 p. m., and thence bowled along for 20 miles, skirting the northern edge of the alkali desert, into which the Humbolt River so mysteriously sinks. Westward, as far as we could see, the white, salt-incrusted plain stretched to the setting sun. Southward the mountains, and the railway at their base, receded into the dim, hazy distance, and to the north the broken foothills lay barren and desolate. We spun along, but how seemingly slow the progress; it is as though we remained in the very center of this deserted land and the wheels revolved under us idly." Here the faithful reader encounters a marvelous tale of a band of wild horses, led by a "magnificent white animal." Hardly had these disappeared, when as darkness dropped down, we realized that without water and food we were lost in the dreaded sink. The car was traveling on a thin crust of sun-baked mud, under which the treacherous black ooze threatened to mire us. At last we reached the foothills and encountered a well-defined trail. We drove into Leet's Station in time for the savory ham and eggs of the Sunday morning breakfast.

"From here we followed the Southern Pacific into Wadsworth, 20 miles, and arrived in Reno, 35 miles from Wadsworth, at 2 p. m., where we enjoyed the luxury of a bath in a real tub and sleep in a real bed. Reno, with its electric cars, paved streets and modern hotels, looked bigger than New York to us. On the morrow, rested and refreshed, we started southward on the last lap of the 'long trail' to the Golden Gate.

Crossing the Sierras into California

"The road wound through a narrow canyon along the eastern slope of the mountains, skirted the shore of beautiful Washoe Lake, and then, ascending a high divide, dropped us down suddenly into Carson City. We rushed through the broad main street and after a run across country over a superb road we reached Wally's Hot Springs. Six o'clock in the morning found us away, and turning directly into an enormous canyon, we confronted the 'Grade.' The road was ankle deep in equal parts of fine sand and disintegrated granite in which the wheels sink to the rims, and it ascends the mountain in a series of great sweeping switchbacks winding, snakelike, back and forth up a mighty spud, so deep that in a quarter of a mile's travel you look down 200 feet on the road directly below you over which you have just come.

"We start abruptly down the Pacific Slope among giant fir trees and come out on the shores of beautiful Lake Tahoe at lunch time. The lake, blue as the sky above, with its setting of snow-clad mountains, glimmers like an immense topaz 7000 feet above the sea. The road, built and maintained by the State, is a credit to the commonwealth. Its cost must have been immense, hewn out of the cliff side as it is. We go down, down, down, in a seemingly unending succession of curves, now under overhanging cliffs, now buried in the semi-darkness of a pine forest. After a hurried meal at Placerville, we headed northwest and reached Sacramento at 1 a. m., having covered 164 miles.

"We get away on the last lap in great style next morning. Down through Stockton and Livermore we fly to Oakland. We finish the great run with a final rush up Market street, in our hearts and minds nothing but gratitude and pleasant recollections to those and of those who so kindly contributed to our success and pleasures en route."

Wearied by the strait confines of prose, Mr. Wilcox concludes his recital with a burst of verse in the true epic mood:

"We have lived an age in a half-moon wane;
We have seen a world; we have chased the sun
From sea to sea—but the task is done.
We here descend to the Great White Main,
To the King of Seas with its temples bare,
And a tropic's breath on brow and hair."

THE AUTOMOBILE CALENDAR

Shows, Meetings, Etc.

- Sept. 21-23.......Cleveland, Good Roads Convention, American Automobile Association.
- Nov. 6-13.........Atlanta, Ga., Auditorium-Armory, National Automobile Show, auspices of National Association of Automobile Manufacturers. Samuel A. Miles and Alfred Reeves, General Managers, 7 East 42d Street, New York City.
- Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.
- Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.
- Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.
- Feb. 22-26 ....Kansas City, Mo., Convention Hall, Fourth Annual Automobile Show.

Races, Hill Climbs, Etc.

- Aug. 27-28.......New York City, Brighton Beach, 24-Hour Race, Motor Racing Association.
- Sept. 6-11.......Lowell, Mass., Automobile Carnival, Lowell Automobile Club.
- Sept. 10-11.......Baltimore, 24-Hour Race, Motor Car Racing Association of Maryland.
- Sept. 15..........Denver, Col., Start of Flag to Flag Endurance Run to Mexico City.
- Sept. 20-22.......New York, Second Annual Run Around Long Island, New York Automobile Trade Association.
- Sept. 21..........Riverhead, L. I., Long Island Derby, Motor Contest Association.
- Sept. 21-29.......Washington-Boston and Return, Munsey Reliability Run.
- Oct. 7............Philadelphia, Second Annual Stock Chassis, 200-Mile Race, Fairmount Park, Quaker City M. C.
- Oct. 16...........Denver, Col., Start of "Flag to Flag" Reliability Run, G. A. Wahlgreen, Manager.
- Nov. 9............Atlanta, Ga., Track Races, Atlanta Automobile Association.
- Dec. 29-30........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

What the Clubs Are Doing These Days

ROCHESTER CLUB HAS LARGE MEMBERSHIP

ROCHESTER, N. Y., Aug. 23—The Automobile Club of Rochester is fast becoming one of the largest automobile organizations in this country. With the additions at its last election the roll now includes over 700 names and there are more applications on hand at present. It is the hope of the members of the body that this club may be soon counted upon the very largest in this respect. Considerable activity along lines of good roads, legislative and touring work has been outlined for fall campaigns.

The recent fifth annual orphans' day was the most successful ever held by the club. There were 585 children and 50 attendants as guests for the day and 172 automobiles in which to entertain them. The passengers were secured at 1 o'clock in the afternoon from the various asylums, the parade formed and ride around the city taken as a preliminary to the rest of the day's fun. The line of cars was preceded by a motor-cycle police squad and a large truck carrying a band. At Ontario Beach Park every concession was thrown open and refreshments distributed freely. The children from each home were assigned certain colors and their cars decorated accordingly, so that loading and unloading was greatly facilitated. This was an arrangement made by Secretary Bert Van Tuyle.

NEW AUTO CLUBHOUSE AT WILDWOOD, N. J.

WILDWOOD-BY-THE-SEA, N. J., Aug. 21—Although but six weeks old, the North Wildwood Motor Club is a healthy infant, as was evidenced by the fact that to-night it had a "house-warming" in its new quarters, at the junction of Central boulevard and Seventeenth street. The clubhouse is a cosy and comfortable structure, having two-story porches and a roof-garden, besides accommodations for such of its members as may desire to use the clubhouse as headquarters during their stay in the resort. The membership list contains the names of many prominent in automobile and newspaper circles in the Quaker City. W. Wayne Davis, manager of the Matheson branch in Philadelphia, is president; the Mayor of North Wildwood, Harry C. Wheaton, is vice-president; William C. Richardson, treasurer; William E. Young and E. M. Omensetter, secretaries, and Charles Winters, counsel. Plans are in progress to hold a meet on the Central Avenue speedway before the close of the present season.

EAST ST. LOUIS NOW HAS A CLUB

EAST ST. LOUIS, ILL., Aug. 23—With a charter membership of 22, the Automobile Club of East St. Louis has been formed in this place, as a direct result of an accident to a boy a few days previous. The traffic rules have been so lax and children so foolhardy on the street that these autoists banded together to secure some action from the local council. It will seek to have the children prevented from running at large on the business streets, and to make it a misdemeanor to throw bottles, glass, tacks and similar articles out where auto tires may be affected. The following officers were elected: President A. B. Sager; secretary and treasurer, James E. Combs.

QUAKERS PLAN RECEPTION FOR MUNSEY TOUR

PHILADELPHIA, Aug. 23—When the Munseyites arrive here on September 21, en route from Washington to Boston, they will be taken in tow by the Quaker City Motor Club, whose house committee, under the leadership of Frank Hardart, Sr., and A. T. James, will entertain the visitors with a smoker and concert in the huge banquet hall of the Hotel Walton. "Doc" Overbeck, the Quaker's scout, has been named as one of the committee of technical sharps to look over the cars after the run.

WASHINGTONIANS PREPARING FLORAL PARADE

WASHINGTON, D. C., Aug. 21—The automobile floral parade of the Chamber of Commerce, assisted by the Automobile Club of Washington, scheduled for September 30, and the Munsey tour to Boston and return, September 21-29, are two projects that are attracting a great deal of interest among local automobilists. The floral parade is expected to be one of the greatest events of the kind ever held in this section. The announcement that President Taft's big White steamer would probably head the parade has caused it to assume national importance. It is also expected that the several members of the Taft cabinet will enter their cars, each of which will fly the departmental flag of its chief. Various other cars owned by the Federal Government will make up the balance of the Government section, and then will come the Munsey tourists. The flag-decorated cars will compose the next section, followed by the floral decorated cars. The last section will be devoted to commercial vehicles. Handsome prizes have been offered, including a sweepstakes cup valued at $600.

NEW ROCHELLE AUTOISTS FORM CLUB

NEW ROCHELLE, N. Y., Aug. 23—Marked enthusiasm for the new organization accompanied the formation of the Automobile Club of New Rochelle on Thursday evening. With about 250 automobile owners in this city, the charter membership of the club is nearly 50, and it is expected that this will increase by leaps and bounds in the near future. The poor condition of some of the streets, and certain conditions which have arisen to bother autoists, led to the call for the local body. It is planned to begin at once upon plans for a clubhouse and garage, and the constitution permits the club to take active part in aeronautics, a subject in which many of the members are particularly interested. The officers elected are: President, E. T. Birdsall; first vice-president, W. B. Ogden, Jr.; second vice-president, J. A. Schofield; secretary, F. M. Carpenter; treasurer, F. D. LeCount; governors, A. F. Bradley, T. N. Benedict, G. W. Sutton, E. Eckart, Robert Fox and G. A. Peck.

SUCCESSFUL ANNUAL TOUR OF WINNIPEGGERS

MINNEAPOLIS, MINN., Aug. 21—Ten cars made the run here via Grand Forks and Fargo, in the annual tour of the Winnipeg Automobile Club last week. Pathfinder McLeod utilized a unique method of marking the course, by placing a funnel through the footboard of the car and using ordinary white beans instead of confetti.

The tourists were entertained by friends in St. Paul and Minneapolis for two days, and returned via the same route.

NORFOLK ORPHANS GIVEN AN OUTING

NORFOLK, VA., Aug. 14—Under the auspices of the Tidewater Automobile Association, 115 little orphan children were given an outing on Wednesday. Twenty cars were donated for the occasion and the three institutions in the city furnished the occupants. They were taken to Ocean View, where the amusements were thrown open to them, and later a lunch provided.

NEW CLUB FORMED IN ABILENE, KAN.

ABILENE, KAN., Aug. 21—The Abilene Automobile Club was organized in this city this week with the following officers: President, C. M. Harger; vice-president, F. H. Forney; secretary and treasurer, J. T. Nicolay. All the towns of the county will be canvassed for members, and inasmuch as good roads will be the object of the body, farmers will be asked to join.

THE AUTOMOBILE

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RACING A PROBLEMATICAL SPORT

Disastrous and disheartening was the initiation of the Indianapolis motor speedway, the fatalities supplying ammunition to those who believe that high speed in automobile competition has nearly reached its conclusion. But, apparently, the end is not yet for contests of this character in America, and, while the element of danger is ever involved, a lesson can be learned from the Indiana race-course which should prevent a recurrence of such an unfortunate innings of sport. This lesson has been taken to heart by the builders themselves, who keenly feel the regrettable opening.

In order to keep faith with the public, as well as with the contestants themselves, the promoters of the stupendous undertaking at Indianapolis rushed their construction to a completion which left much undone when the workmen were driven from the course to make way for the impatient participants in the racing. The track, in its hastily prepared condition, could not withstand the horde of high-powered speed craft, and soon the surface had disintegrated in such manner as to make it positively dangerous. Furthermore, the distances in the feature events were too great for track contests wherein only one driver to a car is employed.

Human endurance has its limits, and men should not be encouraged to exert themselves beyond their capabilities, either in the pursuit of glory or gold, or both. These defects can be avoided on another occasion, though it must always be borne in mind that high-speed automobile racing is not a lawn tennis match or a genteel kind of game, which means that there will be occasional sacrifices to this fierce god of sport, the supporting of which rests entirely with the manufacturers, not a few of whom are now asking themselves whether it pays.

The promoters of the great undertaking at Indianapolis were actuated by a desire to excel anything of the kind ever before attempted in this country, and the seeking of profits unquestionably was secondary, for none believed that such a hazardous venture would be successful financially in a city of moderate size. The wish was to supply a course as safe as can be obtained for mile-a-minute and faster racing. The first inclination, after the frightful introductory, was an abandonment of the entire project, but a revised judgment has brought forth the announcement that $100,000 additional, if necessary, will be utilized in providing all safeguards possible to drivers and spectators.

Here is expressed the sincere hope that no more lives will be cut short in the racing at Indianapolis; but one can never lose sight of the fact that high-speed racing in its sanest aspect involves a risk perhaps only exceeded by the spectacular aeroplane in its abrupt entrance upon the scene; and the man of the air may assert that his sport is even less perilous than that of the fellow who hurtles himself around a track or over winding roads in a machine tested to its utmost endurance, remembering that a thing is only as strong as its weakest part.

DEVELOPMENT IN BODY DESIGN

Improvement in automobile body design has fully kept pace with improvement in the motive power and running gear. We can all remember the bulges and scrolls of the "Roi des Belges" so popular five years ago, which enjoyed the triple distinction of being offensive to the eye, painful to the spinal column, and back-breaking for the unfortunate chassis. Our newer body work is simple in outline and decoration; it relies for effect on proportion and the arrangement of masses. Its simple lines permit a lighter and more mechanical construction, and the graceful reverse curve beloved of the artist no longer catches the unhappy passenger in the small of the back. The depth of the seats and the foot-room have been worked out with some regard for human anatomy; this done, the body builders have made that world-old discovery that utility is the larger half of art.

The most significant development has been that in "baby" and close-coupled tonneaus. The remarkable popularity of these designs indicates that the desire for excessive seating capacity is no longer dominant. A most sensible and logical body, at least in respect to size, was shown on a foreign car in one of the New York shows, but failed to receive the attention that it deserved. It was of the close-coupled type, but the rear seat was divided so as to provide comfortable accommodation for two persons. In addition, there was a single folding seat in the middle, instead of the customary pair. This arrangement seems ideal. Four makes a good party; and, if there should be a fifth, he would be at least as comfortable on the auxiliary seat as in the middle of the usual tonneau seat. Everyone forced to occupy that seat will join in a prayer for its early abolition.

ATLANTA'S NATIONAL SHOW PLANS ANNOUNCED

NEW YORK, Aug. 23—First of the forthcoming national automobile shows is that at Atlanta, and the entire South is interested in it. The exhibition is welcomed there by tradesmen and owners alike as a means of stirring additional enthusiasm for this method of locomotion, and of further awakening that section of the country. The automobile is already working wonders toward opening up the States which have lain idle for years, and with the coming of this event of such wide importance a strong economic result is expected. It was really this event which suggested to the promoters of the New York to Atlanta endurance contest the idea of running down to the exhibition, and thus arouse enthusiasm for good roads.

The Southern show will be held in the Auditorium-Armory, and by the removal of various partitions there will be 65,000 square feet of floor space available. The structure is one of the largest buildings for exhibition purposes in that section of the country, and, under the ownership of the city of Atlanta, has been used for some of the largest of conventions. The show will be held from November 6 to 13, under the management of Samuel A. Miles, general manager of the National Association of Automobile Manufacturers, and of Alfred Reeves, general manager of the American Motor Car Manufacturers' Association.

The applications for space and diagrams of the floor arrangement have been mailed to the makers of automobiles and accessories, and to be considered in the first allotment, these must be returned to the headquarters of the N. A. A. M., No. 7 East Forty-second street, New York, by September 4. No application received after that date will be taken up until the others have been cared for. The first allotment will take place September 8.

Those working in conjunction with Messrs. Miles and Reeves are Asa G. Chandler, president of the Atlanta Chamber of Commerce; John S. Cohen, Clark Howell, E. W. Gans, S. C. Dobbs, C. R. Ryan, E. M. Hanson, J. T. Fitten, and others, all of Atlanta.

VANDERVOORT EXPLAINS HIS PROTEST OF HOWER AWARD

NEW YORK, Aug. 24—After refraining from discussion of the subject the past few weeks, W. H. VanDerVoort, president of the Moline Automobile Company, has consented to tell the facts regarding his protest against awarding the Hower trophy in the recent Glidden tour. Mr. VanDerVoort does not wish it to be thought that his protest was merely on the matter of carrying a tail-light, and in his statement he explains where, in his judgement, a proper enforcement of the rules would have given the Hower trophy to the Moline. Mr. VanDerVoort says:

"I dislike very much to be involved in a protest of any sort, but many of the contestants in the tour almost demanded it, and I think my interest in the Moline and in fair play warrants it.

"Feeling that the text of my protest against the finding of the technical committee in the final inspection of the Glidden Tour cars at Kansas City should emanate from the office of the chairman, Mr. Hower, I have until this time refrained from giving out same.

"Noting, however, that an erroneous report has gone out to the effect that Moline car 101 was protesting the decision on the grounds of Pierce car 108 not carrying a tail-light, we feel that this impression should be corrected. Pierce car 108 did carry its tail-light, and my protest is based upon the fact that this tail-lamp was demolished and the bracket considerably bent.

"Penalties were provided for deterioration, and, according to the rules, car 108 should have been penalized to the extent of the price of a new lamp and the labor required to straighten the tail-lamp bracket. Moline car 101 was required to light its oil lamps in proving condition. This would have been impossible with car 108, as the tail-lamp was entirely inoperative.

"On the basis of material and labor in repairing bracket, and replacing lamp, it would alter the final score in my favor.

"I have no criticism whatever as to the findings of the committee upon penalties which were imposed upon Moline entry 101, and while the crushing of the tail-lamp and the bending of its bracket may appear trifling, I feel that the tightening of the three spring clip nuts and the furnishing of one 1/4x1-inch cap screw, and one 3/8x1-inch step bolt, upon which our penalties were levied, are, from the operative standpoint, of less importance.

"In the case of the protest against the perfect score Glidden car, the public has been led to believe that this was based upon the technical fact that the car did not carry its tail-lamp over a portion of the tour. While this is true, and under the rules should have been penalized, back of it all lies the fact that these lamps were purposely removed in order to prevent the breaking off of the bracket and the tool box, as happened to Pierce car 109 during the tour. As it is only fair to assume that had the tail-lamp been left on the two touring cars, they would both have suffered the same fate as befell the two roadsters."

NEW CONNECTICUT LAW IS AMENDED

HARTFORD, CONN., Aug. 21—When Governor Weeks signed the new automobile law, as stated last week, he did so with the provision that certain changes be made in it by amendments. These have been passed this week by both houses of the legislature and make some important alterations in the statute. The principal change is that in regard to the license fees, which have been changed from certain amounts upon different classes of power to a flat rate per power. Cars of less than 25 horsepower will be taxed at 50 cents for each horsepower, while those about the 25 figure will be rated at 60 cents each. The factories will have to pay only one dollar for each machine tested upon the roads, instead of double that amount. The proposed amendment that automobilists be required to stop when approaching street cars loading or unloading passengers was not included in the bill, thus allowing the three-miles-an-hour clause to remain.

COLUMBUS, O., DESIRES ROAD CONVENTION

COLUMBUS, O., Aug. 23—The Columbus chamber of commerce is making every effort to secure the next convention of the American Roadmakers' Association, which will be held in October. This body of highway builders is composed of some of the most prominent men in the country interested in good roads, representing every State. If the meeting is brought to this city it is likely that it will be held in connection with the annual gathering of the Ohio Good Roads Federation, October 27 to 29.

JONES SECURES INJUNCTION AGAINST I. A. L.

NEW YORK, Aug. 23—The Jones Speedometer Company announces that it has secured a restraining injunction in the U. S. Circuit Court of the Western District of New York, against the International Automobile League of Buffalo. This forbids the sale of Jones speedometers or parts at less than factory list prices.

AUTOISTS NOW LOOK TO LOWELL'S CARNIVAL OF SPEED

LOWELL, MASS., Aug. 23—With the termination of the races on the Indianapolis speedway, the attention of the automobile world is focussed on Lowell and the Merrimac Valley course as the next scene of competition in speed. Stock cars will have complete sway in the national events which will feature the carnival, starting on Labor Day and lasting throughout the week, and as the dates approach little else is thought of in this section. For many weeks the preparations have been going on, the course being treated, railroad facilities improved, and now, chief of all, the racing men are on their way with their swift machines. The committee in charge of the multifarious plans is about ready to state that the entire arrangements have been completed.

Work on the 10.6 mile circuit is nearly at an end, and only enough will be required to keep it in excellent condition for the events. The grand stand is receiving its finishing touches, as is also the pontoon bridge across the river, and the parking spaces have been staked off opposite the big stand and on the boulevard. It has been the aim of those in charge to have all the preliminary work done before the great majority of the ante-race crowd arrives. Many of the racing teams have secured their quarters, and it is advisable for everyone who intends to visit the city to reserve rooms well in advance. Those in charge of the matter have the location of 500 rooms for visitors on their lists, and will gives the names of the places upon application. Additional space is being secured daily, for it is felt that all will be needed. Preparations are made to include a crowd of from 125,000 to 150,000, and an endeavor will be made to keep down any tendency toward exorbitant charges on the part of the local dealers.

Last year, with 80,000 spectators along the course, 300 patrol guards succeeded in preventing accidents and in keeping the course well policed. During the big events next month the number will be increased to 500, of whom 400 will be local militiamen, and the others will be from the local police force. The men will be scattered around the route as last year, with the greatest number where the crowd is likely to congregate, and will be given instructions to keep people off the road at all cost. Wire fence has been used in some places to assist the police, and rope will be ready to stretch in case of any unusual gathering at some now unsuspected vantage point.

The latest entry is a new 50-horsepower Simplex car, a duplicate of the one with which George Robertson won the recent 24-hour track race. Its owner and entrant is Daniel Shea, and he is desirous of securing Robert Hilliard to handle it in the big race here. Hilliard won the light car race at Savannah last fall, and has been prominent in many contests of speed and endurance. The list of entries now includes the following: Three Maxwells, a Moon, an Allen-Kingston, a Columbia, an Isotta, a Mercedes, a Bergdoll, two Appersons, an Alco, two Renaults, Knoxes, Stoddard-Daytons, Benz and Rainiers. Walter Christie is expected to have his new 100-horsepower front wheel drive here for the straightaway speed trials on the day between the small chassis event and the big one for the Lowell trophy. The entries are still being received, so that a wonderful field of starters is expected.

SPECIALIZED CONDITIONS FOR FLAG TO FLAG CONTEST

DENVER, COL., Aug. 21—From Denver to Mexico City is the route over which the tourists in the Flag to Flag contest will be required to travel during the last week of October and the first half of the month of November. The date of the start has been announced as October 25, and that of the finish sometime in the week of November 15. Road conditions are such that the exact time can be figured but approximately, although the rules as announced give the schedule for the competition while under the Mexican banner. The contest is for the George A. Wahlgreen trophy, conducted under the sanction of the A. A. A., and with rules which are much similar to those of the 1909 Glidden tour. Necessary alterations have been made to conform with circumstances that will probably arise across the border. In addition to the prize offered by Mr. Wahlgreen for touring cars will be another for runabouts.

The rules have recently been issued, and chief interest in them is taken in that section which governs the contestants from Eagle Pass, the last city in this country, to the capital of the Aztecs. The regulations previous to the former point are well understood, including penalties for lateness at night controls, the use of observers throughout the daily trips, penalizations for repairs and adjustments, and a final examination. To those autoists, however, who are accustomed to daily control periods of from seven to perhaps ten hours, the schedule of the Flag to Flag competition will be a surprise. From Eagle Pass to Torreon is a long run, and the schedule is five days and six hours for the largest cars, with additions of two hours each for the succeeding five sections; the next run is to Zacatecas, and two days and one hour is the time allowance. The third run can be figured out in plain hours and minutes, for it is to the City of Aguas Calientes, and the running time will be eight hours; then comes another long journey over the shifting roads, en route to the City of Celaya, with two days and 30 minutes schedule; the fifth control will be in the City of San Juan del Rio, with one day and 30 minutes; the sixth will be at the City of Tula, the schedule being another day and 30 minutes, and the final run must be made into the City of Mexico in seven hours and 10 minutes.

The classification has been changed somewhat in these rules, giving an extra division, the prices which separate them now being: $4,001 and over; $3,001 to $4,000; $2,001 to $3,000; $1,251 to $2,000; $851 to $1,250, and $850 and under. The daily schedule before reaching the border will give a 20-minute handicap over class 1 when the running time is nine hours or more, 15 minutes when it is between seven and a half and nine, and 10 minutes when it is less than seven and a half. In Mexico there is considerable difference in the allowance, given in detail in the regulations.

There will be a pacemaker from San Antonio, which will precede the tourists by one or two days. After leaving the United States a number of the regulations in regard to the operation of the cars will be changed. For instance, when tires have to be repaired the engine may be stopped, but there will be no penalty for work in connection with the pneumatics. Another alteration is that mufflers need not be carried, and still another is that if one contestant borrows parts from another contestant or a free-lance car in the tour, it will not be disqualified. When a machine reaches a control of more than one day's duration it may be immediately checked, and continue towards the next stop.

The problem of hotel accommodations is giving the managers some concern, for the plan to have a Pullman train accompany the travelers does not adequately fill the requirements, because for long distances the cars will be away from the railroads. The hotels in the various control cities are able to care for the party, but it would be necessary to camp out on the plains at times, and to carry sufficient food along. It has been thought best to allow those who will participate in the event to decide about the train or hotel arrangements.

Private Malcolm E. Parrott Receiving the Official Despatch at Governor's Island Prior to the Start

MILITARY MITCHELL BEGINS ITS TRANSCONTINENTAL TRIP

NEW YORK, Aug. 23—Bearing a despatch from Major-Gen. Leonard A. Wood, commanding the United States Army, Department of the East, to Major-Gen. John F. Weston, commander of the Department of California, the 1910 Mitchell "Ranger" started from this city for San Francisco on Thursday afternoon. Clad in the regulation army khaki, with canteens, haversacks and revolvers hung on the sides of the new touring car, were Private Malcolm E. Parrott, of the Tenth Regiment of the New York National Guard; Frank X. Zirbes as driver, and Lieut. B. B. Rosenthal, the three members of the party. With the plan of a definite schedule to follow, about 3,693 miles to cover, and probably much more, the new car is essaying one of the most strenuous trips ever attempted. No records will be aspired to, for the car will deviate from the direct route a number of times in order to visit army posts en route.

To New York automobiledom, however, there was wide interest in the Mitchell car itself, when it first appeared on Broadway. The entirely new line of the 1910 product of the Mitchell Company was a surprise, and General Manager Gilson was congratulated many times upon the pleasing style of the newcomer. The radiator, and consequently the hood, are materially different in shape from other Mitchells, and the alteration has included the body also. It was well prepared for the long journey before it, rope, shovel, pick and other tools being in the equipment.

Preliminary to the actual start was a trip to Governor's Island for the official despatch, and at exactly noon the party, acccompanied by a number of Mitchell cars from the Mitchell branch, and a delegation of private owners, assembled at Columbus Circle to witness the beginning of the rigorous jaunt. Private Parrott carried a large flag presented to him by Capt. W. L. Burnett, of his regiment, as well as the pennant of the Hudson Valley Automobile Club of Poughkeepsie, of which he is a member. The route selected is that most generally taken, via Albany, Buffalo, Chicago and Omaha.

LONG BRANCH RACES IN THE TWILIGHT

LONG BRANCH, N. J., Aug. 21—Lengthy delays, while horses were cantering up and down Ocean avenue this afternoon, interfered with what might have been a very successful series of one-mile straightaway speed trials. As it was, the cars did some high-speed work, but the hundreds of automobile parties from neighboring Jersey coast resorts tired of waiting for the start and returned to their homes. It was 5:45 P. M. when the automobiles were called to the tape, and they did not finish the heats until well into the dark, with their gas lights doing valuable service.

Some fast cars had been brought here for the event, among them being Heitemeyer's Simplex, Allen's Allen-Kingston, Rainier's Rainier, Roebling's Roeblink, Lescault's Palmer and Singer, and Burnham's Lancia-Fiat racer. The stock cars had matters their own way, in spite of the fact that there were a number of special types on the course. The Simplex took the honors of the evening for the fastest time, twice covering the mile in 52 seconds, a rate of 69.2 miles per hour, winning the $4,001 and over class, and the free-for-all. The big 120-horsepower Roebling was second in point of time, its record being :53, in the open class. Walter C. Allen's A-K captured the $3,001 to $4,000 division, in 55 seconds, with the P. & S. one second behind. Other class winners were: $2,001 to $3,000, S. P. O., 59 seconds; $1,251 to $2,001, Buick, 1:09; $851 to $1,250, Cadillac, 68 seconds. The A-K repeated its 55-seconds performance in the free-for-all, but a little behind the Simplex and Roebling.

CALIFORNIA TO HAVE 300-MILE RACE

SAN FRANCISCO, Aug. 20—It has been definitely decided that a 300-mile road race will take place during the three days of the Portola Festival. The date has been set for Saturday, October 23, and the event will be run over the Foothill Boulevard, near San Leandro. The Automobile Club of California will have the management of the event, and the supervisors of Alameda County have given their sanction to the event. The course is about 21½ miles long, having two long straightaways between which are many short turns. The cars will be divided into two classes, Class A of cars with greater than 300 inches displacement, and Class B for those under this measurement. The main trophy of the day will be the Portola Cup, which is valued at $5,000. The driver of the winning car in Class A will receive a purse of $800, the second best, $500, and the third, $300. In Class B the winner will get $250, the second, $150, and the third, $50. The winning car in this class also will be awarded a cup, valued at $1,000. Extrance fee will be $150, to be returned at start.

SECOND RUN AROUND LONG ISLAND

NEW YORK, Aug. 24—The second annual endurance run of the New York Automobile Trade Association around Long Island will be held on September 20, 21 and 22. The first night stop will be made at Shelter Island, the cars being parked at Greenport, and the second at Good Ground or Southampton.

LATEST NEWS FROM THE CAPITAL OF MOTORDOM

DETROIT, Aug. 23—When Henry Ford and his associates decided to purchase the old Highland Park racetrack and grounds, in the northern part of the city, and erect thereon what is said to be the largest single building in the world devoted to the manufacture of automobiles, wise ones in the industry shook their heads and averred that the Ford Motor Company had made a mistake in moving so far from the established manufacturing districts. Despite predictions of disaster, the Ford Company went ahead with the project, and now, just as it is moving into its new plant, comes the announcement that a new industrial district will be developed in the immediate vicinity, in which the automobile and its accessories will hold full sway.

Cramped for space in its present quarters that, at the outset, were considered adequate for all time, the Brush Runabout Company has purchasd twenty acres of land on the Grand Trunk Railroad, a short distance from the Ford plant, and work is already under way on four large buildings which will form the nucleus of a group that will eventually house all the local Briscoe enterprises, and may mean the addition of another large plant to Detroit's auto colony.

Frank Briscoe is president of the Brush Runabout Company, whose business has been growing at an enormous rate. Some time ago the Brush people transferred their business from the plant of the Briscoe Manufacturing Company, and now are compelled to put up a plant of their own, in order to meet demands. The Briscoe Manufacturing Company's trade in radiators, in which field it is one of the largest in the country, has grown to such proportions that larger quarters must be secured. The present plant will be added to, and it is the intention, as soon as the new Brush factory is completed, to start work on buildings for the Briscoe Manufacturing Company adjoining.

Quite the most interesting bit of gossip in this connection has to do with the establishment here of a factory by the Maxwell-Briscoe Company, which now has plants at Tarrytown, N. Y.; Providence, R. I., and Newcastle, Ind. Options are held on some forty acres of ground in addition to that already purchased, and it is known that the question has been discussed favorably by the Maxwell-Briscoe Company.

"Any definite announcement regarding such a move must come from my brother, Benjamin Briscoe, of the Maxwell-Briscoe Company," said Frank Briscoe in answer to an inquiry. "It is true that the matter has been discussed at length, and that Detroit has been looked upon with favor. Further than that, there is nothing to be said at present at this end of the line."

Associated with the Brush and Briscoe companies in the new district, it is understood, will be several parts and castings companies. The present plant of the Brush company will, under the new arrangement, be devoted to the manufacture of bodies.

A stock company, capitalized at $300,000 and with ample funds in reserve, has been formed to take over the business of the Blomstrom Motor Company, to continue the manufacture of Gyroscope cars. It is probable that the plant will be established in Adrian, Mich., as a majority of the stockholders in the new concern reside there.

FACTORY BUILDING OBSTACLES OVERCOME

Detroit, Aug. 23—Morgan & Wright's huge tire and rubber goods factory, located on the banks of the beautiful Detroit River, from the standpoint of scenery, light, air and water supply, is probably one of the finest factory sites in the country. It is doubtful, however, if these advantages, particularly the abundant water supply, appealed to the engineers in charge of installing the recent additions to the tire building equipment.

The steam presses in which the tires are cured are so ponderous that it is necessary to go down to bedrock to get a proper foundation for them. As the excavations proceeded below the level of the river, water oozed through into the shafts to such an extent that it was necessary to install a big centrifugal pump, and run it night and day to permit of continuing the operations. Even then the men were compelled to work up to their waists in water most of the time. In spite of these difficulties it is expected that the new equipment will be ready for operation inside of a few weeks.

SUGGESTS TIRE PUBLICITY AGREEMENT

Akron, O., Aug. 23—Anent the varied announcements concerning tire performance in the Glidden tour is a suggestion that hereafter the different makers unite on an agreed statement of facts before submitting their respective claims to the public. "We are willing to do that very thing," says W. B. Miller, secretary of the Diamond Rubber Company, "but we would want experienced tire men to keep the record and act as arbiters. We had on the tour this year four men who know all kinds of tires and tire mishaps intimately, and the result of their joint observations and inspections is supported by their affidavits; but another concern can come along with a different story, and there you are. Perhaps the public doesn't care particularly. Such things work out right in the end somehow, and nowhere more than in the automobile business. In no line of activity does the public more quickly bury false notions or so unerringly pick only the real gold from the unending glitter put forward."

INCREASING USE OF DEMOUNTABLE RIMS

Akron, O., Aug. 23—That fully one-third of next year's touring cars will be equipped with demountable rims is the prediction of H. S. Firestone in the latest news from large tire companies. The improved features of the 1910 demountables are of pertinent interest, and Mr. Firestone's contention is of special importance.

"The growth in popularity of these rims of late has been little short of phenomenal," says Mr. Firestone. "Three years ago they were known only to a few racing men; to-day thousands of private car owners have them. The improved features that appear in the latest rims permit their use with any standard type or make of tire, which means that no matter what may be the favorite tire chosen, the motorist can now enjoy the freedom from annoyance and delay which demountable rims offer."

Kentucky's Governor Honors the Glidden Lexington

The photograph shows Governor Wilson, at the State Fair Grounds, presenting the Lexington crew, which made such a fine showing in the recent Glidden Tour, with a gold watch to Driver Moore, and remembrances to Mechanic Blackburn and to Observer Dodge, all donated by the Lexington Motor Car Company, in appreciation of their services.

Banquet of the Stoddard-Dayton Agents, Held at Hotel Denison, Indianapolis, August 20, During Annual Convention

STODDARD-DAYTON AGENTS AND EMPLOYEES FACTORY GUESTS

INDIANAPOLIS, Aug. 21—Stoddard-Dayton is a name that has become exceedingly well known in this city during the past few days in connection with the opening of the motor-speedway. Not only because of the large participation of cars of this make was this so, but also because of the convention of the agents of the Dayton Motor Car Company, and of the excursion of the entire factory force to this city to-day. Then, too, none of the vast crowd which went out to the races could help seeing the special convention tent erected for the meetings, and at times the public became so insistent that the special exhibtion of 1910 Stoddard-Daytons had to be opened to them.

Inasmuch as the annual meeting of the factory representatives, to discuss the prospects for the coming season, was about due, the scene of action was shifted from Dayton to this city. The agents began to arrive on Wednesday and Thursday, and stayed throughout the race meet, with all their expenses paid by the Ohio firm. To cap the climax the entire factory force was brought here to-day in a special train of 17 cars. A corps of waiters and a chef were in attendance throughout the meet to serve lunches in the three private Stoddard-Dayton grand-stands.

The exhibition tent was an attraction in itself, for it was very large, and decorated to resemble an Italian pergola, covered with growing vines and flowers, with bey trees and junipers to carry out the effect. The result was that the whole appeared as substantially built as if intended to be permanent. Fifteen of the new models were grouped around the outer oval, giving ample space in the center for the morning sessions, and the exhibit was intended to be comparatively private. The crowds, however, were evidently so desirous of seeing the machines that they were allowed to inspect them. There was every style of automobile there, including roadsters, runabouts, baby tonneau, regular touring cars, a speed car and enclosed models of limousines, landaulets and coupes. The latter type attracted a great deal of attention, for the upholstering and details were elaborate and the whipcord, leather and broadcloth were used to their best advantage. A limousine of the 30-horsepower chassis was of particular interest, as was also an inside-driven coupe, which has its steering wheel, gear and brake levers so arranged that entrance can be made from either side with ease.

Two banquets were the features of Thursday and Friday evenings, on the former occasion the agents gathering around tables grouped in the shape of a U, and last night the letter S was similarly described. The autophone, an orchestra, and a military band took turns at furnishing the music.

The agents who attended were the following: Whitney and Ferris, Boston; Cramer, Buffalo; Babcock and Tillotson, Chicago; Church, Los Angeles; Hershede, Cincinnati; Moore, Cleveland; Jekins, Columbia; Roberts, Columbus; Dodds, Dayton; Barnett, Denver; Sears, Des Moines; Neumann, Detroit; Burington, Holyoke; McGee, Kansas City; Ward, Lexington; Longest, Louisville; Burmeister and Kelly, Minneapolis; Hartwell, Mobile; McShane, Newark; Wheeler and Westerfell, New Haven; Newton, Whiting, Percy and Warren, New York; Berren and Hamilton, Philadelphia; Fetill, Omaha; Moore and Jackson, Pittsburgh; Ziebrich, Rochester; Thompson, Salisbury; Holligan, Savannah; Thompson, Thomasville; Atwood, Toledo; Smith and Bonvier, Toronto; Lucey, Troy; Tool and Decker, Utica; Ide, Syracuse; Halff, San Antonio; Shellenberger, Wichita; Shoemaker, Elmira; Cox, Harrisburg; Schaab, Baltimore; Dorsett, Washington; Wallace and Dewitt, Chattanooga; Garret, Wilmington; Leavitt and Plughoff, San Francisco; Sherman, Salt Lake City.

CHANGES IN CLEVELAND WHITE BRANCH

CLEVELAND, Aug. 23—Several changes took place to-day in the Ohio retail department and local branch of the White Company, following the resignation of its manager, Hobart M. Adams. Frank E. Stiverson has been appointed to the position, and at the same time retains his former capacity as sales agent for this city and the State. Concurrent with this is the announcement by the factory officials of the consolidation of the repair and stock departments of the local branch and of the factory. Some confusion has been caused by White owners out of this territory getting in touch with the retail end of the business instead of the wholesale at the factory. H. N. Searles, who drove the kerosene-burning White steamer in the Glidden tour, will be in charge of the enlarged department and will be in direct touch with all owners and agencies from any locality. The changes in this city in regard to the Ohio territory do not directly affect the White representatives at Cincinnati, Toledo and Columbus.

The White plant is now working upon the 1910 product and shipments of the kerosene cars have been going on for some time, in quantities which promise one of the greatest seasons in the history of the concern.

Progress on Duplicate Addition to Chalmers-Detroit Factory, Detroit

Bowser Company Adds to Factory—Growth of the automobile industry has necessitated the addition from time to time of factory space at the plant of S. F. Bowser & Company, Fort Wayne, Ind., but none of the magnitude of the new building now under way. Up to the first of this year the Fort Wayne factory had 65,000 square feet of floor space, and the new structure will just double this. Work is progressing rapidly on it, and a contract has just been let for the installation of a 320-horsepower gas engine with a gas producer plant. The entire factory is working to the limit to supply gasoline and lubricating oil storage outfits for the automobile trade, in addition to that for the general demand. It also manufactures tanks, pumps and similar devices, as it was doing for fifteen years prior to the introduction of the automobile business.

Diamonds in Tire Mileage Record—A tire mileage record that many motorists will envy was made by G. W. Butler, who won first prize, $1,000, in the "lowest upkeep" contest conducted by one of the large automobile manufacturers. Mr. Butler is a chauffeur in the employ of J. E. Clenny, of Chicago, and his daily records were duly sworn to. The Diamond make of tires was used and in 17,003 miles covered gave an average of 11,289½ miles each, counting only the tires fully used up, or an average of 9,045 miles, including tires in use when the contest closed. A hint to automobile owners is found in Mr. Butler's system, by which when a rear tire had run 3,500 to 4,500 miles it was changed to the front, so that the newest tires were always on the rear.

Fine Building for Wintons in Seattle—What is claimed will be the finest automobile establishment on the Pacific Coast is being planned by the Winton Motor Carriage Company for Seattle. This will be erected at Pike street and Terry avenue, of steel and concrete construction, with a frontage of 80 feet and a depth of 120. It will have six stories, two below the street level and four above. The contracts have been let and the building will be ready for occupancy on January 1 next. The entire structure will be used by the Winton interests, for the rapidly increasing business in that city and the Northwest has far outgrown the present big quarters at 715 East Pine street.

Rushing Stearns Factory Addition—Under a forfeit of $100 a day, work is now being rushed on the new four-story brick and concrete addition to the F. B. Stearns factory in Cleveland, O. Under terms of the contract, machinery in the new building must be in running order by September 15. For the past year the Stearns factory has been badly cramped because of lack of room, the machine and forge shops being particularly hard pressed. The new addition, 120 by 180 feet, will materially aid the production department and provide for much quicker delivery.

An Ajax Transcontinental Record—In publicity matter issued by the Ajax-Grieb Rubber Company is the interesting tire report of the trip made by Mrs. Alice R. Ramsay across the continent in her Maxwell car. It is stated that three of the Ajax casing ran the entire 4,200 miles with the original New York air in them, and that but one puncture necessitated a change of the fourth, after several thousand miles had been covered. This is in line with the guarantee given by the Ajax company for 5,000 miles of running or 200 days of service with its tires.

Carriage Company to Specialize in Auto Bodies—The Carriage Woodwork Company, of Hamilton, O., has announced its intention of making a special feature of its work in automobile bodies. It has engaged William Cheetham, formerly of Detroit, to take charge of the construction department and to turn out both wood and aluminum bodies. Mr. Cheetham has had large experience in this line, having just finished a contract in Pontiac, Mich. He is a graduate of the Kensington School of Fine Arts of London.

Firestone Tires on Oldfield's Record-Breaker—At the Indianapolis Motor Speedway two of the fastest records set for an American special track were those which Barney Oldfield made for the mile and kilometer. On his car he used Firestone tires and set the mile record at 43.1 seconds, as against the 48.2, held by Jay on a regular track. The kilometer record for an American circular course is a new one, 26.2 seconds, a rate of 85.5 miles per hour. The Firestone Company is justifiably proud that its tires were used in such a meet on the big car.

Testing New P. & S. Motors—Experimental work and thorough tests of the new Palmer & Singer motors are now being carried out. Two new types of motors will be added to the already ample line of six and four-cylinder machines, and the preliminary work was held under the direction of Engineer David Landau. Mr. Landau states that one of the new engines will be able to furnish a speed of ninety miles per hour, and that the other type will have marvelous hill-climbing ability.

Bosch Gets Largest Magneto Order—The Bosch Magneto Co., of New York, announces that it has secured the order for equipment of Bosch magnetos on all Indian motor cycles for 1910. The Hendee Manufacturing Co., builders of this machine, has adopted the Bosch for its output next season, and the Bosch company states that the order exceeds by several thousand any similar one on record.

Addition to Parts Company Plant—The Illinois Automobile and Parts Company in Peoria, Ill., has had work started upon a $6,000 addition to its factory that will double its present capacity.

PERSONAL TRADE MENTION

Fred J. Titus has joined the sales force of the Palmer & Singer Manufacturing Company as assistant sales manager in charge of the out-of-town territory. He will begin his new duties on September 1. Mr. Titus is one of the best-known figures in the automobile trade and until recently had been connected with the Harry S. Houpt Company, leaving to enter the agency field in Newark, N. J.

O. L. Weaver, of Cincinnati, has resigned as manager of the branch of the Goodyear Tire & Rubber Company in that city and will locate in Cleveland as factory sales agent for Overland automobiles in eastern Ohio, western Pennsylvania and West Virginia. In severing his connection with the Goodyear Company he broke a service of ten years, six of which he had spent as manager of the Cincinnati branch.

Will S. Gilbert is now the automobile editor of the Cleveland *Plain Dealer*, succeeding Henry H. Hower, who has joined the Stearns forces. Mr. Gilbert was connected for many years with the Cleveland *Leader*, and is one of the veteran automobile writers. He covered the Glidden tour this year for the *Plain Dealer*.

A. K. Brown, of the Hoyt Electrical Instrument Works, Penacook, N. H., has been given charge of the Boston branch, 161 Summer street. He has been connected with the makers of the Hoyt instruments for a considerable time, thus being well equipped for his new position.

E. W. Carter, of the Hoyt Electrical Instrument Works, will hereafter be connected with the factory at Penacook, N. H. Mr. Carter has been in charge of the Boston office.

CHANGES IN THE BOSTON TRADE

Boston, Aug. 21—The crop of changes in the Boston automobile trade that comes every year about the time of the appearance of the new models has arrived, and recently there have been a number of shifts of interest. Prominent among them is the establishment of a branch house by the Thomas company. It is called the Thomas Motor Branch Co., and is in charge of Charles S. Henshaw who, several years ago, was the Thomas agent here. Just now the branch is located in upper Columbus avenue, but negotiations are in progress for a site in the Back Bay. For the past year or more the Thomas agency has been held by the Whitten-Gilmore Co., who now have the Chalmers and the Hudson agencies.

Another shift in local representation is the passing of the Algonquin Motor Car Co., agent for the Oldsmobile, and the organization of the Olds-Oakland Co. as selling agent for the Oldsmobile and the Oakland, two General Motors cars. The new concern has taken the Algonquin Motor Car Co.'s lease of the salesroom on Massachusetts avenue. On Boylston a new arrival is the Stevens Sowers Motor Car Co., which has the agency for the Jackson and the Fuller cars. The Selden Motor Car Co., of Massachusetts, is just opening a new store at 801 Boylston street, and the Continental Caoutchouc Co., heretofore represented by an agent, has a branch store about ready for business on Boylston street. The Panhard & Levassor branch, formerly on Massachusetts avenue, has moved to Dartmouth street, taking the quarters formerly occupied by the Goodyear Co. The Velie agency at 21 Hawkins street, formerly the Kilbourne-Corlew Co., has become the Corlew-Coughlin Co.

Two important real estate transactions marking the inroads that motor vehicles have made on the public carriage business were consummated lately. One of these was the sale of the large modern stable at Massachusetts avenue and Newbury street, formerly occupied by Kenny & Clark, livery and cab men, to F. J. Tyler, of the Maxwell-Briscoe Boston company. It is understood that Mr. Tyler will make the necessary alterations and soon the Maxwell-Briscoe sales, shop and garage headquarters will be established in the Kenny & Clark building. It is well located near Commonwealth avenue and the parks, most convenient for garage purposes and most conspicuous for sales.

Not far from the Kenny & Clark building on Massachusetts avenue is the large stable of the Boston Cab Co., which, by an arrangement made recently, is to be converted into a garage and headquarters for the Taxi Service Co.

Other changes in the local trade, including the placing of some new agencies, are said to be pending.

RECENT BUSINESS CHANGES

Lucia Brothers Change Firm Name—The Lucia Brothers Motor Car Company is the new name adopted by Albert J. Lucia and Howard E. Lucia, of Green Bay, Wis. Up to this time the Lucia Cycle Company was the firm title, but inasmuch as the automobile business is taking the entire attention the old name has been abandoned. The concern was started in 1888 with bicycles, and in 1900 automobiles were first taken up. A well-equipped garage and repair shop is maintained in Oconto, in addition to the headquarters in Green Bay.

Boston Taxicabs Companies Combine—The Taxi Service Company and the Boston Cab Company have arranged to work together, the former having purchased a substantial interest in the latter. For the present they will be operated separately, but without conflicts, and will later be merged. A. E. Morrison will continue as manager of the Taxi company.

TAXICAB AND TRANSIT

Dixon Springs, Tenn.—An automobile line has been established between Dixon Springs and Gallatin, a distance of 23 miles. At present but one car is being used, making the outbound trip in the morning and returning in the afternoon, connecting with trains to Nashville. If traffic requires it, another machine will be put into the service.

IN AND ABOUT THE AGENCIES

Baker, Chicago—The Baker Electric Vehicle Agency has leased for a term of ten years the property on Michigan avenue, 100 feet south of Twenty-third street. A building will be started at once, with the provision that it must be ready for occupancy on May 1, 1910.

Franklin, Pittsburgh—W. F. Reynolds, who was recently appointed manager of the new Franklin branch, has secured quarters at 5926 Baum street and will take possession on September 1.

NEW AGENCIES ESTABLISHED

Rambler and Regal: Charlotte, N. C.—Carolina Automobile Company, South Church street, E. A. Robbins, manager. Distributors for North and South Carolina.

Chalmers-Detroit, Hudson, Hupmobile: Natrona, Pa.—Plumer Eaton and Howard Humes, Second avenue.

American Simplex and Overland: Kansas City, Mo.—Louis J. Long and Clifford Histed, 1527 Grand avenue.

Jackson and Fuller: Boston—Stevens-Sowers Motor Car Company, 821 Boylston street.

Reo and Premier: Atlanta, Ga.—J. E. Levi & Co., 222-224 Peachtree street.

Peerless: Donaldsonville, Ga.—Louis A. Maurin.

Hudson: Trenton, N. J.—Harry B. Salter.

RECENT INCORPORATIONS

New Jersey Carbureter Company, Jersey City—Capital $25,000. To manufacture steel, iron, malleable iron, wood, and other carbureters, appliances, etc. Incorporators: Charles R. Nutter, F. L. Houghtaling, Charles F. Zissel, Jr.

Chicago Automobile Self-Starting Appliance Company, Chicago—Capital $70,000. To manufacture and deal in automobiles and accessories. Incorporators: C. E. Crane, Harry Hobbs, Charles Conlon.

C. A. Coey Automobile Service Company, Chicago, Ill.—Capital $200,000. To conduct an automobile livery and garage service. Incorporators: C. A. Coey, C. E. Gregory, D. Henderson.

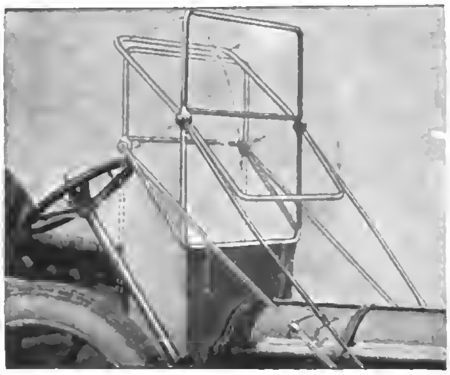
Harry S. Houpt Manufacturing Company, New York—Capital $600,000. To manufacture automobiles, motor boats, and aerial machines. Incorporators: H. S. Houpt, M. K. Harris, G. Cheney.

Parker Motor Company, Hartford, Conn.—Capital $50,000. To manufacture automobile engines, etc. Incorporators: Lucius F. Robinson, Albion B. Wilson, Francis W. Cole.

Group of Overland Automobiles in the Government Mail Service at Indianapolis, Taken in Front of the Postoffice

Information for Auto Users

The Friction Folding Wind Shield—This shield, of the centrally-hinged type, is capable of a great variety of positions, all of which are obtained without manipulating a single spring or thumb-nut, and with the use of but one hand. It is easily within reach of the driver when wanted, and may be quickly folded out of the way when not in use. No adjustments are necessary. The frame is made of



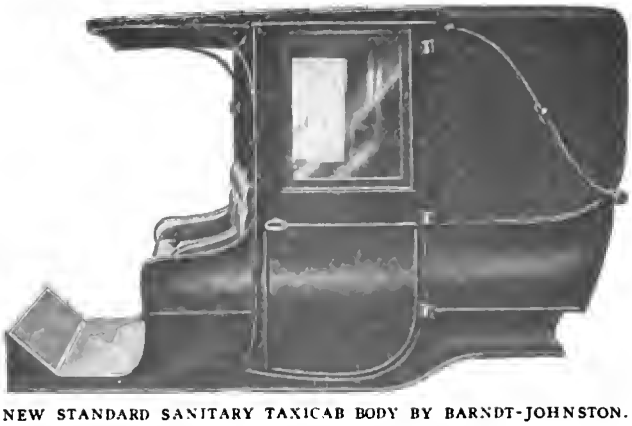
CENTRALLY HINGED TYPE OF WIND SHIEID

seamless brass tubing, with a sub-channel to hold the glass firm and prevent rattling. There are no sharp edges or corners to catch the dirt, so that it may be easily polished and kept clean. Its normal position for country driving is with the upper part folded down to the front at an angle of about 45 degrees below horizontal; this position greatly reduces the wind resistance, and the air currents are deflected over the driver's head. At the same time the glass does not interfere with his vision. The maker is the Newark Rivet Works, of Newark, N. J.

Barndt-Johnston Taxicab Body—The Barndt-Johnston Auto Supply Company, of Columbus, O., is furnishing various manufacturers with a new standard taxicab body, which embodies a number of up-to-date ideas. The body is made as sanitary as possible by the use of the skeleton type top and the substitution of linoleum for carpet as the floor covering. The framework of the body is of white ash, and the panels of sheet steel coated with aluminum. The rear portion is extremely large and roomy and will accommodate five passengers comfortably.

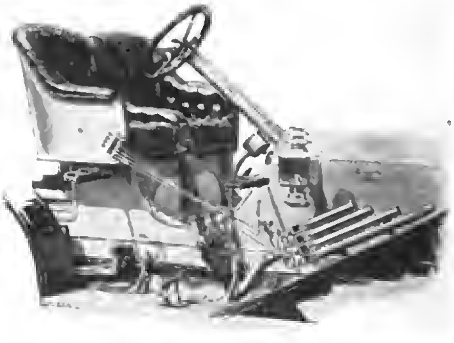
K-W Ignition and Lighting—To its line of magnetos and coils the K-W Ignition Company, of Cleveland, has added electric headlights and side lamps, intended to be operated by the current from one of their ignition magnetos. The lighting system is connected directly to the magneto, which may or may not be used for ignition purposes as well. Ignition requires about 25 per cent. of the current output of the magneto, consequently reducing to some extent the available amount of illumination; but even in this case it is claimed that the light is more powerful than that obtained from an acetylene system. When the motor is stopped the lighting, of course, stops too; but a storage battery is provided to supply current for the side and tail lamps, if required. The total battery consumption of these is about 3-4 ampere hours. The light also varies in intensity with the speed of the car, up to about thirty miles an hour, above which it remains constant. No matter how slow the car goes, however, there is always light enough to meet all requirements. There is no danger of burning out the lights at any speed; the regulation is automatic without governors or any other trappy devices.

The K-W line of electric lamps includes automobile headlights, side and tail lamps, speedometer lamps, dome and bracket lamps for closed cars, and searchlights and side lights for motorboats. The headlights are fitted with parabolic reflectors of brass, silver-plated, in which the electric bulbs are accurately focussed. The bulbs are of the tungsten type and very economical in their consumption of current. Fittings are also made by which gas headlights and oil side lamps may be converted to electric. One interesting feature of the K-W system is that if more light is required for a few seconds to make out some distant object, the clutch may be slipped momentarily, allowing the engine to speed up and doubling the illumination.



NEW STANDARD SANITARY TAXICAB BODY BY BARNDT-JOHNSTON.

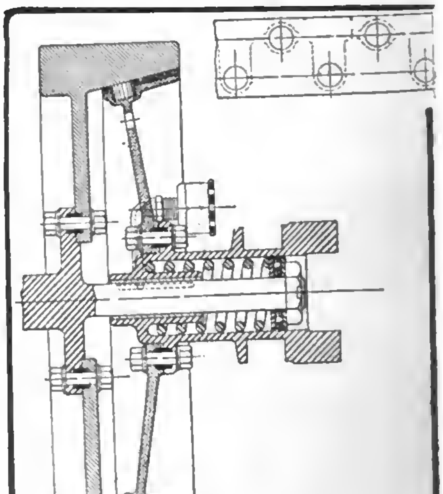
New Four-Tone Horn—That prolific inventor, C. H. Foster, of the Gabriel Horn Mfg. Co., Cleveland, has just brought out another clever little appliance for the automobile, which is destined to be just as popular as his previous devices are. This is a very small, compact horn of four tones, suitable for playing bugle calls and similar simple tunes, through



NEW GABRIEL HORN IN PLACE ON CAR

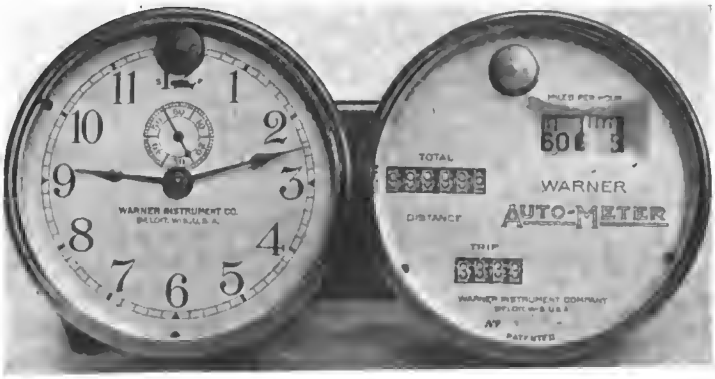
the medium of the exhaust gases. It is operated by a keyboard comprising four keys, each controlling one note, and the whole located on the side of the seat, convenient to the driver's right hand. In addition, a foot pedal, when pressed, sounds all four notes at once, this serving as a warning signal. While any location is possible, the usual place is that shown in the cut above, on the front running board, just back of the front fenders.

General Cone Clutch—A revival of the interest in cone clutches, which has been so noticeable in connection with the most recent car production, is accounted for in a wide measure when notice is



CORK INSERT CONE CLUTCH FROM INDIANA

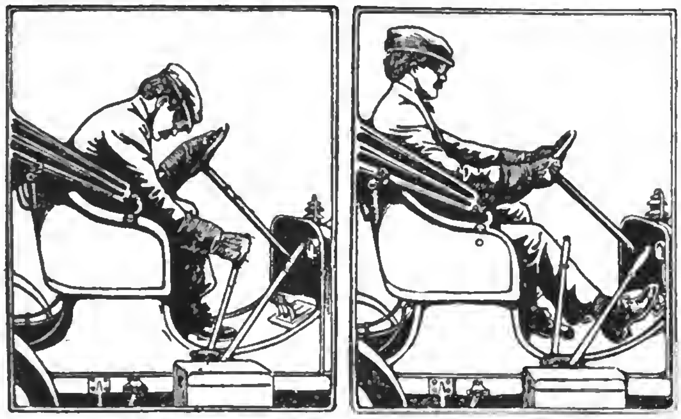
taken of the line of cone clutches that are to be had from the General Manufacturing Company, of Elkhart, Ind. Of the several sizes and models of cone clutches which this company is furnishing to makers of cars in large quantities, the type F size, rated at 30-35 horsepower, is here illustrated and, as will be observed, it is leather-faced with "cork inserts" and up to the standard established by the National Brake and Clutch



WARNER'S NEW TWINS AS THEY APPEAR FACE TO FACE

Company, originators of "cork inserts." In addition to the cork, with a view to bringing the leather to a good bearing springs are placed at equal distances around the periphery, under the leather, so that the leather is pressed out evenly against the female member of the clutch. The General Manufacturing Company is manufacturing a full line of these clutches, in addition to transmission gear sets of the latest and most approved types for use in 1910 cars.

F-B Automatic Clutch Release—All owners of the Buick Model 10 will be interested in a device brought out by the F-B Company, of Columbia, S. C., known as the F-B automatic clutch release. Its purpose is to enable the driver to release his high-speed clutch without stooping over to reach the lever. This is accomplished by interconnecting the service brake with the clutch, so that when the brake is applied the clutch is released, and when the brake is taken off the clutch automatically engages again. The result is the same as if the car were fitted with a sliding gear and master clutch. The device has been on the market for some time, and many letters of commendation have been received.



METHOD OF OPERATION OF F-B AUTOMATIC CLUTCH RELEASE DEVICE.

As the two cuts show, the old way of releasing the clutch was an awkward one, resulting in a cramped position and the loss of much time in reaching for the lever. This device does away with all that, allows better control, a clear view ahead and eliminates the stooping forward action.

One New Idea from Cincinnati—This southern Ohio city has gone into the motoring field with a new accessory especially designed for automobiles. This is a dry battery, known as the Sparker, and its manufacturers, the Rock Island Battery Company, Cincinnati, are exploiting it as an extra special ignition dry cell, and the highest priced cell on the market as well. This battery differs from others in that Japan is the source of the manganese ore used, instead of Russia. Other points of difference are the high voltage and comparatively high amperage peculiar to the cells. It is a hand-made cell and the result of three years of experimentation and successful use. Made in every size for which there is a demand, the most popular 2½ by 6 size, known as No. 6, retails at 35 cents. Other larger sizes are priced in proportion. The well-sustained electromotive force makes it worth every cent of its cost, high as it is.

Separate Department for Automobiles—One of the largest of the many large metropolitan supply houses, that of the New York Sporting Goods Company, 15 Warren street, has had its automobile supply department expand to such an extent that the necessity arose for segregation. So it is that the basement and first floor have been given up to supplying motorists' wants. Chains, oils, batteries and other heavy goods of a similar nature will be located in the basement, and above them, on the first floor, will be found clothing lamps, horns and the smaller parts. Located just one door from Broadway, in the heart of the downtown district, this store will be found very convenient.

Warner Autometer "Twins"—No mechanical change has been made in the 1910 Warner Autometer, but a new combination autometer and clock has been brought out, called "The Twins," very attractive in appearance. As may be seen from the illustration, the clock and the speedometer-odometer device are each in a cylindrical case exactly similar in size and shape, thus giving the instrument an appearance of symmetry very pleasing to the eye. The dials are illuminated from the interior, the light being thrown directly on their backs, and so arranged that it does not interfere with the vision of the driver. As most autoists know, the Warner Autometer, which is made by the Warner Instrument Company, of Beloit, Wis., is built on the magnetic induction principle. Chronometer construction is followed, the moving parts running on sapphire jewels and balls. The driving shaft is designed to turn at one-fourth the usual speed, that is, at 680 revolutions to the mile, thus giving it long life and eliminating noise and vibration. The odometer is built with the same care; its trip and season dials register up to 1,000 and 100,000 miles, respectively.

With improved roads, automobile speeds are gradually increasing, and this device will meet with a wide range of usefulness among the motorists who think, in the words of a Warner competitor, "it's nice to know how far you go," the modern version being "it's nicer to know how fast you go." The new twins allow for the first time the record of time, distance and speed at one and the same time.

INTERIOR VIEW OF NEW YORK SPORTING GOODS SALESROOM

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VOL. XXI NEW YORK—THURSDAY, SEPTEMBER 2, 1909—CHICAGO No. 10

THE AUTOMOBILE

NEXT LOWELL'S NATIONAL STOCK RACES

Where the Storm Center will be Located

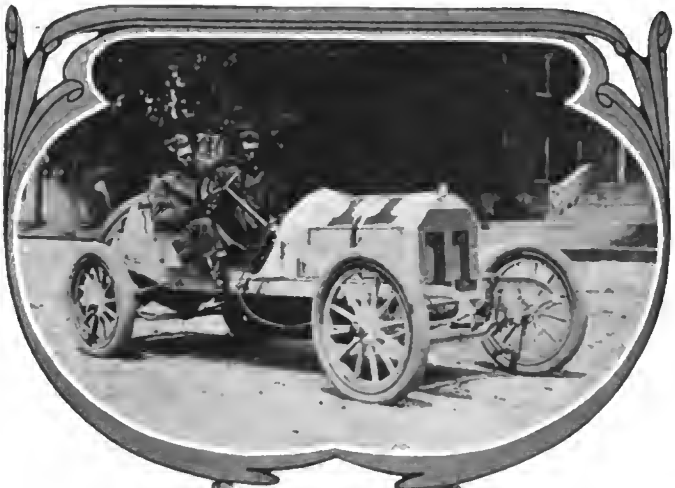
Hustlers Heinze and Hower

LOWELL, MASS., Aug. 31—If conscientious preparation and a generous entry list insure success, then there should be no question of most satisfying competition in the A. A. A. national stock car races to be held next week under the auspices of the Lowell Automobile Club.

The Merrimac Valley course is 10 6-10 miles long, and the only fault that might be found is in the fact that it is for the most part composed of ideal boulevard roads which will permit of exceptional speed. Under the capable leadership of John O. Heinze, the Lowell club has prepared for the racing in no prodigal manner, but with a thoroughness that has not taken into account the question of expense. Chairman F. B. Hower of the A. A. A. contest board has been very much on the scene, while the near presence in Boston of President L. R. Speare of the A. A. A. has been another advantageous situation. The representative entry is sufficient to guarantee gilt-edge sport, and the presence of enormous crowds is a certainty with a course in such close proximity to an over-populous area.

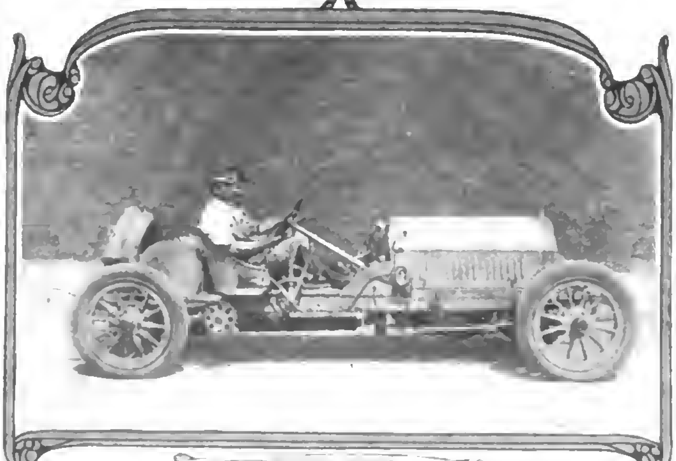
The little cars will open the competition on Monday, followed by mixed straightaway trials on Tuesday, with Wednesday devoted to the big car event. Motor boat races will occupy Thursday morning, with a Marathon foot race in the afternoon, and on Friday the meet will conclude with the motorcycle events.

That there will be speed in plenty is generally recognized, for the stock car of to-day is the equal, in available power, of the racing craft of earlier and more unrestricted days. The intent of the manufacturers interested in racing is to limit competition to cars of which the duplicates can be found in the salesroom



Moon, Yorick Cup — Davis, Driver

Benz Vesper Trophy — Stoecker, Driver



Alco Lowell Cup — Grant Driver

by the man who selects because of ability demonstrated in racing. While it is true that the rules at present require some revision, the progress made in this direction in the past year has been decidedly substantial.

How the Various Competitions are Scheduled

From the looks of the entry list and the events scheduled, this will probably be the greatest automobile road-racing event of the year. The classes represent the fastest American and foreign cars of the "stock chassis" types. Only classes 1 and 2 will have foreign cars. Of the eighteen machines in class 1, only three are not native, the foreign representatives being the Isotta and two Fiats. In class 2 are the Benz and the Renault, the former being rather a "dark horse," as that size of Benz is scarcely known in this country.

The list of events and the days of their running are as follows:

MONDAY, SEPTEMBER 6

Class 2—Vesper Club Trophy—For all cars having a piston displacement between 301 and 450 cubic inches. The minimum weight limit for this class is 2,100 pounds. The distance will be twenty laps or 212 miles.

Class 3—Yorick Club Trophy—For all cars having a piston displacement between 231 and 300 cubic inches. The minimum weight limit for this class is 1,800 pounds. The distance will be fifteen laps or 159 miles.

Class 4—Merrimac Valley Trophy—For all cars having a piston displacement between 161 to 230 cubic inches. The minimum weight limit for this class is 1,500 pounds. The distance will be twelve laps or 127 2-10 miles.

TUESDAY, SEPTEMBER 7

Mile Straightaway Trials for high-power machines.

WEDNESDAY, SEPTEMBER 8

National Stock Chassis Competition for cars in Class 1—Lowell Trophy and $2,000 cash—The cars in this class are limited by a cylinder capacity varying from 451 to 600 cubic inches. The minimum weight limit for this class is 2,400 pounds. The distance will be thirty laps or 318 miles.

THURSDAY, SEPTEMBER 9

Motor Boat Races in the morning, and a Marathon foot race in the afternoon.

FRIDAY, SEPTEMBER 10

Motorcycle racing with six events will be run off.

Without doubt, the third day's racing will prove the representative road competition event of the season. The foremost cars and drivers are involved, among the drivers being such well-known ones as Robertson, Strang, Lytle, De Palma, Chevrolet, Burman, Cobe, Poole and Parker in the big car class. In the small cars will be Dingley, Matson, Lorimer, Jelnaw and Knipper, all of whom will drive Chalmers "Blue Birds"; while Chevrolet, Burman, DeWitt and Ryall will handle Buicks; with See, Sickinger and one yet to be named, as a Maxwell trio. Basle will have a small Renault.

The events are scheduled to start at 10 o'clock in the morning every day except Tuesday when they will not begin until 2.30 p. m. In the long races Monday and Wednesday, the cars will start at half-minute intervals, and on the opening day the smallest class will be started first; that is, class 2 will start before class 3, with class 4 last. It is expected that the classes will finish about the same time.

Numbers Were Drawn on Monday

The numbers for the order of starting were drawn this noon, the drawing taking place in the clubrooms, which are in the Richardson Hotel. This is also the official headquarters for the A. A. A. and of the meet. Those present included Chairman F. B. Hower of the A. A. A. contest board; Secretary E. L. Ferguson and Fred Wagner, the official starter. To the secretary of the local club, J. A. McKenna, fell the lot of drawing the numbers which decided the starting position of the cars.

Special numbering will serve to distinguish each class. To class 1 belong all cars numbered from 1 to 20. Class 2, since it contains more than ten cars, has necessitated the use of letters: hence the cars are designated by letters from A-2 to K-2. All class 3 cars will have numbers in the 30's, while those which belong to class 4 will be identified by being in the 40's. Thus the class and the car can be quickly and conveniently determined at its approach. One unusual feature of this race which should be mentioned, is that it will be run clockwise instead of counter-clockwise, as usual. Following is the official entry list, together with the order of starting:

SMALL CAR RACE—THREE CLASSES
Monday, Sept. 6

CLASS 2—VESPER CLUB TROPHY: For cars of 301 and including 450 cubic inches piston displacement; minimum weight of car, 2,100 pounds; distance, 20 laps (212 miles); entry-fee for each car, $300; additional prizes: $600 to winner, $200 to second, $100 to third, in cash or plate.

No.	Car Name	Driver
A-2	Chalmers-Detroit	L. B. Lorimer
B-2	Stoddard-Dayton	Burt Miller
C-2	Knox	
D-2	Acme	
E-2	Benz	
F-2	Renault	Charles Basle
G-2	Buick	Louis Chevrolet
H-2	Chalmers-Detroit	Burt Dingley
I-2	Stoddard-Dayton	B. W. Shaw
J-2	Buick	Bobby Burman
K-2	Knox	Fred Belcher

CLASS 3—YORICK CLUB TROPHY: For cars of 231 and including 300 cubic inches piston displacement; minimum weight of car, 1,800 pounds; distance, 15 laps (159 miles); entry-fee for each car, $300; additional prizes: $600 to winner, $200 to second, $100 to third, in cash or plate.

No.	Car Name	Driver
30	Columbia	John J. Coffey
31	Buick	George De Witt
32	Atlas	
33	Buick	Lewis Strang
34	Moon	Geo. Davis

CLASS 4—MERRIMAC VALLEY TROPHY: For cars of 161 and including 230 cubic inches piston displacement; minimum weight of car, 1,500 pounds; distance, 12 laps (127 2-10 miles); entry-fee for each car, $300; additional prizes: $600 to winner, $200 to second, $100 to third, in cash or plate.

No.	Car Name	Driver
40	Buick	Arthur Chevrolet
41	Maxwell	Wm. Sickinger
42	Chalmers-Detroit	Wm. Knipper
43	Buick	Jimmie Ryall
44	Maxwell	Arthur See
45	Maxwell	
46	Chalmers-Detroit	J. M. Matson
47	Chalmers-Detroit	Frank Jelnaw
48	Velie	

NATIONAL STOCK CHASSIS RACE FOR THE LOWELL TROPHY
Wednesday, Sept. 8—Distance, 318 Miles

Open to any "stock chassis" of 451 to and including 600 cubic inches piston displacement; minimum weight of car, 2,400 pounds; entry-fee for each car, $400. The length of the course shall be 10 6-10 miles, which shall be covered thirty times, making the total distance of the race 318 miles. In addition to the trophy, cash prizes will be awarded as follows: To winner of first place, $1,000; to winner of second place, $500; to winner of third place, $300; to winner of fourth place, $200.

CLASS 1

No.	Car Name	Driver
1	Buick	Lewis Strang
2	American	
3	Allen-Kingston	Hugh Hughes
4	Buick	Bobby Burman
5	Alco	Harry F. Grant
6	Isotta-Fraschini	A. J. Poole
7	Fiat	E. H. Parker
8	Knox	Fred Belcher
9	Stoddard-Dayton	Burt Miller
10	Knox	
11	Fiat	Ralph De Palma
12	Simplex	George Robertson
14	Knox	
15	Stoddard-Dayton	B. W. Shaw
16	Apperson Jack Rabbit	H. H. Lytle
17	Buick	Louis Chevrolet
18	Lozier	Harry H. Cobe
19	Stoddard-Dayton	

Great Preparations for the Race

Much credit is due to the Lowell Automobile Club for the efficient preparations which they have made so far or have under way at present. The grandstand is practically finished, and is an enormous affair. The road for more than a mile on either side of the stand is fenced with heavy wire, and both turns at Dunbar avenue are guarded in such manner that the cars can go fully fifty feet off the road before reaching the barricade.

On the day of the race it is hoped that the militia will be permitted to wear their uniforms. Five hundred soldiers and a hundred flagmen will keep the 10-6/10 mile-circuit clear.

The southern side of the course is State boulevard and is a fine macadam road. This has been treated with an asphaltum composition which is in good condition for practice and should be excellent by the time of the final races. On the northern side is a short stretch of macadam; otherwise it is ordinary dirt road. The improved road will soon be tarred, and the dirt section has already received a coat of calcium chloride, which effectually lays the dust. The steam rollers are now going over it finally to put it in the best possible condition. Not only has the club gone to the expense of treating the roads with dust-laying solutions, but

The Maxwell Runabout Trio

Dingley, Matson, Knipper, Lorimer, Jelnaw

Chalmers-Detroiters At Home

Pontoon Bridge Across the Merrimac River

they have gone so far as to cut down the top of one hill so that the descent will not be so abrupt. The hill is called the "Dip," and it is probably the worst place on the course. There is a very steep declivity, followed by a turn at the bottom. The road has been filled in until the part in the valley is fifteen or twenty feet above the creek which flows in the bottom. Along the edges of this narrow filled-in road are large heavy boulders, which will easily put any car out of the race that may skid into them, even if it does not go off of the road.

The grand stand is one of the best that has been erected at any American race. It is built in eleven sections, each of which is ninety feet long and contains seventeen boxes and seats for five hundred persons. Thus there will be accommodations for nearly 6,000 people. The entrances are from a covered walk which is under the grand stand and are of the type similar to those in the Harvard Stadium. An electric-lighted pontoon bridge has been built across the Merrimac river near the stand, so that spectators may reach the course from the trolley cars. To remove any possibility of accident to the officials and press men, a suspension bridge has been erected across the course between the judges' stand and the main stand.

Several other bridges have been put across the course at other places for the convenience of pedestrians, while across Dunbar avenue a heavy bridge has been built so that cars can reach the inside of the course without having to cross the track.

At the hairpin turn, which is at the western end of the course, the road has been widened, and a tree which grew at the center of the junction of the two roads has been removed. The only other turns of account are those from Varnum into Dunbar avenue, and from Dunbar into the boulevard. These are both rectangular, and they are to be cemented, so that the skidding will not tear them up excessively and so that there will be a wider road into which they may skid.

Where the New Dirt Road Was Made Connecting Burman Avenue and the Boulevard

Some of the Cars at Practice

Only a few of the teams had reached the circuit on Tuesday. Those which have arrived have found nearby quarters. The Chalmers team have two farmhouses on the backstretch. This team was one of the first on the course, and both Dingley and Lorimer have made a few practice runs over the course. Matson would have done so this morning had he not had the accident. Knipper and Jelnaw, his teammate, had to go around in touring cars, as their cars have been delayed on the road somewhere. The early arrival at the course of the Chalmers team is deemed significant by those who know, and a duplication of victories at Crown Point and in the Jericho Sweepstakes are predicted.

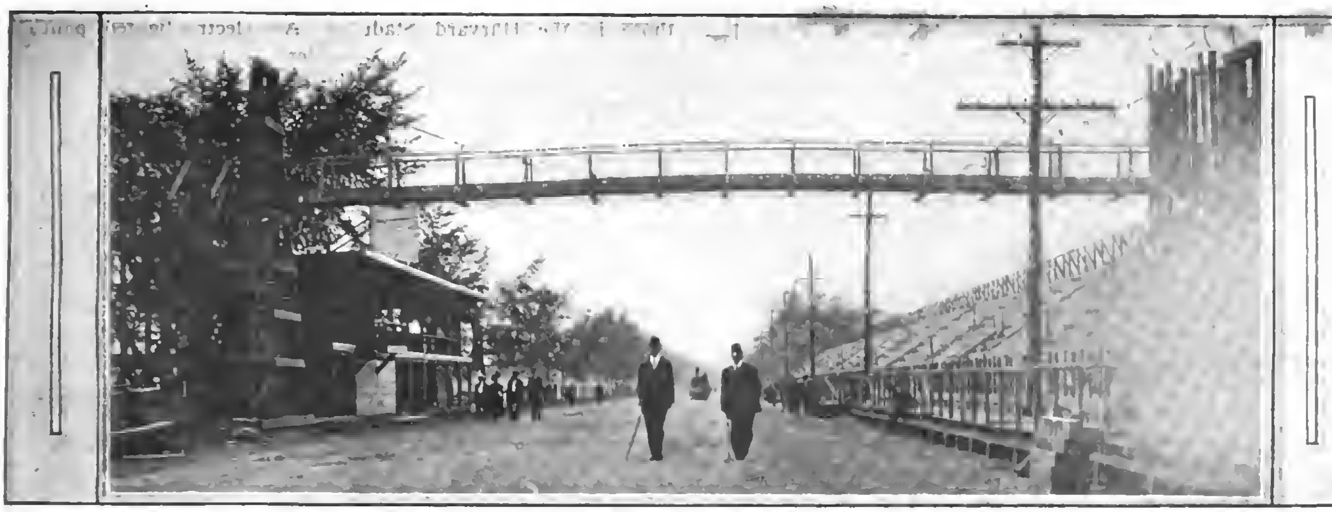
"Herb" Lytle, who is driving the Apperson, is much feared in his class, and has arrived early in order to profit by practice, if that can help to win a race.

Another contender who has been trying the circuit is Hugh Grant with the Alco. This car is practically a duplicate of the car which did so well last year over this course. Grant has the greatest confidence that he will do still better this year.

Among to-day's arrivals was Al Poole, with the Isotta and exactly similar to the car which last year won the Lowell trophy and also won the Savannah and Briarcliff cups. Last year Strang drove the car, but this year he will drive a Buick. All the Buicks have not arrived as yet. Only one has been on the course thus far.

In the second class there is considerable apprehension over the Benz entry, which is really a "dark horse," as no Benz cars of this size have been raced in this country. If the small car does as its bigger brothers have done in Europe, and in the Savannah race last year, there is little hope for the other contenders.

Mrs. Bert Dingley, Mrs. Joe Matson, Mrs. Harry Bill



On the Track at the Grand Stand, Where a Bridge Permits Safe Passage Over the Course

The driver, Stoecker, is scarcely known in this country, but has a series of victories in Europe to his credit.

The Maxwells and the Stoddard-Dayton driven by Bert Shaw are the only others who are on the course so far to-day. The next couple of days should see the remainder of the teams on the course.

Maxwells will be represented in the light-car contest by three of the latest production, the Model Q. This is the four-cylinder car of 22-horsepower, just announced for delivery. The cars have been in a number of events, notably hill climbs, and have given splendid accounts of themselves.

Following its custom at big races, the Maxwell-Briscoe Company has arranged for the use of 20 acres of land belonging to the Butterfield farm, and this space will be thrown open to Maxwell owners. There will be ample parking space thus assured for all who tour to the carnival in this make of automobile.

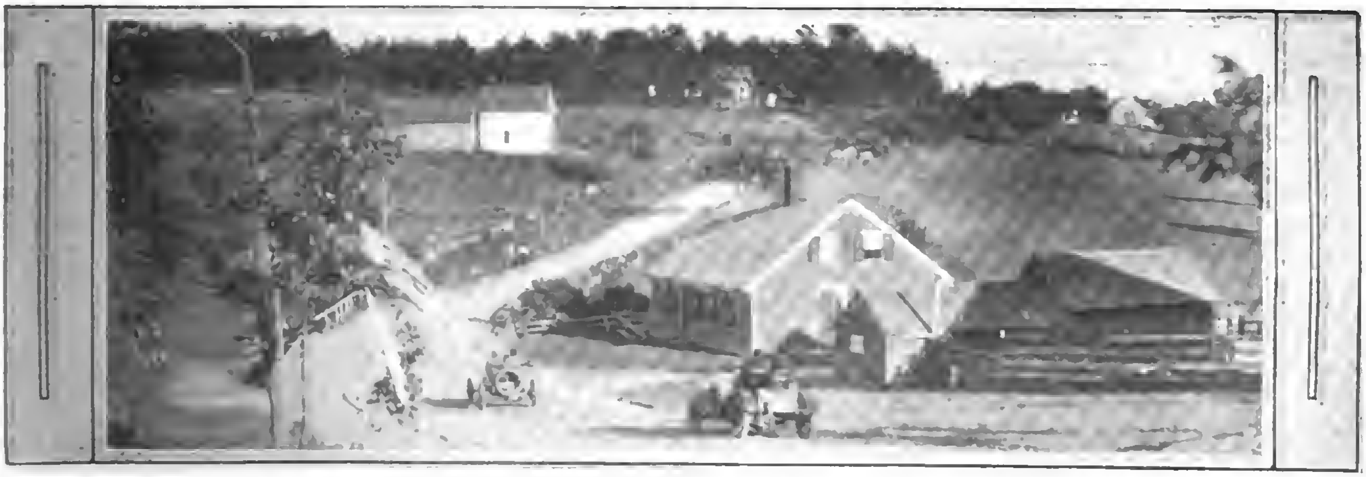
The Moon car, which will be driven by Harry Davis, in the competition for the Yorick cup, is the same stock roadster which was entered in the Indiana light-car race, and there secured fourth place. Previous to that it had been in another road race, and there won second place, driven by Harold Brinker. This latter was the Denver road contest, in which he made a run from a position near the rear right up to the second place.

One of the late cars to be entered will undoubtedly be a strong favorite, both because of itself and of its driver. The machine is a 50-horsepower stock Simplex, and it will be handled by George Robertson. This model is the one used by Robertson in winning a number of victories in stock-car events, notably two recent 24-hour races, and in one of these establishing the world's record of 1,177 miles. It will be seen next week in the big race on Wednesday.

One Unfortunate Fatality in First Practice

LOWELL, MASS., Aug. 31—Much to the regret of all concerned the practice opened to-day with a fatality, and this happening has cast a gloom over the few drivers already on the course. This morning the Chalmers, driven by Joe Matson, just as he was going to practice, struck and fatally injured a boy on Varnum avenue. No blame, however, is placed on Matson, as he did everything in hi power to prevent the accident. So violently did he apply the brakes that the differential and wheel clutches were entirely destroyed. Reliable reports state that the boy tried to run across the road, and seeing the machine approaching, lost his head and remained rooted to the spot. Matson tried to avoid him, but just before the car reached him the boy jumped directly in front of the machine. The radiator of the car was demolished, so severe was the impact. As a result of the accident, Matson is now under a $2,000 bond.

A petition for an injunction to prevent the holding of the races was filed to-day in the Superior Court. The attorney, E. J. Tierney, represents Mrs. O. A. Gray, an owner of real estate along the course, who claims that her property will be damaged by the speeding autos. It was claimed that the act of the Legislature permitting the event is unconstitutional, and Judge Dana issued an order of notice, returnable on Thursday. The complaint is directed against the Lowell Automobile Club, the officers of which are not inclined to believe the injunction will be made permanent at this late hour.



Deep Dip on the Back Stretch, Which Is the Most Dangerous Part of the Whole Course

H. O. SMITH ON GLIDDEN TOUR PROTEST

NEW YORK, Aug. 31—In order to make plain the reasons for his protest in connection with the Glidden tour, H. O. Smith, president of the Premier Motor Mfg. Company, has issued a statement wherein he aims to show that if the rules were properly enforced there would be no question about the Glidden trophy going to the Premier. He has declared himself as follows:

"I have been in hopes that the chairman of the Contest Board of the A. A. A. would give out full information, setting forth the conditions surrounding our protest at the conclusion of the Glidden tour, and it is evidently the failure to do this which has occasioned our receiving requests from so many sources to give full facts regarding the protest, which I am satisfied, to avoid a general misunderstanding, the public should know.

"The Premier Company regrets the necessity of making a protest on a point which on the surface might seem so trivial, but a number of cars have proven so good that only small points of vantage could be found by the technical committee at the conclusion of the strenuous run as the basis for determining awards.

"However, this contest was run under stated rules, and the rules specified under "Qualifications," paragraph No. 5:

> Cars shall at all times during the tour carry mufflers and guards, and be fully equipped as per manufacturers' catalog specifications, except that tops and wind shields need not be carried.

"The two roadsters of the same make as the car which was awarded the Glidden trophy, which carried their lamps attached in the same manner as provided on the touring car of that make, suffered in consequence on account of the bad roads, by one having a bent bracket and a badly crushed lamp and the other by having the receptacle in the rear to which the lamp and bracket is attached entirely dragged off.

"The failure to carry lamps was in itself a violation of the rules," continues Mr. Smith, "and, judging by the experience of the roadsters of this make which carried the full equipment, it is fair to assume that the touring cars which did not carry this equipment the entire distance escaped at least as much damage as was done to these two roadsters, and an official report of the penalties shows that the roadster of this make, No. 109, with a total of 10.2 points, was charged, among other things, for replacing tool box, bracket and taillamp, 3 points for time; bracket, 1.2 points for material; taillight, 3.2 points for material; while other cars in the contest were charged for lamps and brackets, and in addition one or more cars were compelled during the technical examination to light their oil lamps to show that they were in good going condition."

In conclusion Mr. Smith says: "Since the Premier car conformed to the rules, and made a perfect road score, and at the conclusion suffered a penalty of only one and a half point, on account of broken spring clip and reapplying fan belt, a proper charge for lamp only would alter the final score and make the award favorable to the Premier."

DETOUR ON ALBANY-PITTSFIELD ROUTE

ALBANY, N. Y., Aug. 30—Secretary Martin of the Albany Automobile Club advises tourists going from Albany to Pittsfield or vice versa of a detour necessary from the village of East Schodac to Nassau, a distance of five and a half miles, due to the reconstruction of the road. The Albany club has erected signs showing a serviceable route around the closed section. With this exception all of the roads on the Albany-Pittsfield route are in excellent condition.

MITCHELL ARMY CAR ON THE PRAIRIES

Carrying army dispatches from New York to San Francisco, the Mitchell Ranger, which left the former city on August 19, is now on the open prairies of the West. It reached Chicago on the following Tuesday, and proceeded on the next day to reach Iowa. That State was crossed during the remainder of the week, and Nebraska entered. Latest reports locate the machine near the Wyoming line.

CORONER BLAMES TRACK MANAGEMENT

INDIANAPOLIS, Aug. 28—Blame for the accidents that occurred during the recent race meet at Indianapolis, resulting in the death of five persons, has been placed on the management of the Indianapolis Motor Speedway by John J. Blackwell, coroner of Marion county.

Of the accident that occurred when the National car driven by C. C. Merz bursted a tire, killing Clyde Kellum, the machanician, and two spectators, the coroner says:

"I find that the protection of the spectators and the public who paid their admission fee to see the races was very lax. There was no discipline among the guards and soldiers stationed there to guard the public from danger. I find also that there were danger signs and placards around the track and the Indianapolis Motor Speedway Company knew the dangerous condition that existed there and should have afforded the public more and better protection from death and accident."

In his verdict relative to the deaths of William A. Bourque, driver of the Knox entry and his mechanician, Harry Holcomb, the coroner stated that he expected to recommend that the accident be investigated by the grand jury.

In preparation for the next meet, to be held in October, the Speedway management is planning to resurface the track with bitu-mineral paving material, and changes will also be made in the rearrangement of the private grand stands to assure greater safety.

WINNERS, STEAM AND GASOLINE WHITES

CHICAGO, Aug. 30—The second annual gymkhana was held at the Wheaton County fair, Saturday, under the management of a committee from the Chicago Motor Club, and a White steamer driven by Paul Melchert was returned the winner, with a White gasoline car handled by G. W. Turgeon second. J. H. Seek's Premier was third, a Silent Knight Daimler fourth, Diamond T fifth, Falcar sixth, Overland seventh, Austin eighth, Peerless ninth, Buick tenth, Columbia eleventh, Halladay twelfth, De Tamble thirteenth, and a Knox fourteenth. The gymkhana was made up of five sections, starting with an obstruction race in which the driver carried a glass of wine and steered with one hand; then came the motor roulette, circus ring, lancers and the teter board. On the last-named just half the cars succeeded in balancing. This was the first public appearance in Chicago of the White gasoline car and the Daimler, the latter being an English machine.

JACKSON COMPANY SUES FOR CUP

INDIANAPOLIS, Aug. 30—The Jackson Auto Company has filed suit against the Indianapolis Speedway Company and the Wheeler-Schebler Company for possession of the $10,000 cup offered by the latter company to the winner of the 300-mile race. A Jackson car was in the lead when the race was stopped at 235 miles because of the accident that caused the loss of three lives. The Jackson people also sue for $100,000, which amount of damage they claim has been done them through the withholding of the prize. Just what action the Speedway Company will take is not stated. The A. A. A. officials decided upon a "no-race."

BALTIMOREANS WILL USE PLENTY OF OIL

BALTIMORE Aug. 30—Street Cleaning Commissioner Wickes says that with his experiment of laying the dust in the city streets with oil, he has at last mastered that evil, which has been for years a bane to Baltimoreans. This process will be in constant use hereafter. The Commissioner has also been experimenting with oil on the macadam roads within the city limits with the view of saving the roads from the havoc wrought by autos, and he says that he finds the oil scheme the best preventative. The result is that he has advocated oil-covered macadam roads for all residential sections of the city.

Brilliant Scene at the Start of the Round-the-Clock Grind, with Ten Fine Cars in the Line-Up

RENAULT WINS FATAL BRIGHTON TWENTY-FOUR

NEW YORK, Aug. 28—Many accidents, one doubly fatal, distinguished the second Brighton Beach twenty-four-hour race conducted by the Motor Racing Association this season. Shortly before midnight Friday the Stearns driven by Grosso collided with Patschke's Acme on the clubhouse turn. Grosso was mortally injured and Leonard Cole, his mechanic, was killed outright. The Acme crew was uninjured. Grosso died Sunday morning without recovering consciousness.

The Renault driven by Basle and Raffalovitch won with a score of 1,050 miles, 41 miles behind Robertson's performance in the July race, and 127 miles behind the record. Rainier, again a consistent performer, finished second with 938 miles; Acme No. 3, driven by Patschke, took third with 883 miles, and Palmer-Singer, Allen-Kingston and Acme No. 4 finished in the order named. Lozier, Fiat and Stearns were eliminated by accidents, and Houpt dropped out early in the race. Michelin tires were used on first and second cars.

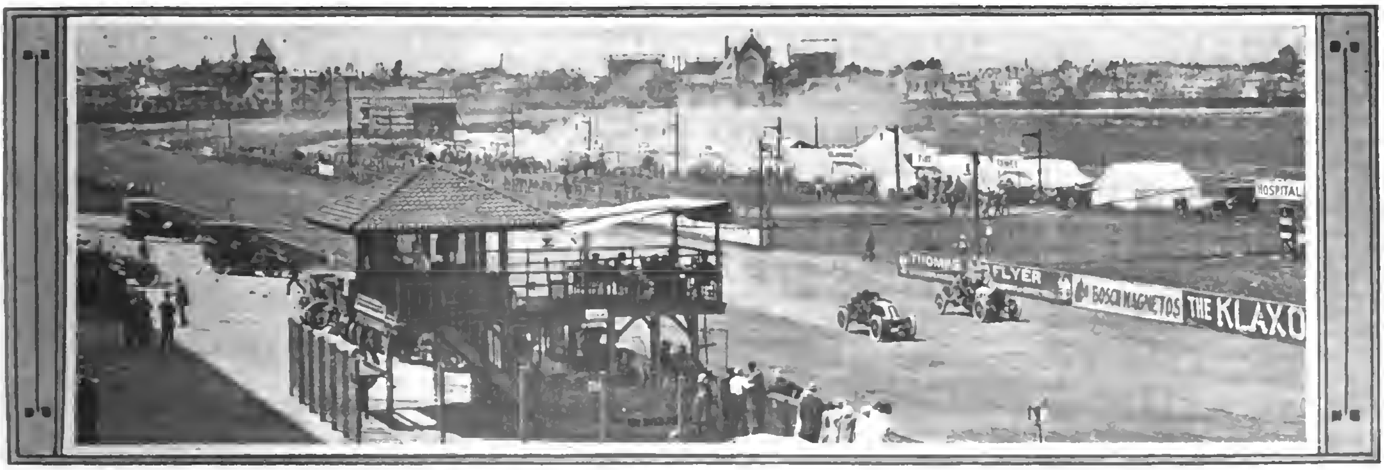
The start at 10 P.M., Friday night, afforded the usual picturesque features, and was attended by a record-sized crowd. The association's repeated prediction of a record-breaking entry again proved unfounded, as but ten machines lined up for the starter's pistol. De Palma and his Fiat got away in the lead, and finished the first five miles in 5:32 3-5. Patschke in Acme No. 3 led at the end of the first hour, and his score of 55 miles proved sufficient to win him the $200 prize for the best hour. Van Tine's Acme No. 4 made the same distance in a few seconds more.

Then the acccidents began. The Allen-Kingston lost a rear tire on the upper turn and was struck by the Fiat. The impact burst the gasoline tank of the A-K, and instantly the car was enveloped in flames. Hughes and his mechanic leaped from the car, blazing like human torches, and rolled in the grass of the infield. Both were painfully burned, but Hughes later appeared on the track again. The Fiat's frame was twisted and cracked, and its springs broken, putting it out of the race.

A few minutes later came the fatal accident. At the clubhouse turn the Stearns collided with the Acme, and instantly all was a terrible confusion. The car turned a somersault and was smashed into fragments. Leonard Cole, the mechanic, was frightfully mangled, and Grosso's back was broken. The two twisted forms

HOW THE POSITIONS SHIFTED HOUR BY HOUR IN THE 24-HOUR RACE AT BRIGHTON BEACH, N. Y., AUGUST 27-28

No.	Car	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	**Renault**	2	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	**Rainier**	3	1	1	1	1	1	1	1	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2
3	Acme	1	9	6	5	5	5	5	4	5	4	4	4	4	4	4	3	3	3	3	3	3	4	3	3
2	Palmer-Singer	4	5	3	3	3	4	4	3	4	5	5	5	5	5	5	5	4	4	4	4	5	5	4	4
8	Allen-Kingston	5	10	8	8	6	6	6	6	7	7	6	6	6	6	6	6	6	6	5	4	4	3	5	5
4	Acme	1	4	5	4	4	3	3	2	3	3	2	2	2	2	3	4	5	5	4	5	6	6	6	6
5	Lozier	4	2	4	6	7	7	6	5	6	6	7	Turned over on backstretch.												
7	Houpt	10	6	7	7	8	8	7	7	8	Burned out connecting rod.														
9	Fiat	2	8	Frame and springs smashed in collision.																					
6	Stearns	3	7	Wrecked.																					



Leading Renault and the Allen-Kingston Have a Brush About Noon—Paddock in the Background

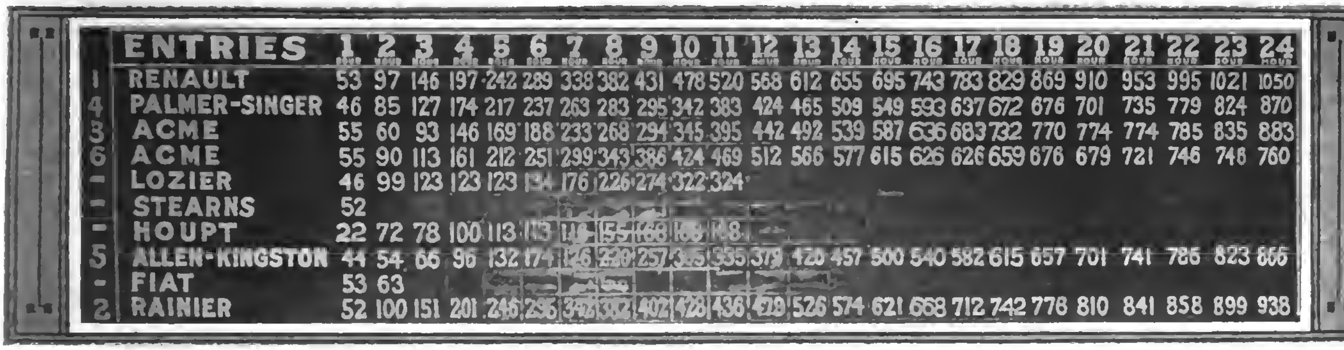
lay near the wreck of the car for some moments while the other cars were signalled to stop. The ambulance took away the Stearns crew, one dead and the other dying, and the pieces of the big car were pulled into the field. Patschke in the Acme had retained control of his car, and drove to the paddock, where the front axle and construction was replaced. The Renault had been in the mix-up, too, and its steering cross-rod had to be straightened.

The race was resumed at 11:40, and half an hour later the front wheel of Acme No. 4 gave way while rounding the clubhouse turn. With great presence of mind Van Tine steered the car through the canvas fence and brought it to a stop, avoiding a mix-up with the pursuing cars. At the end of the second hour the Rainier led, scoring 100 miles. About 1 a. m. the Lozier, driven by Heina, blew a tire and broke a wheel on the far turn and upset; the driver and mechanic were thrown across the track, but picked themselves up with only a few bruises. The two Acmes were both on the track an hour after the accident and started to make up lost time. The driving of both Patschke and Van Tine was of the sensational order. About daybreak the Allen-Kingston in leaving the paddock upset a lamp post, which struck Patrick Corrigan, a policeman, and put him on the hospital list with a fractured leg and dislocated knee.

During the eighth hour the Renault, carefully driven by Basle, overtook the Rainier and gradually drew into the lead, despite the latter car's desperate sprinting. Van Tine's Acme was in third place and the Palmer-Singer fourth. The Lozier, which had reappeared, was put out of the race for good at 8:25. Its left rear tire burst on the turn into the backstretch and it went through the fence, breaking its front axle. Heina and his mechanic again escaped unhurt. About the same time the Houpt burnt out its connecting rod bearing and was withdrawn.

Charles Basle in the Winning Renault—Just After Finishing

Laurent Grosso and Leonard Cole, in the Unfortunate Stearns



Scoreboard Could be Read from the Grand Stand—This Photograph Taken by Night, After the Finish

The succession of accidents now was broken, and the remaining six cars continued to the end of the race. The Renault steadily increased its lead over the Rainier, and the latter opened up a wider gap on the rest of the field. Basle settled down to a humdrum pace, and the race assumed the aspect of a procession. A good-sized crowd assembled in the evening and divided its attention between Patschke's sprinting and Pain's fireworks, which were visible over the fence. The finish lacked enthusiasm, and the crowd quickly scattered to other attractions.

In the preliminary events Friday afternoon Woltman in the Hupmobile won the six-hour race, making 226 miles, after Adams and the S. P. O. had been disqualified for dirty work on the turns. Adams was suspended for thirty days. The other S. P. O. was second with 212 miles. De Palma and the Fiat "Cyclone" won the five-mile in 5:14 3-5, with Kilpatrick and the Hotchkiss second, in 5:16 4-5. In getting off on a false start the "Green Dragon" driven by Gilhooly went through the fence on "Death Turn," owing to the edge of the cement surface breaking his wheel. The "Red Devil" driven by Charles Bowers stopped on the backstretch and did not finish.

Walter Christie with his front-drive racer, gave an exhibition mile trial, but the best time he dared make was 57 4-5. His car called forth some applause, and it was evident that it could have gone faster if it had been able to hold the track. De Palma made two attempts in his Fiat "Cyclone," making 57 flat and 55 4-5 on the second trial.

No.	Car	Drivers	H.P.	Cyl.	Drive	Tires
1	Renault	Basle, Raffalovich	42	4	Shaft	Michelin
2	Palmer Singer	Lescault, Howard	57	6	Shaft	Diamond
3	Acme	Patschke, Dearborn	60	6	Chain	Goodrich
4	Acme	Van Tine, Bowers	51.6	6	Chain	Goodrich
5	Lozier	Cobe, Heina	51.6	6	Shaft	Diamond
6	Stearns	Grosso, Mulford	46	4	Chain	Diamond
7	Houpt	Robertson, Poole	48.4	4	Shaft	Michelin
8	Allen Kingston	Hughes, Lawwell	48.4	4	Shaft	Diamond
9	Fiat	DePalma, Parker	42	4	Chain	Michelin
10	Rainier	Disbrow, Lund	40	4	Shaft	Michelin

Despite numerous protests, and the condemnation of the daily press, the Motor Racing Association announces that it will hold a third race in September during the Hudson-Fulton celebration. The association denies that the condition of the track was responsible for the accidents, and says that they might just as well occurred if the track had been a hundred miles in circumference. However, there were some very bad spots later in the race. The Rainier Motor Company has made public a resolution not to participate in any more twenty-four hour races, being convinced that under present conditions such races are dangerous and against public sentiment. Others will doubtless follow its lead.

Hupmobile Winner and the S. P. O. Turning Into the Home Stretch

Parking Spaces Filled with Large and Expensive Private Automobiles

Wright Aeroplane in Flight: Photograph Was Taken from a Balloon

CURIOUS PHOTOS OF WRIGHT AEROPLANE

Photographing one air craft from another is still a novelty, and these pictures taken from a balloon, have the additional merit of depicting more clearly than otherwise would be possible the appearance and proportions of the Wright aeroplane and the method of launching it into the air. The arrangement of the front and rear rudders, the pylon and starting rail are all plainly visible, as well as the position of the operator. In one photograph even the rapidly turning propellers can be distinguished.

Just Leaving the Starting Rail

In the lower photograph the machine has just been placed in position on the starting rail, and the weight, the fall of which provides the initial impulse, is being hoisted to the top of the tower. A rope runs from the weight through the pulley at the top of the tower, thence to the ground, under the starting rail to a pulley at the far end, and then back to the aeroplane, to which it is connected by a catch that is automatically released at the end of the rail. In one of his flights at Fort Myer, however, Orville Wright succeeded in starting from the rail without the use of the falling weight, the thrust of the revolving propellers proving sufficient to take the machine off in good shape. It is predicted that the Wrights will soon discard the weight altogether.

Another photograph shows the machine just leaving the end of the rail. The forward lifting planes have been tilted so as to raise the front edge of the main planes; the greater lifting effort resulting from their increased angle then raises the machine gently in the air. If the wind is favorable it is often not necessary to run the full distance before taking flight.

One of the surprises of the Rheims aviation meet was the skilful work of Lefebvre, who in ten days taught himself to operate his Wright machine. He made his first trials on the broad meadows of Holland. First he balanced the machine on a pivot in a wind blowing 10 feet a second, and endeavored to handle the horizontal rudder and the flexible wing tips in such a way as to maintain it in equilibrium. Then he had laid a rail about 90 yards long, and got several mechanics to push him along it while he maneuvered the rudders. At last he gained sufficient confidence to start the motor, and then, one fine day, he flew away. A few days later he took his machine to Rheims and won. Everyone who has ever ridden in a Wright aeroplane has commented on the ease with which it is controlled.

Flying Low and Racing With Its Shadow

Ready to Be Started by the Falling Weight

RHEIMS TOURNAMENT AFFORDS GLORIOUS SPECTACLE

RHEIMS, Aug. 29—Marvel has succeeded marvel in the aviation meet on Bétheny Plain. Aeroplanes by the score have flown there; skimming the ground with planes gleaming white in the sun; soaring majestically against a background of crimsoned clouds, or darting, a narrow line of black, across the face of the harvest moon. Never before in history have such scenes been witnessed. Stevenson's locomotive, Fulton's steamboat meant but the spreading of man's dominion on earth. Now we have conquered the air.

The simple, matter-of-fact way in which this aviator or that orders out his machine, guides it into the air and takes a spin around the course leaves the spectator with the feeling of having just awakened from a Rip Van Winkle nap. These wonderful craft start in flight as easily as any bird; they soar high, or ripple the tall grass with their wind, as their masters please; they pass each other in every direction, crossing above or below, sometimes tossing in each other's wakes; again two or three race neck and neck at express-train speed. The mechanics, who turn their backs on any ordinary flight, the hangers-on, the race-going populace, speak a jargon of planes, tails, equilibrium, air currents, which one a year ago would have thought the ravings of a lunatic. An aviator brings his machine to earth in front of its shed and asks for his time on the lap; the crowd presses around and comments critically. Even the bookmakers are here, quoting odds on Curtiss or Bleriot. Aeroplanes of the Wright, Voisin, or Bleriot types are sold at list prices, and the buyers squabble over deliveries.

Each day has seen its heroes. Monday, Curtiss made a record for the course. Tuesday, Bleriot broke it. Wednesday, Paulhan broke all records both for distance and time in the air. Thursday, Latham made a new record of ninety-six miles, though in less time than Paulhan's trip. Then both were surpassed by Farman on Friday, when he traveled more than 112 miles, only stopping because of the darkness. Saturday, Curtiss won the International Cup, the greatest prize of the meet, and Bleriot made a new record for a single lap. On the last day Curtiss set a record for three laps; Latham ascended to a height of 500 feet, and Farman carried two passengers around the course at a speed of 35 miles an hour.

Accidents have been remarkably few, and none serious. Several aeroplanes were more or less smashed. Bleriot was the most unlucky; Thursday he ran his big 80-horsepower monoplane into a fence while trying to land in front of the grandstand, breaking its wings and propeller, and Sunday, while in full flight with his smaller machine, the rudder failed to respond, with the result that the machine crashed to the ground, the burst gasoline tank caught fire, and the aviator was painfully burned. Fournier, the hero of many automobile races, suffered a broken nose. Other aviators occasionally bumped fences or hay-stacks, but without serious consequences.

The races were arranged and conducted in such an orderly manner that it has been possible to make a complete summary of them, and even to figure the scores of the aviators and the types of machines, as in a track meet. Latham and the Antoinette monoplane are the largest individual scorers, but in totals the biplanes surpas sthe monoplanes.

THE SUMMARY OF RHEIMS

Prix de la Vitesse: 3 laps, 30km. (18.6 mi.)

Pos.	Aviator	Aeroplane	Time
1	Curtiss	Curtiss	23:29
2	Latham	Antoinette 29	25:18 1-5
3	Tissandier	Wright	28:59 1-5
4	Lefebvre	Wright	29:00
5	De Lambert	Wright	29:02

Prix du Coupe Internationale: 2 laps, 20 km. (12.4 mi.)

Pos.	Aviator	Aeroplane	Time
1	Curtiss	Curtiss	15:50 3-5
2	Bleriot	Bleriot	15:56 1-5
3	Latham	Antoinette	17:32
4	Lefebvre	Wright	20:47 2-5

Prix du Tour de Piste: 1 lap, 10 km. (6.2 mi.)

Pos.	Aviator	Aeroplane	Time
1	Bleriot	Bleriot	7:47 4-5
2	Curtiss	Curtiss	7:48 2-5
3	Latham	Antoinette 29	8:20 3-5
4	Latham	Antoinette 13	8:32 3-5
5	Lefebvre	Wright	8:58 4-5

Prix de la Champagne: Greatest Distance

Pos.	Aviator	Aeroplane	km.	(mi.)
1	Farman	Farman	180	(112)
2	Latham	Antoinette	155	(96)
3	Paulhan	Voisin	131	(81)
4	De Lambert	Wright	116	(72)
5	Latham	Antoinette	111	(69)
6	Tissandier	Wright	111	(69)

Prix de l'Altitude: Greatest Height

Pos.	Aviator	Aeroplane	m.	(ft.)
1	Latham	Antoinette	155	(494)
2	Farman	Farman	110	(361)
3	Paulhan	Voisin	90	(295)
4	Rougier	Voisin	55	(180)

Prix des Passagers: 1 lap, 10 km. (6.2 mi.)

Pos.	Aviator	Aeroplane	Time
1	Farman	Farman, 2 pass	10:39
2	Farman	Farman, 1 pass	9:52 4-5
3	Lefebvre	Wright, 1 pass	11:20 4-5

Prix des Dirigibles: 5 laps, 50 km. (31 mi.)

Pos.	Aviator	Aeroplane	Time
1	Kapferer	"Col. Renard"	1:19:49 1-5
2	De la Vaulx	"Zodiac"	1:25:01

INDIVIDUAL SCORES OF THE RHEIMS MEET

Aviators	Firsts (5 pts.)	Seconds (3 pts.)	Thirds (2 pts.)	Fourths (1 pt.)	Total
Latham	1	2	2	0	15
Curtiss	2	1	0	0	13
Farman	2	1	0	0	13
Bleriot	1	1	0	0	8
Lefebvre	0	1	0	3	6
Paulhan	0	0	2	0	4
Tissandier	0	0	1	0	2
De Lambert	0	0	0	1	1
Rougier	0	0	0	1	1
Aeroplanes					
Antoinette	1	2	2	1	16
Curtiss	2	1	0	0	13
Farman	2	1	0	0	13
Wright	0	1	1	4	9
Bleriot	1	1	0	0	8
Voisin	0	0	2	1	5

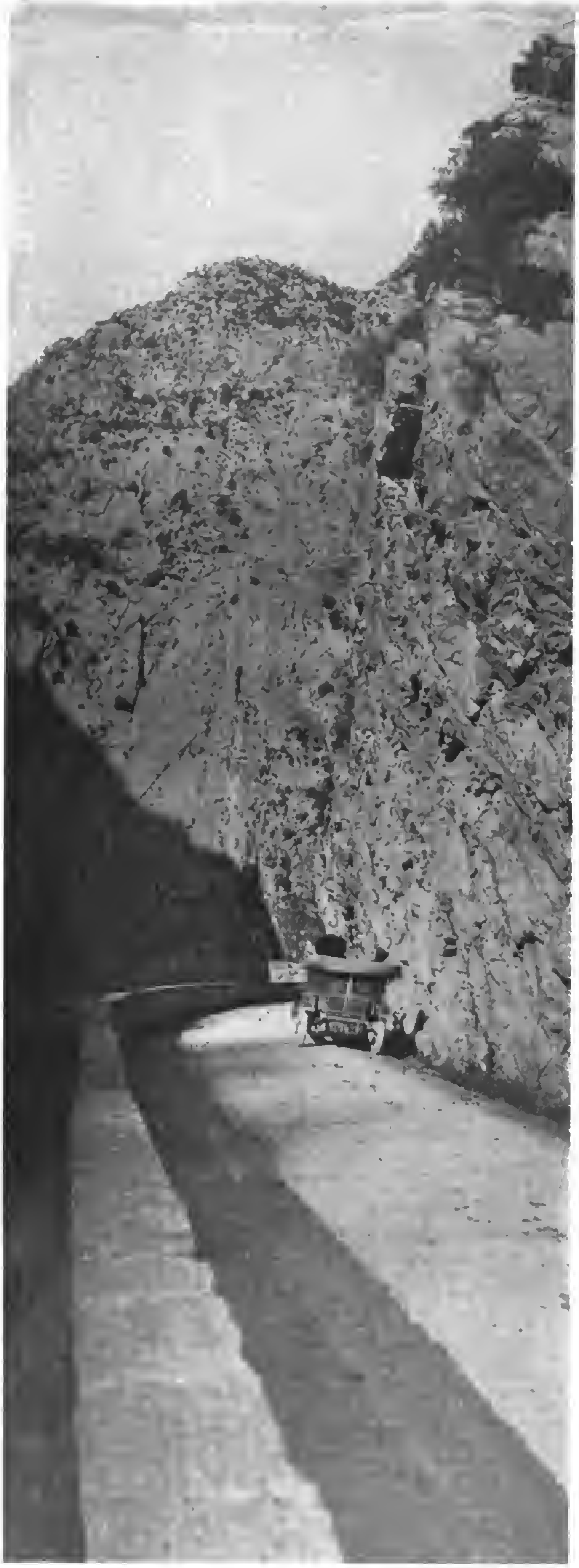
BLERIOT'S MACHINE WILL BE HONORED

PARIS, Aug. 20—When it comes back from England, Bleriot's most successful flying machine will be given an honored position in the Arts and Metiers Museum in Paris, where it will have as companions Wilbur Wright's original flyer, with which he made all his records in France, Ader's flying machine, the first in Europe to rise from the ground, and Cugnot's steamer, the precursor of the automobile. Louis Bleriot preferred to sell his machine to the City of Paris for $2,000 in preference to disposing of it in England for ten times that amount. The price he is obtaining for it from the French authorities is the actual cost of production, this type of machine now being sold for $2,000.

Although having a well-equipped factory, and a business organization behind him capable of handling orders on a large scale—for Bleriot is also the head of an auto lamp factory.

CODY SUCCEEDS WITH BRITISH FLYER

LONDON, Aug. 20—This country may at last claim to possess a successful aviator, for S. F. Cody has vindicated the claims so long made for his army aeroplane. Recently the machine made three two-mile circuits of Laffans Plain. Subsequently, this performance was repeated and a six-mile cross-country journey was successfully essayed. This last trip was accomplished with the machine carrying ballast to represent a passenger, so that afterward passenger flights were frequently tried. Mr. Cody has entered for the Liverpool to Manchester £1,000 prize. The machine is of the tailless biplane type and is one of the heaviest that has yet been constructed, weighing over one ton. The framework is made of bamboo struts with metal joints. The engine is an eight-cylinder E. N. V. of 80-horsepower, operating by chains two propellers situated between the main planes.



"Beyond the Alps Lies Italy": a Road in the Maritime Alps

ITALY AS A TOURING GROUND

Cortlandt Field Bishop has been an inveterate European tourist for a number of years, and being of an observing nature, he has frequently supplied information which has been of much value to other automobilists in their travels abroad. Recently, Mr. Bishop completed a tour of Italy, and in an article printed in the Paris edition of the New York *Herald*, he comments as follows:

"Speaking generally, roads in Italy have improved during the last few years and are becoming better. In many parts, notably around Milan, Naples and Turin, the steam roller is employed. Improvements have also been made in gradients.

"The rule of the road in Italy is rather a troublesome question to automobilists owing to its lack of uniformity. This is a relic of the time when Italy was divided into a number of independent states. Before the advent of the automobile, when traffic was only local, this absence of uniform regulations was not of much consequence. But when automobiles began to tour through the country they quickly discovered its inconvenience. It was frequently impossible to know when one passed from one former political division into another, and, consequently, whether to continue to keep to the right of the road or to change over to the left or vice versa.

"This uncertainty partially disappeared a few years ago with the passing, largely through the efforts of the Touring Club of Italy, of a law requiring all traffic to keep to the right, as in France and America. At the same time a kind of local option in the matter was granted to cities of a certain size. It was stipulated, however, that where the general rule of the road was not in force that fact should be plainly indicated at all the octroi stations. Rome, Milan and Genoa took advantage of the option, and within the limits of these cities vehicles must keep to the left and pass each other on the right.

"Although the rules of the road have thus been simplified in Italy, it is still necessary to use caution, especially in the neighborhood of large cities. The peasants are gradually getting accustomed to automobiles, but the country people, in their high, narrow, two-wheeled carts, have not lost the habit of sleeping on the road, and if they awaken at the sound of a horn are just as liable to pull to the left as to the right. Heavy ox teams also cause a considerable amount of obstruction, while in the vicinity of large cities the presence of cyclists, who are more numerous in Italy than in France, necessitates careful driving.

"Automobilists touring in Italy have at their disposal, thanks to the T. C. I., a better and more complete series of road maps and road information than in any other country in Europe.

"The Touring Club's latest achievement is the publication of the first part of a road map of Italy, designed solely for the use of automobilists. The main roads are marked out in bold red lines, with the distances given between the principal points. This is accompanied by a pamphlet which shows the best routes for passing through and in or out of the principal cities of Italy. The main thoroughfares to be used in passing through are printed in red letters.

"The Simplon was the first modern carriage road to be built across the Alps. It was built by order of Napoleon I after his disagreeable experiences on the Great St. Bernard, although he never crossed it. This road is now a favorite with automobilists.

"There have been some recent changes in the rules regulating the passage over the Simplon Pass by automobiles, and these are not generally known. Until this year it was impossible to enter the pass after 4 o'clock. Now the time is extended to 5 p. m. The time allowed for crossing is four hours and not four hours and a half as is generally supposed. This year the pass was opened to automobiles after May 20, instead of June 15, as formerly was the case. The Simplon is a good piece of engineering: automobiles have been allowed to pass only for the last four years, and the amount of automobile traffic on it can be imagined from the fact that during the four months of last season 550 machines passed over it."

Automobile Wheels, Rims and Tires

By Thos. J. Fay

ROAD SHOCKS must first be taken by road wheels, through tire contact, and thence the vibrations traverse, spreading out in all directions, from the hubs of the wheels. What happens to the car as a whole may be set aside for the time being, rather with the expectation that there is much to be said of a pertinent character before the wheel subject will be adequately explored. Resilience, that rather indifinite term, is continually used in explaining just how wheels, aided by tires, accomplish the work for which they are placed.

According to Rankine, resilience is synonymous with spring, and "is the quality of mechanical work required to produce the proof strain, and is equal to the product of that strain, by the mean stress in its own direction which takes place during the production of that strain—such stress being either exactly or nearly equal to one-half of the stress corresponding to the proof strain." * * * Rankin goes on to say: "Each solid has as many different kinds of stiffness, toughness, strength, and resilience as there are different ways of straining it; pliability is used as a general term to denote the inverse of stiffness."

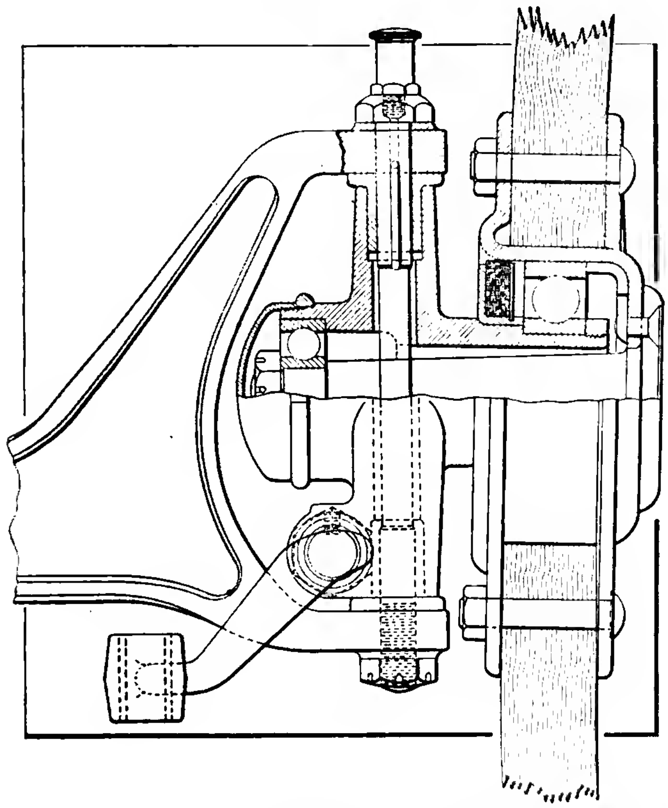


Fig. 1—Example of inverted swivel hub offering advantages in the direction to dispel steering moments

Resilience, then, may be properly used under all sorts of conditions, especially in connection with wheels, rims, and tires, but in the absence of "specifications" the term possesses little or no actual significance. In the same way there are many big words used to describe, in glowing terms, the fine qualities of the wheel-maker's art, nearly all of which fail to afford to this ancient craft a simple measure of "horse sense" which, after all, is the basis of wheel-making, built up, as it is, on a foundation of experience dating from wheels for carts which rolled over the first road built by one of the Pharaohs, during the fourth dynasty, which road was about a mile in length, taking on the features of a causeway, leading up to the sight of the Great Pyramid, the date of which is generally considered to be as early as 4,000 B. C., according to accepted authority.

Automobile Makers Eliminated the Fifth Wheel—When the first automobile was designed and constructed the fifth wheel was retained, on which the turning depended, but it was soon found that, at the higher speeds attained by automobiles, this primitive method of steering was attended by dangers. In time it was concluded that when the plane of the steering road wheel is in the plane of the steering pivot, the effect of road inequalities will not be transmitted to the steering gear, or, if a line passing through the center of the road wheel at right angles to the axis of rotation, bisects another line, which, in turn, passes through the turning pivot, provided the point of bisecting is at the point of tire contact with the road, the effect of road inequalities will not be transmitted to the steering gear.

Fig. 1 is offered to show that the ills of road inequalities may be thwarted to a vast extent, in that the road wheel may be very close to the pivot in the knuckle, and the angle of the road wheel, which is usually 1 1-2 degrees out of the vertical, will then be enough to assure that the point of bisecting will be at the point of ground contact of the tire. Fig. 2 is more conventional, representing, in a general way, many of the examples to be seen in actual practice, and in order to indicate more nearly the competence of this plan it is only necessary to glance at Fig. 9, in which the line A O′ passes through the center of the road wheel and the line A′O′ passes through the axis of the knuckle pin, but the lines, so drawn, do not bisect at the point of contact of the tire on the road wheel with the ground. The actual difference is about equal to the radius of the section of the tire, and to this extent the effect of road inequalities will be transmitted to the steering gear, which is made semi-irreversible to compensate for this difference. Absolute irreversibility is not desired since shock would then be augmented.

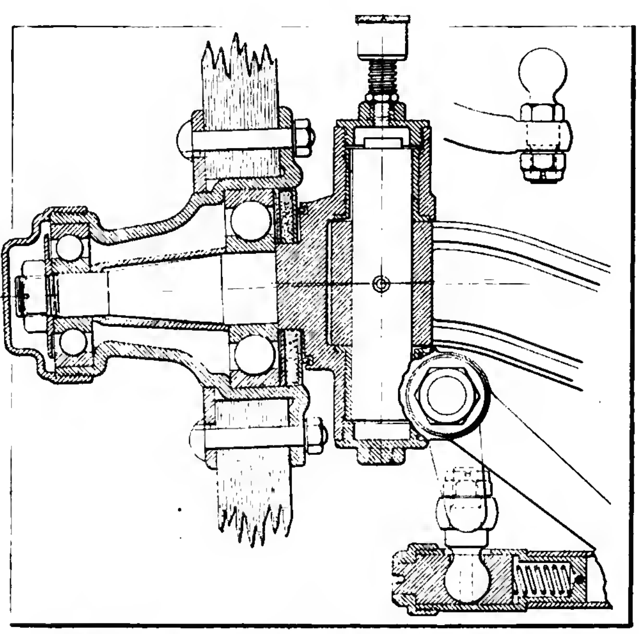


Fig. 2—Example of a conventional steering wheel knuckle, with the road wheel center close to the pivot bolt.

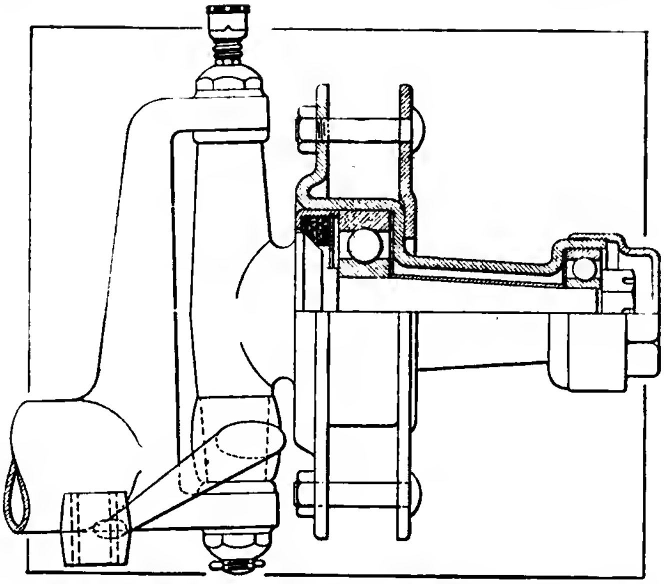


Fig. 3—Depicting annular type ball bearings in a hub made of drawn steel, with a drop forged knuckle

It would be possible to reduce the distance O O', Fig. 9, by quite an appreciable amount, but it would be at the expense of additional "dish" of the road wheels; even 2 degrees looks over much in actual practice, and besides, the object in placing the wheels out of the vertical plane is to ride the weight of the car on "plumb" spokes, which to do, must take into account the crown of the road, which is never more than 1 degree, and rarely so much. Crown of the roadbed is determined as follows:

Let,

O = equal ordinates in inches.
C = crown in inches.
R = one-half width of the roadway.
D = distance from center to any point in feet.

when

$$O = C\left(\frac{D}{R}\right)^2$$

Frequently the crown of the road, at the center, is on a basis of 9 inches per 100 feet, which represents 3-4 of 1 per cent, and this is about all the difference that should be noticed in any endeavor to render the spokes in the wheels plumb. There is one more point to be considered, i.e., lost motion in the knuckle joints will augment the trouble due to crown of the roadbed, and this, together with the effect of crown, makes it necessary to fix the angle of the wheels, with respect to true vertical plane, 1 1-2 degrees out of the vertical plane, which should be maximum.

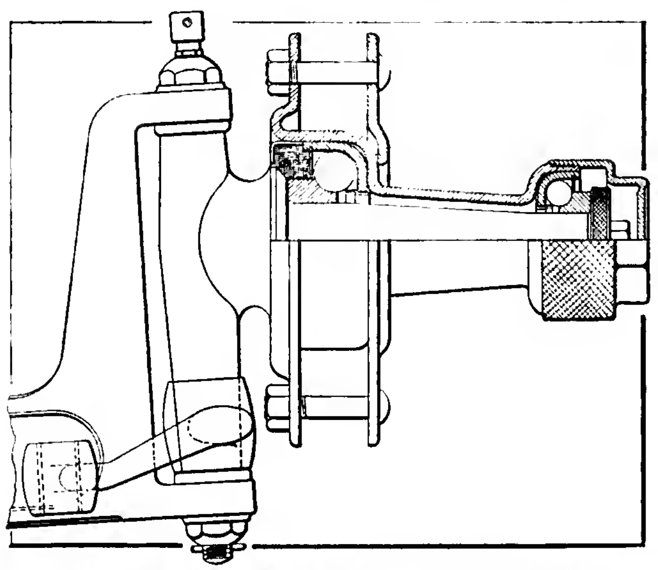


Fig. 4—Same as Fig. 3, excepting that the ball bearings are of the cup and cone type and adjustable at will.

While Fig. 1 depicts a nearly perfect canting knuckle for front wheels, Fig. 2 accords with practice to a considerable extent, referring to the location of the knuckle turning bolt, and a close inspection of the two figures, in contrast, will be enough to show that there is but little difference between them as respects the centers of moments. The design, Fig. 1, is interesting in that it shows how to hide the hub of the wheel so that it will not protrude far outside of the protecting boundary of the pneumatic tire, which may be a good point.

Hubs Differ in Important Particulars—Formerly, owing to the extended use of plain bearing artillery types of wheels, the hubs were relatively long, and the general appearance was in some contrast with present practice. Then, hubs were frequently made of cast gray iron, although it was soon found that, for live rear axle types cast iron frequently failed, due to the conditions involved in keying the shaft to the hub. It was found that the relatively small diameter shaft induced a condition of high pressure, and the key burrowed into the cast-iron hubs of the driving wheels. Many failures resulted in this way.

As anti-friction bearings came into vogue, they indicated the need for better hub construction, due in a large measure to the requirements of accuracy, and lightness finally became the goal for all ambitious designers, who, in their desire to eliminate unnecessary flywheel effect, made wheels of increasing strength

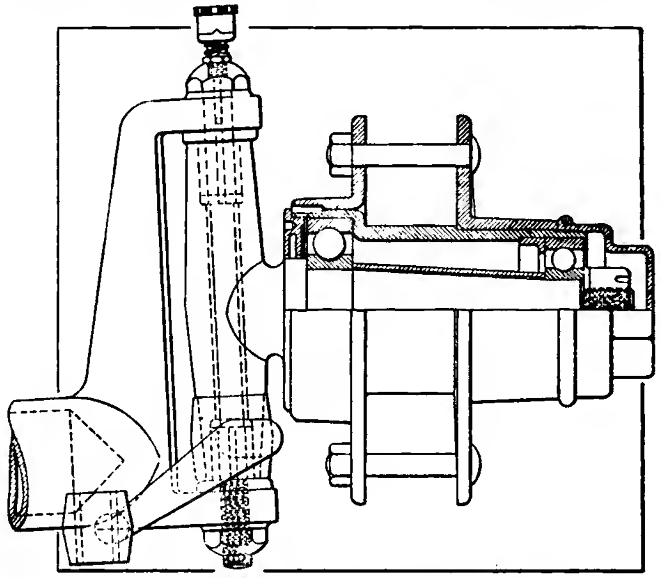


Fig 5—Front wheel hub with annular ball bearings in which the center of the wheel is too far from the center of the knuckle pin

and gained a double victory, since lightness was a natural sequence. Fig. 2 indicates just how lightness followed strength, due to the scheme of design, which took into account an even thickness of hub-walls. The same figure shows how annular types of ball bearings may be properly mounted, with provision for clamping the inner races, which is a necessity, although, in this example, the plan is penalized since there is no allowance for axle-wise floating of the outer raceway. Referring to Fig. 10 it will be observed that the outer raceway is provided with adequate axle-wise clearance, as indicated by a a, which allowance should not be less than 0.5 millimeter (about 0.020 inch).

A Safety Washer Should Be Used in Every Case—Considering annular types of ball bearings, it is desirable to use a safety retainer (washer) in front of the outer ball bearing, back of the hub nut, as shown in Figs. 2 and 11. This washer will prevent the bearing from dissembling even if a ball does crumble, however remote this contingency really is. Fig. 5 shows defective designing in that the safety washer is not present; outer races are cramped, and the spacer between the inner racs is so thin that it is likely to fail in service. The spacer shown in Fig. 2 is somewhat more substantial, but a better plan is depicted in Fig. 12, which represents a design promulgated by the Hess-Bright Manufacturing Company, involving the use of a specially shaped spacer, which also serves as a safety bearing, which would come into play were the ball bearings to fail since the spacer is so fashioned that it offers bearing surface for the hub between the inner and outer ball bearings to come down upon.

In connection with the hub, as shown in Fig. 12, the same makers compiled a table affording such information as would seem to be required in the selection of Hess-Bright ball bearings, giving dimensions, and bearings to use when the conditions are normal. This table is here given:

HESS-BRIGHT WHEEL HUBS AND BEARINGS TO USE

Carrying Capacity of Hub in Pounds			Axle Diams. Inches		Bearing Number		Centers Inches	
Pneu. Tires	Solid Tires	Steel Tires	A	B	A	B	C	D
400	300	240	.4724	.9842	301	305	1	1 3-4
620	465	370	.6693	1.1811	303	306	1 1-8	2 1-4
730	550	430	.7874	1.3779	304	307	1 5-16	2 5-8
1000	750	600	.9842	1.5748	305	308	1 7-16	2 7-8
1600	1200	965	.7874	1.7716	404	309	1 3-4	3 1-2
1950	1460	1165	.9842	1.9685	405	310	1 15-16	3 7-8
2330	1750	1400	1.1811	2.1653	406	311	2 5-16	4 5-8
	2000	1600	1.3779	2.3622	407	312	2 1-2	5
	2330	1870	1.5748	2.5590	408	313	2 5-8	5 1-4
	2750	2200	1.7716	2.7559	409	314	2 7-8	5 3-4
	3350	2670	1.9685	2.9527	410	315	3	6

Bearing Selection: When center distance $C = \frac{D}{2}$:

Mr. Hess points out that the inner bearing must take the larger proportion of the load under the usual conditions, and in selecting bearings his recommendation is to first determine the proper size for the set of bearings and then take the next larger regular

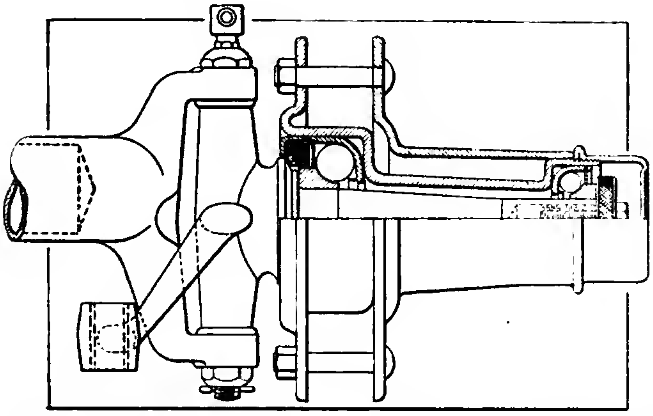


Fig. 6—Front wheel hub with cup and cone ball bearings, felt closure, and cap screw replacing a hub nut

size for the inner bearing. Some recommendations are also made, which would seem to be well drawn, as follows:

CONSTRUCTION NOTES

Both inner and outer races of both bearings to be a neat slip fit.
Both inner races to be clamped endwise under pressure.
The inner bearing to take endthrust.
The inner bearing outer race to have 1-64" side clearance.
Front and rear hub caps should be securely locked.
Water and road grit must be kept out.

Design Depends Upon Tires Used—Glancing at the table it is to note that the burden which it will be safe to employ in view of a given set of bearings will depend upon the tires; while this is a matter which involves the bearings, even so, if larger bearings are required when tires are solid than would be used with pneumatics, then the hubs must be larger, in order to take the larger bearings. According to the table made up for Hess-Bright bearings, the hub carrying capacity will be as follows:

RELATION OF CARRYING CAPACITY TO TIRES USED

Carrying Ratio of Tires Pneumatic	Solid	Steel
100	75	60

The above relations do not assume that the speed of the car will be on a constant basis; obviously, pneumatic tires will allow of the highest speed, solid (rubber) will come next, and steel tires will be at the foot of the speed list.

This question of speed, in view of the tires used, and load carried, was discussed at the 1909 summer meeting of the Society of Automobile Engineers, and in his paper ("Energy Con-

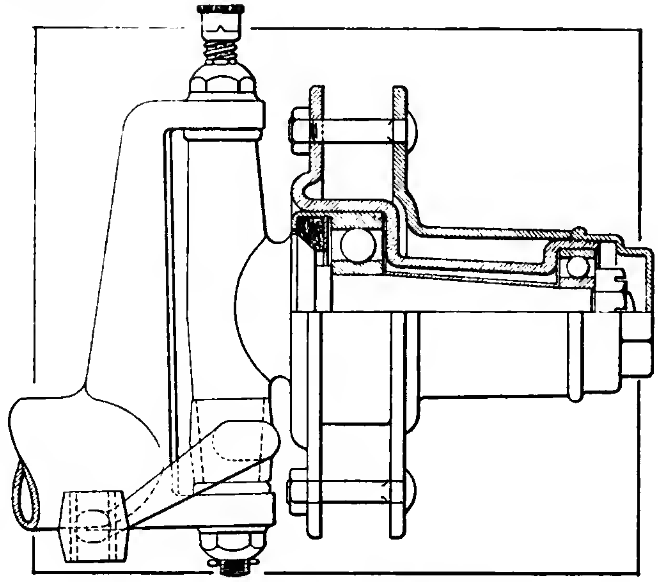


Fig. 7—Drawn steel hub, annular ball bearings, and hollow knuckle swivel pin with grease cup lubrication

sumption of Commercial Vehicles") Alexander Churchward gave for the most economical speeds, among other data, the following:

ECONOMICAL SPEEDS CONSIDERING TIRES AND LOADING

Gross Weight	Type of Tires	Speed in M. P. H.
1,500	Pneumatic	20
2,000	"	20
3,000	"	18
4,000	"	16
2,000	Solid	16
3,000	"	15
4,000	"	13
5,000	"	11

The above speeds cannot be construed as limiting, but it was the idea of the author that they represent (all things considered) the maximum from the point of view of economy.

Hubs, while they can scarcely lay claim to an overplus of quality if they are made of cast gray iron, are frequently made of drawn steel, and in this process, light weight, great strength, and relatively low cost, share equally. For examples of drawn steel work reference may be had to Figs. 3, 4, 6 and 7, while Fig. 8 shows a steel casting for the hub proper, with a pressed steel-tubed flange piece. This same figure gives, in cross-section, a brake-drum, and while the subject of brakes is somewhat separated, even so, the rear wheels must be fashioned to take the drums, and to this extent it is desirable to give the matter attention here, from the point of view of fastenings.

The drum, as shown in Fig. 8, is of drawn steel, with uniform thicknesses of walls and machined with considerable accuracy, so that it flanges onto the hub, fitting in the recess provided and in

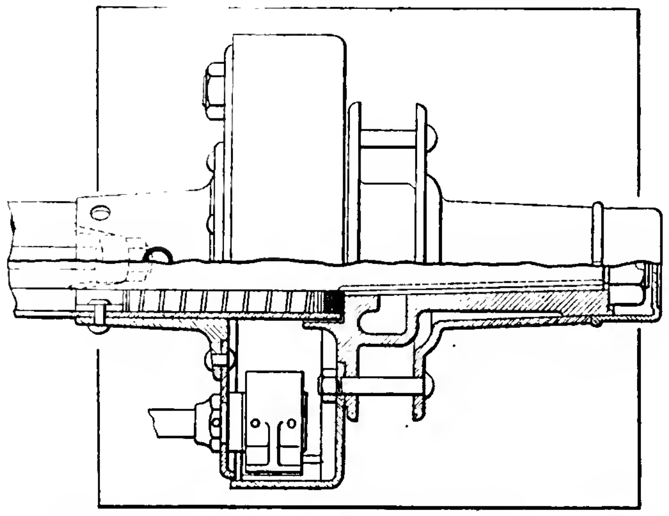


Fig. 8—Hub for live rear axle showing Hyatt roller bearings and felt closure, also close nesting and light weight.

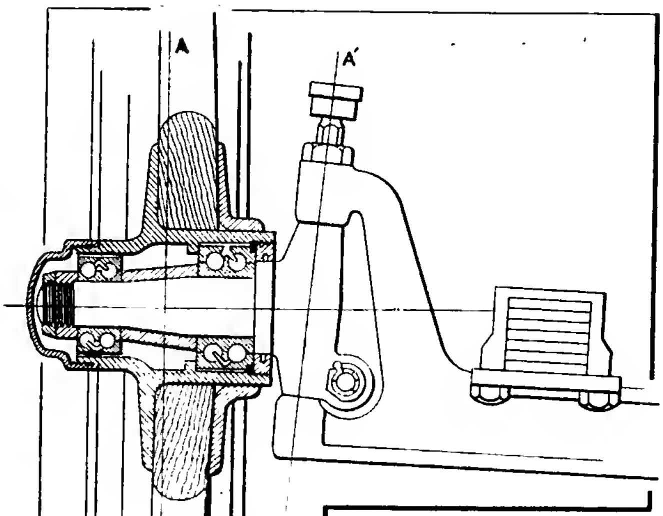
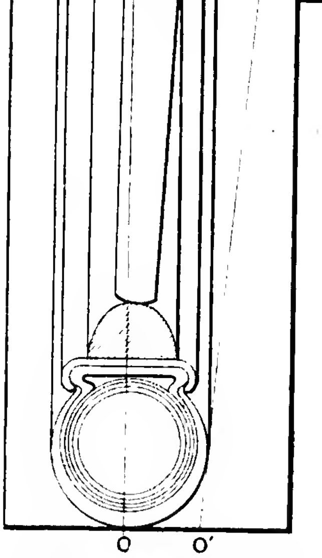



Fig. 9—Diagrammatic front wheel assembly, with New Departure ball bearings, showing the difference O O'

every way representative of the kind of practice which makes for success. Steel castings may also be used, and it is generally possible to machine them to any desired size; they may be cast in quite intricate shapes, if the process is attended by the requisite amount of skill. That the drawn-steel products are a little better is generally believed, and that they are a little cheaper is a matter of experience, although, in the drawn-steel work, quantity production is essential to success.

Quality and quantity go hand in hand, as the above point adequately indicates, excepting that labor, involving as it does, accuracy of machining, must be taken up on a separate basis, although it cannot be shown that production in quantity must, of necessity, lead to inferior work. Workmanship, as a matter of fact, may be good, or bad, independently of quantity production.

Compactness Largely Influences Designing—In the class of cars using live rear axles, owing to the ill effect of excess weight, if the parts, as bearings, are relatively great in diameter, housings will have to increase accordingly; designers aim to select bearings which will do the work required without having to provide a large tube or housing. Fig. 8 depicts a case in point, in which Hyatt roller bearings are used, and, as the design shows, economy of space is a conspicuous feature. This particular example is devoid of the floating shaft principle, and the shaft is made somewhat larger since the bending moment, due to the weight on the wheel, must come on the shaft. The shaft may be a taper, or a parallel fit in the hub, and in the case in point the hub is made of extra length, which assures that the key will be of adequate ability. The hub-nut prevents the wheel from floating off, and with a sufficiently large shaft, if the axle is properly rated as to the load it will safely carry, there is no reason why it should not serve its purpose. Hyatt roller bearings are also used in semi and full-floating types of live rear axles as well, so that the style of design is a separate matter, excepting that weight, which is not desirable beyond the exact requirement, is held to a low limit when the bearings are of considerable length, rather than of great diameter.

Advantages of Floating Types of Hubs—If the shafts in live rear axles are free to respond to torsional moments only, it is self-evident tbat they may be smaller for the work, and

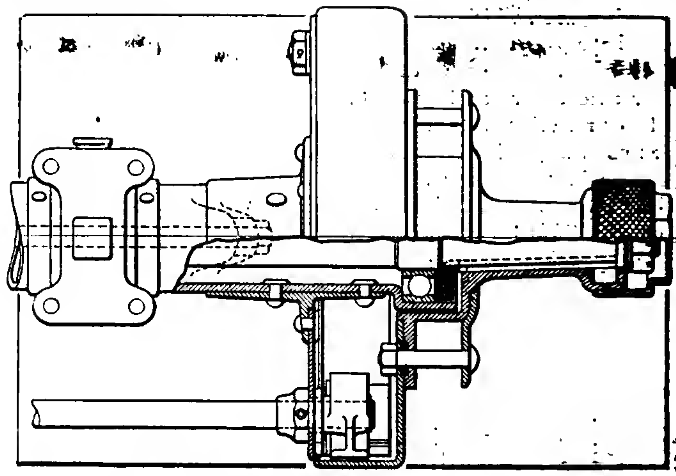


Fig. 10—Hub end of a live rear axle, showing drawn steel brake drum attached to hub flange

strength will reside in them to a marked degree. On the other hand, if the driving jaws, in the hub of the wheel, are not liberally fashioned and nicely fitted lost motion will be present, and a little of this lost motion is as a "nest egg." As an illustration of this point, it is only necessary to call attention to the varied character of the service rendered by keys in practice when they are properly proportioned and tightly fitted they do the work very well, indeed, but if they are not tightly fitted, even though they may be large enough, they will soon generate lost motion and fail in service. What is true of a key or a feather holds for a set of driving jaws, and no matter how they are made, if they are not properly fitted the end will be disastrous. Fig. 14 shows a fine example of a full-floating type of live rear axle in which the bearings are of the annular type, and the driving jaws at the ends of the shafts engage with the hub in a proper manner to abort failure from lost motion.

In this case the tube is reduced in diameter to take the bearings, and the shoulder so formed is taken advantage of in the process of providing for thrust. The shaft has no work to do excepting to take torsional moments, and the design throughout includes drop forgings of steel and drawn-steel parts. The inner races of the ball bearings is a sufficiently heavy tube, but it is not shaped in such a way as to act as a "preventer bearing," hence complete dependence is placed on the ball bearings and they are made large enough to take the responsibility. This class of hub work is much in evidence in various makes of cars, and this particular example is from the 1910 McCue car.

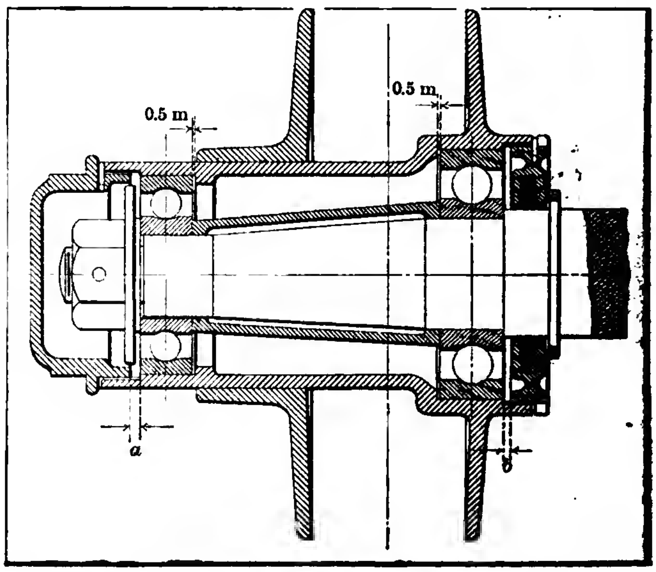


Fig. 11—Section of a hub with annular type ball bearings with inner race clamped and outer race floating

Hub-Caps Should Be Locked On—The main idea in using hub-caps is to protect the bearings, which is a matter of the introduction of a suitable lubricant and retaining the same in place to the entire exclusion of the silt of the road. It is too much to expect that a hub-cap, merely because it is screwed on, unless it presses up against a shoulder and is a good fit, will stay on under all conditions. If a locking device of some suitable design is used, there will be small chance of recording the loss of a hub-cap, and while there is no direct hazard attached to the loss, even so, foreign substances are bound to depreciate bearings if they get to them. Fig. 3 shows one of the possible plans, and it has the virtue of being simple and effective. In this case the snap spring rests in a groove provided in the hub, and the inturning end of the lock engages with a hole passing through the hub-cap.

Closures Indicate Ingenious Application—One of the duties of hubs is to protect the bearings from rust and foreign substances; acid, which is also ruinous to ball bearings, will most likely come from the oil, and the way to avoid this class of trouble is to use unctuous, non-acid producing lubricant. That the lubricant will stay in is a necessity which will be readily accomplished if it is non-mobile, of adequate body, and if the closures are efficient for the purpose. The front end of a hub is easy enough to protect if a cap is used, and if it is locked on, or at least designed to stay in place until it is removed as a matter of necessity. At the rear of the hubs the situation is not so easy, and piano felt is employed extensively in this work, examples of which will be found in Figs. 1, 2, 3, 4, 6, 7, 8, 10 and 11. If the felt is of a good quality, steeped in boiling paraffine, success will attend its use, provided it is in sufficient presence and well supported. The felt washers to be of the greatest value should be 1-2 inch or more in face and approximately rectangular in section.

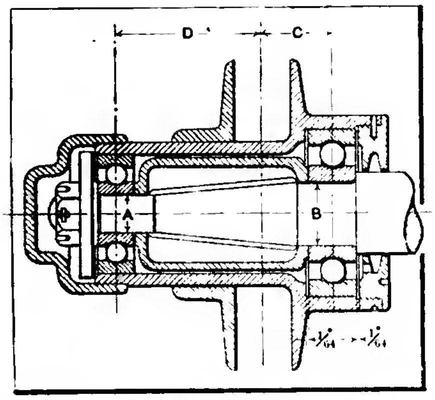


Fig. 12—Hess-Bright type of hub with annular type ball bearings and safety spacer which serves as a preventer bearing

When the closures are formed by V-shaped grooves in collars, as in Figs. 5, 9 and 12, the result will be very good, particularly if the grooves are liberally provided and means are included to drain the lubricant back to the inside. Fig. 13 shows a defective method which cannot possibly protect the bearing, whereas it might be the means of trapping water which could easily find its way into the cavity due to pressure from a hose when the car is being washed. Water indicates destruction.

Perfection Lies Buried in Details—Important as the general plan would seem to be, and however much attention may be accorded primary schemes, the end will not be in the plane of harmony unless all the details are looked to with the utmost care. Danger lies in considering that a hub of a wheel, for illustration, is but a crude device at best, and not entitled to the same discriminating care as would have to be accorded to a crankshaft, timer, or other important part.

When the mist of obscurity is lifted, it will be found that success lies absolutely in looking after details. As an example of the strenuous service wheels must render, let the pull, at the radius of the clamping bolts, be investigated, which for a case will be as follows:

When,

W = weight on one wheel in pounds.

f = coefficient of friction for rubber tires = .60 approximately.

R = radius of wheel in feet.

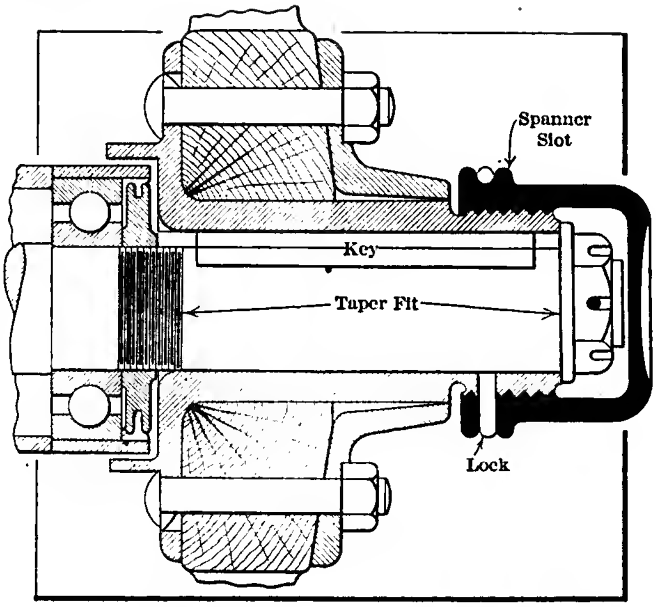


Fig. 13—Section of a hub in which the closure is defective and bending moments apply to the shaft

r = radius of clamping bolt circle in feet.

P = pull in pounds at radius of clamping bolts.

Then,

$$P = \frac{W f R}{r} = \frac{600 \times .60 \times 1.5}{.33} = 1{,}636.36 \text{ pounds.}$$

In which, the weight on the wheel is 600 pounds, and the radius of the clamping (flange) bolts is 0.33 feet or four inches. This will be the effort which will have to be exerted to skid the wheel, presupposing a motor capable of delivering the necessary torque, which is a normal expectation.

If this substantial figure, representing the pull which will come on the hub-flange bolts, under normal road conditions, must be considered, what is to be said about an abnormal case, as when a car is negotiating deep sand, considering a motor of great power, or better yet, if a large flywheel is added, thus rendering the motor capable of delivering a vast twisting moment momentarily?

The real hazard is, as yet, under cover; if the pull on the bolts, as above referred to, is a matter of concern, it is nominal in comparison with the work which will fall on the key, or the driving jaw in the hub, owing to the difference in position, the latter being closer, by a considerable margin, to the axis of moments. If 1,636 pounds will be exerted at a radius of four inches, the pull at one inch radius will be 6,544 pounds, and considering keying, the pull will be even greater since the radius of the center of the key from the axis is less than one inch in most cases. The pressure will still be present.

(To be continued)

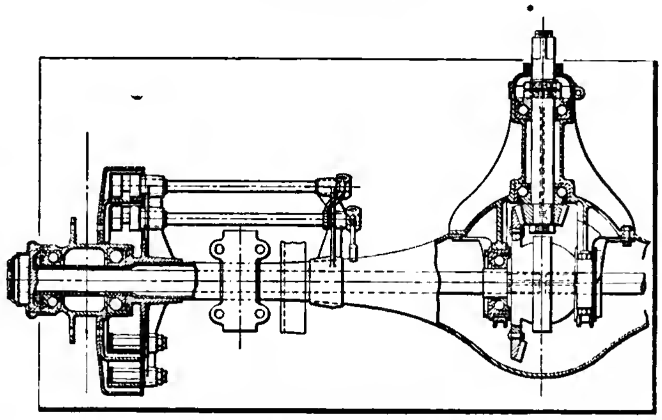
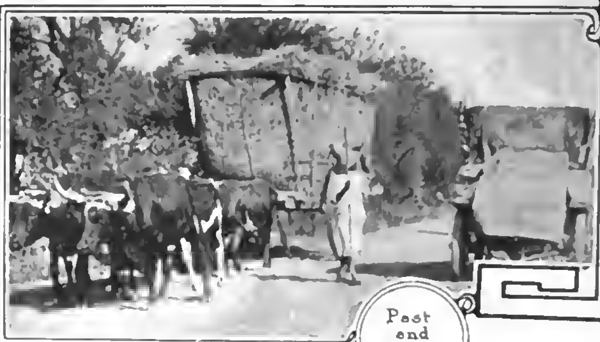


Fig. 14—McCord full floating live rear axle with annular type ball bearings and parts of drop forged steel

What One Finds In Old Mexico

CAR CHALMERS
PHOTOGRAPHER SPOONER

Among the Cactuses.



Past and Present

Little Mothers

Chimes of Mexico

Spooner on the Water Wagon

Sombreros are Essential

The National Game

The Man with the Plow.

Chihuahua Cathedral

Helpful in Overhauling the Car

By Stillman Taylor

ALTHOUGH a car requires and should be regularly given a certain amount of daily, weekly and monthly attention, this overhauling of certain parts is not enough to keep a car in the pink of condition. A thorough overhauling of the entire car is occasionally required, that the needed repairs may be made. It is only by this thorough overhauling that the owner can get a good idea of the car's condition, ascertain what parts show wear, and correct wrong adjustments which may have been previously made.

The principal reason for "knocking down" the engine is to find the exact condition of the pistons and bearings, as well as to clean out thoroughly any carbonized oil that may be found adhering to the cylinder walls. Make it a point to clean each and every part as it is taken apart. This should apply to nuts, bolts and other small parts as well as to the larger parts of the car. Do everything in a methodical manner, taking ample time. Many amateurs are prone to litter up the workroom with the various parts of the car, laying everything down in the most handy place. Avoid this confusion of the parts, by providing a sufficient number of boxes to accommodate the several units of the car, and keep everything pertaining to a certain part in its respective box. As soon as one part is unjointed or uncoupled, insert its pins or screws in their proper place before laying aside. This will prevent any small parts from being misplaced and save annoyance when putting the car together again.

To begin, the carbureter, pump, wiring, spark plugs and any other movable part fastened to the engine should be removed. When removing the magneto, the gear wheels of the engine and the driving pinion of the armature shaft should be marked with a punch at the point where they mesh, if not marked already. By taking this precaution the magneto may be assembled on the car in its proper place without disturbing the original ignition timing of the car. Each valve should be marked as it is taken out, that each may be replaced in its proper seat. It will be convenient to number them 1, 2, 3, etc., by punch mark.

The cylinder castings may now be lifted off the pistons and removed to the work bench. Some workmen prefer to lift cylinders and pistons off together; this is a good plan if a helper is at hand, but more difficult for one man than lifting the cylinder alone. But in assembling without assistance, and especially when the cylinders are cast in pairs or *en bloc*, the weight of the cylinder casting is considerable, and it is much less laborious first to assemble the cylinders with the pistons in their respective places, and so avoid holding up the heavy casting while fitting the cylinders. Then uncouple the connecting-rods from the crankshaft and remove rods and pistons together. Before taking down any other part of the car, it is a good plan to first clean out the cylinders with kerosene to remove any oil and so soften deposits of carbon adhering to their walls. If the deposit is light, this soaking may be all that is necessary, but where a considerable amount of carbon has gathered in the combustion chamber, the walls must be scraped, either with a suitable carbon scraper sold for this purpose, or with a file bent and sharpened to a cutting edge.

All the piston rings should be clean and bright; if any black streaks are found, it is a certain indication of leakage. All worn piston rings should be replaced. Examine the piston pin with a view to possible looseness and wear. It is important that this pin should be a tight fit, otherwise it may work out and injure the cylinder walls. A loose piston-pin may be due to the set-screw becoming loose, or it may be caused by wear. In the latter event, the pin should be replaced with a new one of the proper diameter and length. Thoroughly clean the piston, rings and pins with gasoline.

How the Valves Should Be Ground—The valves should be next attended to, as the chances are they need grinding. This is not a difficult task, and if the directions are followed the amateur should be able to turn out quite as good a job as the garage. Procure emery of the grade known as 120, put a small quantity in a saucer, and add kerosene (gasoline should not be used, as it evaporates too rapidly) to make a thin liquid paste. Then add a few drops of heavy lubricating oil to give the mixture a little more body. Put a small amount of the grinding mixture on the face of the valve and its seat, insert a screwdriver in the valve slot and rotate in its seat. This is easiest done by rolling the handle of the screwdriver between the palms of the hands, first one way, then the other. Do not use a greater force than is necessary to turn the valve in its seat. Lift the valve up occasionally, turn it partly around in its seat and rotate as before until the valve and its seat show a bright ring the entire way around. Renew the grinding mixture occasionally, but remember that a small quantity of emery and plenty of kerosene and oil will not only make a smoother job, but will also do it much more quickly than a large amount. Finally, the valves and their seats should be washed with gasoline to remove every particle of the grinding mixture.

The camshafts in most cars are removed by taking off the cover of the case which encloses the timing gears and pulling the camshafts through this opening. All modern cars have the crankshaft gear marked, and another mark between the two teeth of the timing gear on the camshaft. When assembling, the single marked tooth should be inserted between the two teeth as designated. Breakage or undue wear of the cams is a matter which only the factory experts can handle.

Cleaning the radiator of grease or any scale that may have accumulated is best done after the car is reassembled and in running order. The writer's method is to dissolve one-half pound of lye in a bucket of water, stirring until dissolved. This should be strained and the radiator filled with the mixture. Run the engine for five minutes and allow to stand for a quarter of an hour, then drain off the mixture and fill up with clean water; run the engine for a couple of minutes and drain off again. Three or four rinsings should be given to remove all the alkali.

The gear-box cover should now be removed and the gears examined. As most transmission systems are fitted with annular ball bearings, only a good cleaning to remove old grease will be required. In case any gears are badly worn and their edges chipped, they should be replaced with new ones.

The clutch may next be taken down. The exact mode of procedure differs in different car clutches. In most cars using clutches of the multiple-disc type it may be removed as a unit; in other forms, the shaft connecting the shifting sleeve may be uncoupled, which gives sufficient room between clutch and gear box to take the cluch apart. If the latter is of the cone type, it may be found that the leather face is badly worn and that a new leather is necessary. This is not a very difficult job, but requires painstaking work.

Replacing the Leather of a Cone Clutch—Remove the old leather by cutting off the rivets on the underside and driving the rivets through to the outside. Keep the old leather and use it as a pattern by which to cut the new piece. It will be much better, however, to purchase from the factory a new leather of the proper width and thickness. As a new leather will have considerable "give," it must be stretched tightly over the cone. First cut one end of the leather square and fasten it to the cone with two rivets. The other end should not be cut at this stage of the work, but brought around to meet the fastened end, and, after tightly stretching it over the small end of the cone, fasten it with a single rivet. Then force the leather up onto the cone, drill out and countersink the holes and rivet up securely. The only knack in the operation is to keep the leather tight that it may be a snug fit on the cone. A loose leather will, naturally, be a dead failure. After the leather has been forced into its place the uncut end should be trimmed to make a good joint. Any unevenness may be trued up with a file. The new leather will readily absorb several applications of castor oil before it becomes smooth and pliable.

Care should be taken that the rivet heads are countersunk below the surface of the leather. In case they work flush, owing to the wearing down of the leather face, they should be reriveted. The "biting" or jerky action of a cone clutch may often be traced to the rivets working out, and this will frequently prevent the clutch from being readily disengaged. Reriveting will prove an effective remedy in this case, and considerable additional service may be had from the leather before it wears down to the rivet heads.

The differential gear should be tested with a view to locating any wear or side play. This may be done by jacking up the rear axle and shaking one wheel forward and backward while the other is held stationary, and noting how far the wheel must be turned before the movement is taken up by the flywheel of the engine. Any noticeable play will generally be found either in the center pinions or studs of the differential gear, in the large and small bevel gears, in the clutch sleeve, or in the universal joints. The differential gear and live axle of modern cars seldom give trouble if kept properly lubricated, and the car's mileage should run up into many thousands before any considerable amount of play is evident. The joint pins of the propeller shaft may become loose through wear, in which case a knocking noise in the transmission gear will indicate the cause and location of the trouble. These pins may be readily replaced with new ones at small cost. If the play is found in the bevel gears, the small gear should be adjusted to mesh deeper with its larger mate. This may be done by means of the adjustable locking ring or by inserting a washer of the proper thickness. It may be found, however, that no adjustment is necessary, and a thorough cleaning with gasoline to remove all oil and grease will be all that is required. The case should then be refilled with the quantity of oil and grease recommended by the manufacturers.

Oil pipes or "leads" which conduct the oil to the bearings should be removed and all old oil washed out by forcing gasoline through them. Care should be taken that the passages of all oil leads are clear and unobstructed. The oil pump should be taken apart and given a thorough cleaning with gasoline. The sight feed lubricator on the dash should also be cleaned out and the glasses wiped and washed out with gasoline.

Look at the Steering Gear and Brakes—The steering gear is a very important part of the car, and, as the safety of the occupants may be endangered by any binding, the reader should give it even more careful attention than the other parts. The gear should be taken down, given a thorough cleaning and examined for possible wear. In case the steering action is stiff and the wheel turns hard, the ball joint may be out of adjustment due to wear; the steering link may be bent, or the cause may be insufficient lubrication. If there is any considerable amount of backlash, the cause may be looked for in the joints of the levers, in the swivel pin, in loose bearings, or in wear of the worm and sector. Another common cause of backlash is often found in the wheels, which work out of alignment. It is essential that all moving parts of the steering gear be well lubricated.

The distance rod is easily bent, which throws the front wheels out of line. This is a common cause of "side slip" and rapidly wears out the tread of the tire. The bent rod should be uncoupled and carefully straightened. On many cars, however, the rod is designed to be bent, in order to clear other parts.

Each wheel should be removed and examined at the hub to see if the spokes have become loosened through shrinkage. Although this is not a common fault, it is, nevertheless, worth looking for. If slightly loose, tighten up the bolts which secure the two side flanges together, clean out bearings with gasoline and renew any ball or roller which is found damaged. If rust has accumulated, scrape or sandpaper it off (a painter's wire brush is a handy tool), and when perfectly clean coat the rim with beeswax. This may be applied with a clean paint brush if the wax is heated to a liquid state. This will effectually prevent further rusting of the metal, and will do much to preserve the life of the tires.

Examine the brakes to ascertain if the lining is in good condition. If worn, the old lining should be replaced with new. If the brakes are of the internal-expanding type, the shoes may have become worn, in which case they should be renewed. Toggle joints and adjusting nuts should be inspected and any looseness taken up. Brakes should be adjusted on the road, as any improper adjustment of the equalizer bar will have a strong tendency to make the car skid. Both brakes should be adjusted alike, that the braking force applied by the equalizer may be transmitted to the wheels equally.

The tires should be cleaned of the old chalk on the inside of the shoe. If they are badly worn on the treads, but otherwise in good shape, send them to the factory to be retreaded. A tire should never be kept on the car after the rubber tread wears down so as to expose the fabric. Any small cuts and holes should be washed out and filled with rubber solution.

Inner tubes should be tested for leaky valves and patches attended to at once. The old casings and tubes may be made to give considerable additional mileage by using them on the front wheels, where the strain is not so severe.

Caring for the Electrical Apparatus—Look over the electrical plant and replace worn wires with new. Clean out the timer with gasoline and lubricate with light oil. The magneto need not be taken apart, as it will probably only need a little surface cleaning, a few drops of oil, and the amateur had better not meddle with its internal mechanism. The storage battery should be examined, and if the brown deposit collects in any quantity at the bottom, the electrolyte should be poured out into a glass bottle and the battery washed out with clear water (rain water preferred). Clean the top of the battery and make it a point to keep it clean and free from acid. Clean the terminals of any corrosion and see that the air vents are not clogged up. If the accumulator has been neglected, either in the electrolyte having been allowed to get below the proper level or in not giving it the regular monthly "charge," it may get a bad case of sulphating.

To get the battery into its normal condition, empty out the electrolyte and wash the case thoroughly with soft water. Pour in only about seven-eighths of the acid solution and fill up with distilled water to cover the top of the plates. The battery should then be charged with a low current until the plates are restored to their normal condition. If very badly sulphated, the white coating should be washed off with a rag, and in case this fails to remove it, scraping must be resorted to. If the electrolyte is not sufficient to cover the top of the plates, fill up with distilled water so that the liquid will just cover them. The specific gravity of the electrolyte should not be less than 1.150, and, although varying somewhat, a hydrometer reading of 1.250 is recommended. This is approximately 1 part of sulphuric acid to 4 1-2 parts of water, which will be found sufficiently accurate if no hydrometer is at hand. If the electrolyte should test lower than the first figure, add pure sulphuric until the 1.250 mark is reached.

In case the plates are broken down or "buckled," or if the paste has dropped out of the pockets in the grids, the accumulator should be sent to the manufacturers for repair. In some accumulators the liquid is not used, but a jelly made of silicate of sodium and dilute sulphuric acid takes its place. If your battery is of this type, it is well to remember that the jelly must be kept moist on the top, and as the emulsion becomes dry a little water should be added to replace that which is lost through evaporation.

The contact points of the coil will probably require adjusting. This is very easily accomplished by trimming up the points with emery paper. Do not rub away the metal unnecessarily, only removing enough to true the points so that they make a good contact. In adjusting the vibrator, remember that a light tension is much better than a stiff tension. A light flexible vibration with a moderately high-pitched buzzing note will not only give a better spark, but will keep the points in better shape. A heavy tension will make the coil less responsive and will pit the contact points and exhaust the battery more quickly. As a coil will render the most efficient service only when the vibrators are adjusted as nearly alike as possible, a special ammeter is often used to determine the current consumption of each unit. The ammeter should show a reading of 6-10 amperes.

Assembling Often the Most Difficult—In assembling the car the engine had best be put together first. When putting the pistons in their respective cylinders see that the splits or joints in the piston rings are not in line, but are spaced evenly around the piston. See that all parts are thoroughly clean and that no grit or stray strands of waste happen to be caught on any projection. All nuts and bolts should be screwed tight and the jaws of the wrench should be properly adjusted to them, that the corners of the nuts and cap screws may not be rounded off. Insert the cotter pin after each nut has been screwed home. In joints where packing is required the old packing may be used if it is in good shape. Joint faces should, of course, be perfectly clean. A stout grade of manila wrapping paper soaked in linseed oil will make an excellent packing for crankcase and other joints having a good contact surface.

While the engine is being reassembled it will be found advantageous to check up the valve timing. To do this, turn the fly-wheel until the inlet valve plunger of No. 1 cylinder just touches the lower end of its valve stem. At this point the line on the fly-wheel indicating "Inlet No. 1 Open" should coincide with the pointer on the engine base. If the contact between the valve stem and the plunger is made before the mark on the fly-wheel lines up with the pointer, the valve opens too early. In most cars the adjustments may be made by the screw cap and lock-nut on the plunger. As the valve stems are lowered by repeated grindings of the valves, the plungers require adjustment occasionally to compensate for this movement. Insert a piece of paper between plunger and valve stem, and by lightly pulling on the paper the time of contact and the moment of release may be determined to a nicety. When the paper is held tightly, a good contact is assured, and the moment the paper becomes loose and can be moved about, the contact is broken. In many cars the reference or index mark on the engine bed is omitted; in this case the markings on the fly-wheel must be brought directly to the top. The other inlets and the exhaust valves should then be similarly checked up and adjusted.

Most cars base the valve setting on a 1-32-inch clearance space between valve stem and plunger rod when the valve is closed. This may be taken as the minimum amount, and should not be increased. A larger amount of clearance will cause the exhaust valve to open too late, and, the exploded gases not being entirely expelled, the power of the motor will be impaired. This clearance is necessary to allow for the expansion of the valve stem when it becomes heated.

Too much stress cannot be laid on the necessity of going about the work in an orderly and methodical manner. A mechanic who leaves parts lying about carelessly will rarely be found a good one, and certainly he is not a proper model for the amateur to copy. With the proper circumspection, then, and with a little "horse sense" in applying the directions to his particular make of car, the amateur owner should have no difficulty in making a good job of overhauling, thus bettering the condition of his machine and at the same time acquiring a valuable stock of knowledge for the future.

SOME INFORMATION FOR THE MAN WHO DRIVES

Examine the Car Below the Frame—Most autoists are content to make all their inspection of the car and its mechanism from above, and rarely give more than a casual glance below the frame except when trouble occurs. On cars fitted wtih pressure-feed on the gasoline, the piping should be frequently inspected, on account of the danger from fuel leakage. Such inspections should be made when the motor is stopped and the pressure still turned on. The tank should be gone over for leaks arising through the opening of its seams from vibration, or the loosening of the union connecting the fuel lead with the tank. The lead and its connection to the carbureter should also be examined for leaks and abrasions due to rubbing against other parts of the mechanism. If any such are found they should be immediately repaired. Twine, tire tape or rubber bands will act satisfactorily as fenders to prevent further mischief. Unions which can not be made tight by screwing up should be taken apart and the male connections coated with soap or red lead, which will render them tight for a considerable time.

After going over the fuel system, the brake rods and steering connections should be examined for loose joints and broken oil and grease cups. Grease boots on the drive-shaft joints should be seen to be sound and filled wtih grease. A cleaning out of the dirt from the interior of the mud-pan will often reveal lost cotter pins or nuts and tend to a more agreeable handling of the draincocks, carbureter and filter. This time will be well spent when the chances of fire or accidents arising from faulty steering or brake connections are taken into account

When the Jack Is Missing—Should the jack be missing or broken, an efficient substitute can be rigged from a large stone or a number of bricks piled one on another until the height is sufficient to life the wheel from the ground. Having gotten the stone or piled the bricks one of the floor-boards can be utilized as an inclined plane and the car backed up until the axle rests on the top of the pile. When the work has been performed, the axle will have to be pushed off the pile, but as the drop is inconsiderable no harm can come to the tire. Where stake-and-rider fences abound, one of the rider timbers can be utilized as a lever with a stone as a fulcrum to raise the axle, supporting the latter with another stone during the repair and gently easing down the axle when ready to proceed.

Where the Owner Himself Takes Care of the Car—Beautifully polished brass and nickel work look smart on any car, but it requires considerable attention to have the work always in ship-shape condition. With the autoist who has a chauffeur or garages his car no thought need be given to the matter, but he who does all the work on his car has, as a rule, little time to spare on polishing and so his bright-work belies its name. Autoists, therefore, who purchase a car will find that it will pay them to have all nickeled or brassed parts given a coat of man-of-war gray or oxidized-bronze finish so that only at long intervals will it be necessary to give the parts more than an occasional wipe. The time and labor thus saved will be well worth the money spent.

Benefits of Night-Driving— Driving at night is beneficial in a number of ways. A drive at night after the day's work clears the mind and fills the lungs with fresh air. The rapid passage of the car creates a sense of buoyancy and the reaction causes a feeling of drowsiness which makes the autoist sleep like the proverbial top. Especially is this the case with nervous persons or those whose occupation keeps them indoors for the greater portion of the day. This applies to driving in the spring, summer or autumn, as winter driving at night in an open car is far from pleasant, and may subject the riders to neuralgia.

LETTERS INTERESTING

TWO CYCLE POWER OUTPUT

Editor THE AUTOMOBILE:

[1,995]—Referring to your answers to questions number 1,986, page 316, August 19th issue, comparing two and four-cycle motors, your statement that "The very best two-cycle engines will not develop much over one-fifth more power than the same sized four-cycle," does not do justice to the perfected type of two-cycle motor. For example, take a two-cylinder, four-cycle motor of 4 1-2-inch bore and stroke, and the power limit is about 12 horsepower. For comparison, take the Atlas, two-cycle motor, with which I am well acquainted, and the two-cylinder engine of 4 1-2-inch bore and stroke shows 22 horsepower, and the comparison holds good in the three and four-cylinder types, actually showing at least 60 per cent more power than the best four-cycle motor of equal dimensions.

A little investigation will show you other good two-cycle motors that can easily disprove your statement as to power. Your comparison for the greater part was unbiased and very clear. My taking exception to your last lines is due to the fact that most of the prejudice against the two-cycle motor has been due to ignorance of actual facts and of the increased efficiency of the present-day motors, and misstatements of any nature, in a widely read paper such as "The Automobile" should be revised, at least when involving important interests.

THOMAS E. DENTON.

Newark, N. J.

Replying to the above criticism, attention is called to the description of the Thomas cars in the same issue as mentioned, page 319. In this is given a chart of the actual power of a 4 1-2-inch diameter engine as plotted from accurate tests. This shows that the power which can be developed from six cylinders of that size may easily reach 64.2 horsepower. Now, the A. L. A. M. rating formula gives this sized engine a power output of but 48.6. So, the actual engine exceeded the rating formula by 32.1 per cent. Since this is not an unusual motor, it is fair to assume that any other of the same general dimensions would do equally well. So, taking the A. L. A. M. rating for a two-cylinder, four-cycle engine of 4 1-2-inch bore from a table, it is found to be 16.2 horsepower. Now, adding to this the increase of 32.1 per cent, which it is possible to obtain, the result obtained is 22.4. As compared with the power which you say can be obtained from a two-cylinder, two-cycle engine of this same size, there is a slight increase in favor of the four cycle of 1.8 per cent instead of the one-fifth or 20 per cent the other way which we generously allowed.

If it is a fact that more power can be obtained from the two-cycle engine of any given size, why is it that none of the two-cycle people ever give out accurate and bona fide test results like the one spoken of above, instead of contenting themselves with claims as to wonderful power output. The writer is very much interested in this subject and has searched long and faithfully for data to prove what the two-cycle power output really was. After three years searching, it must be confessed that the only information came to light very recently and that was from England and concerned a radically different construction of two-cycle engine, which could not well be compared with the ordinary four-cycle engines.

A power curve of this English two-cycle motor, two of them in fact, as compared with an equally well-built English, four-cycle engine of similar size, showed up as follows: Both two-cylinder, two-cycle engines developed the same maximum power, which was 13 1-2 horsepower at 950 revolutions, with a rapidly falling torque curve, the greatest power being taken at the speed mentioned, higher speed giving less power. Now, the four cylinder, four cycle, which ought to be halved as a source of comparison, gave on the testing stand (the same in each case) 30 1-2 horsepower. This was on a constantly rising torque curve, which showed or appeared to show, that much more power would be developed at still higher speeds. So, taking half of this modest four-cycle output for comparative purposes, we get 15.25 as compared with 13.5 for the two cycle. This, you see, is 13 per cent in favor of the four cycle rather than 20 per cent for the two cycle.

While not desiring to start a controversy on this subject, the writer would say that this lack of data, combined with the results from what little information is available, has led him, personally, to think that the two cycle will not give as much power as a four cycle of equal size, number of cylinders, and similar construction. In this, he is like the man from Missouri, willing to be shown.

VERY ELUSIVE MISSING

Editor THE AUTOMOBILE:

[1,996]—I am taking care of a * * * * * * touring car, the engine of which, when it runs under heavy load or at high speed, disengaged from the car, will run perfectly; but when running at low speed and idle, will run almost entirely on one cylinder. The car has a * * * * * * * coil and shows a very good spark on both terminals when pulled off from the spark plug. The spark plugs are in good condition, and the compression is good. I have adjusted the carbureter in different ways and the miss cannot be stopped. Now will you advise me through "Letters Interesting and Instructive" where the trouble may be. S. S.

New Ulm, Minn.

The trouble is in the wiring. You have one of these faults: loose wire or connection: broken-down insulation, or broken wire. The first being the case, the wire is shaken out of a connection or circuit by the running and consequent jarring of the engine when under load, which is not the case when turning over quietly without load. This applies equally well to the third case or broken wire, which holds together, perhaps through the strength of the insulation, when running slowly and quietly.

The broken-down insulation only shows itself when the spark is required to jump a large gap through compressed gas, as in the cylinder, whereas it will not show on a small gap outside of the cylinder. The remedy is to renew the wiring.

ELECTRICS' POPULARITY

Editor THE AUTOMOBILE:

[1,997]—Without wishing to be too critical of your editorial in the July 15 number, permit me to correct the apparent erroneous impression that the revival in the use of electrics has been "of late." The increase has been a continuous one for a number of years, though many have not realized that any change was taking place.

As to leading electric vehicle manufacturers into the "promised land," apparently the writer of your editorial is not familiar with the past history and the effect that the premature announcement of the Edison battery had on trade in 1903 and 1904 and various occasions afterward.

We are all anxious that Mr. Edison should do what he has himself expected, though few have any hopes of such accomplishment as the press heralded. Indeed, it has been said that Mr. Edison never authorized the exaggerated claims which have been made.

The Edison, or any other battery which is better than that which we now have, will be welcomed, but if any manufacturers are waiting "with bated breath" it is probably in wonderment as to how many new editorial writers will take occasion to dilate on the possibilities which offer such opportunities for imagination.

Probably very few manufacturers will again invest much capital in special models to take the Edison battery until the scrap castings and patterns from former models built for that purpose and charged to profit and loss are forgotten.

And as to the hose-pipe tire, your reference is misleading. Except for the very low voltage, light car of the Baker, no one has, except for occasional test or experiment, used a thin wall hose-pipe tire for years. All of the so-called electric tires are made in detachable form and have been for a number of years. They can hardly be called thin walled, but are rather flexible walled and made of finer fabric and more pure rubber than the gasoline type of tire. When properly made they seem to have just as great durability. HERBERT H. RICE,

THE WAVERLEY COMPANY.

Indianapolis, Ind.

WHY NOT USE BROKEN CHAIN

Editor THE AUTOMOBILE:

[1,998]—In the issue of Aug. 19 of your paper and on page 315, under the heading "Chain or Shaft," the following statement occurs: "If one of the chains break, on a double chain driven car, it is helpless, and must be towed home."

I don't see it. Why not use the broken chain, a piece of wire, or a bit of rope to fasten the sprocket on the end of the counter shaft on the side of the broken chain to the frame of the car and drive home with the other wheel? It has been done and so can be done again.

Fredonia, N. Y. A. WILSON DODS.

The above wayside repair is not only a good and practical one but will save the owner of a chain-driven car, in a similar fix, from the annoyance of being towed home. The idea is to fasten the counter-shaft on the broken chain side so that it cannot rotate. In this case, through the action of the differential, the engine will drive the other shaft in the regular manner. It will thus be possible to proceed home but at a reduced speed. As blocking one shaft of the differential in this way will cause the other shaft to rotate at twice its usual speed, it will be necessary to use the low gear, and difficulty may be met on hills.

ANSWERED AND DISCUSSED

LONG STROKES DISCUSSED

Editor THE AUTOMOBILE:

[1,999]—I have for years stood for a short stroke engine in order to gain the light weight and compactness needed in auto work, and I regard the use of long strokes as a mistake for daily use. For the racing service for which they were designed I have nothing to say. I feel that your answer to Mr. Hickman (1,949) is not full enough to make clear the facts. The long stroke engine cannot make so many turns per minute as can the short, because the limiting thing is the piston speed. Thus a 4-inch stroke can turn its shaft 50 per cent faster than a 6-inch stroke engine and not exceed the same piston speed. This means that the short engine is 50 per cent more flexible. Your statement that less reducing gearing is necessary is hardly correct. With a flexible engine there is less need for speed changes than with an engine which is incapable of making those changes by throttle. But the racing car has little need for speed changes. It is not subjected to deep mud, thick traffic, steep hills and such things as make necessary the use of low gears on a car for daily use. It therefore is not at a disadvantage if it has a less flexible engine, but, on the contrary, gains if its engine of a given size can be made to work more efficiently. But what is best for the racing man is not of necessity best for the road user. I saw comfortable road bicycles converted into comfortless racing things and then the public, disgusted, gave up the style of using the cycle. Racing rules should limit power by limiting piston displacement and let the designer make the engine the way he thinks it ought to be. This developing an industry by laws made by people who know little or nothing of the subject can never be productive of best mechanical results.

CHARLES E. DURYEA.

Reading, Pa.

Since long-stroke motors may be made to turn over as slow as 250 revolutions per minute, which is as slow as it is ever necessary to run the engine, and engines of a stroke equal to twice the bore have actually turned over as high as 1,800, it seems as if the claim of lack of flexibility is not well founded. The Arrol-Johnston 4-inch engine developed its best power from 1,500 revolutions on up to 2,400 revolutions, at which latter number of turns, the power output was in excess of 72, as compared with the rating for this engine (a four cylinder, four cycle) of 25.6 horsepower.

It seems as if this denoted superior rather than inferior flexibility, and sufficient power to entirely eliminate the gear box, which is going "less reducing gearing" one better. At ordinary speeds, this motor will develop more power than an ordinary short or equal stroke engine, so that for the same power requirement it may be run slower. In emergency cases, when a lot of power is suddenly required, instead of gearing up as in the short-stroke motor, the throttle is opened, and advantage taken of the superior power ability of the longer stroke. In this respect it is somewhat similar to the steamer, which is able to develop an enormous amount of power for a short time, with this essential difference in favor of the internal combustion engine that it can keep on developing the extra power for an unlimited length of time.

If an average power requirement be taken, it will be found that the long-stroke unit develops it, or meets the requirement, with a smaller rotative speed. This means that the gear reduction at the rear axle may be less whatever the speed may be. This lesser reduction at the rear axle means that the driving bevel may be larger and consequently stronger, or on the other hand, the driven bevel may be smaller without reducing its strength, since it is already very large. The size of this governs the road clearance which may, by this latter method, be materially increased. Similarly, this reduction of size of the driving gears reduces the size, weight, and cost of the bevel gear and differential housing. In this way, the whole rear construction is reduced in size, cost, and weight.

It is the firm belief of the writer that the engines of the future will be of very small bore, taking up very little space. In place of the present sizes, a long stroke and superior construction will be relied upon to give a very much higher power output than we now obtain. As to the linear piston speed, if that is satisfactorily taken care of in racing cars, in which the very highest speed is maintained for upwards of ten hours, there is no doubt that touring cars will be well cared for.

The gain from these smaller bore but longer stroke engines of the future will be threefold; lessened space, devoted to the power unit; greatly reduced weight, despite longer stroke, and as a factor of the other two, lowered cost. The light weight of both engine itself, and rear consctruction, as previously pointed out, will evolve more mileage from the tires, and other similar parts, resulting in making the upkeep less.

This tendency towards the small engine with long stroke is noticeable in a mention of a few of the latest productions of the other side. Thus, taking those most handy we find: the new Mercedes (German) with a four-cylinder engine of 80 mm bore (3 1-8 inch) by 130 mm (5 1-8 inch) stroke. Delaunay-Belleville (French) has just brought out a new little car equipped with a four cylinder 85 mm (3 3-8 inch) bore by 120 mm (4 3-4 inch) stroke. So, too, in England, the latest Sunbeam car has an engine of 95 mm (3 3-4 inch) bore by 135 mm (5 5-16 inch) stroke. This latter would rate at 22.5 and actually developed on test 54 on a continually rising torque curve. Doubtless, the sales record of this car would show how many motors of 5 by 5 and larger sizes were put out of business altogether by the newer and smaller car, with the more powerful long stroke (1 to 1.42 ratio).

COMPRESSION—EXPLOSIONS

Editor THE AUTOMOBILE:

[2,000]—Will you please answer the following through "Letters Interesting and Instructive":

1. About what pressure is exerted per square inch in a gasoline engine cylinder when the charge is exploded?
2. What effect would it have upon a four-cycle engine if the charge were to be exploded just before the completion of the compression stroke (of course sparking of the ignition would be a little earlier than the explosion)?

A. F. C.

Fitzwilliam, N. H.

In answer to your first question, this quantity varies from 50 up to about 75 pounds per square inch for the compression pressure, which is multiplied by four (roughly) by the explosion. That is, the explosion pressure varies from 200 up to 300 pounds per square inch. These figures are for normal engines intended for ordinary touring purposes, and do not take into account the cars especially built for racing and similar purposes in which the compression pressure may go as high as 100 pounds per square inch, and the explosion pressure to more than 400 pounds.

Your second question describes average and daily automobile practice, if you but knew it. That is, in engines now used, the spark is made to jump a measurable amount before the engine reaches the upper dead center, or as you put it, before the compression stroke is completed. The lag in the propogation of the flame through the mixture, with the consequent lag in the expansion of the exploded gases, is so great that at the speed of the motor, the expansion does not begin to drive the piston down until it has passed the center. This action only occurs at high speeds, when the rotative speed of the engine enters into the question, with a favorable action. At slow speeds, the spark is made to happen at points further and further ahead on the stroke, until the extreme point is reached at the starting position. This last is usually fixed at 15 degrees of the crankshaft after the upper center.

From this point, the angle gradually decreases with increasing speed, until it reaches and passes the center point. Beyond this, in many cars, it may continue up to 20 or more degrees past the center. In point of fact, a number of prominent and successful French designers exceed this very much, as will be noted by the short table appended. In this the rotative speed (maximum) is given and the angle is that of farthest advance before center measured on the crankshaft:

Rochet-Schneider	20 degrees	1,400
Aries	20 "	1,500
Darracq	21 "	1,500
Vinot-Deguingand	27 "	1,500
Brouhot	30 "	1,300
De Dion	30 "	1,400
Unic	30 "	1,650
Peugeot (Beaulieu) ...	31 "	1,400
Sultan	32 "	1,600
Renault	33 deg. 30 min.	1,600
Brasier	34 degrees	1,350
Cottin-Desgouttes	38 "	1,300
Peugeot (Paris)	38 "	1,300
Cornilleau-St. Beuve ..	43 "	1,300

These are arranged in order of advancing spark advance, and it will at once be noticed that the speeds of rotation do not follow in a natural increasing order.

AERONAUTIC EXPLANATION

Editor THE AUTOMOBILE:

[2,001]—I have been considerably puzzled by some of the aeronautical terms that seem to be coming into general use. For instance, Bleriot's machine is called a monoplane, which one would naturally suppose to mean that it had one plane or supporting surface, but a description of this same machine says that it has two wings. I am unable to reconcile these statements with any degree of satisfaction to myself. I am also unable to see what improvement the Wrights have made in aeroplane construction. The pictures I have seen of their machines do not look any different from the others, except that they do not have any wheels. Can you explain what their patents are based on? Perhaps some day the different types of airships will be as familiar as shaft-drive and chain-drive, but meanwhile there may be many of your readers who are in my predicament. I am sure that an explanation of these details will be of general interest. OLD-TIMER.
New York City.

The sudden leap into prominence of the different sorts of flying machines has certainly introduced an abundance of new technical terms into the language, and we are of your opinion that these may be confusing to a great many who are really interested in this subject and would like to keep abreast of the times in it. We already have in course of preparation an article which will treat this subject thoroughly, to appear in a near issue of THE AUTOMOBILE. Meanwhile we shall be glad to go into the subject at some length.

The basic distinction in all flying machines is between lighter-than-air and heavier-than-air types. The former rise by the direct action of gravity until they reach a level where their weight equals the weight of the volume of air they displace. The latter rise by the action of the pressure of the air beneath their rapidly moving surfaces.

The lighter-than-air class includes all balloons, as well as the vacuum airships sometimes proposed. Dirigible balloons, which are those popularly called airships, have been made familiar by Zeppelin in Germany and by Knabenshue, Baldwin and others in this country.

Of the heavier-than-air class, the original form is simply the kite. The only difference

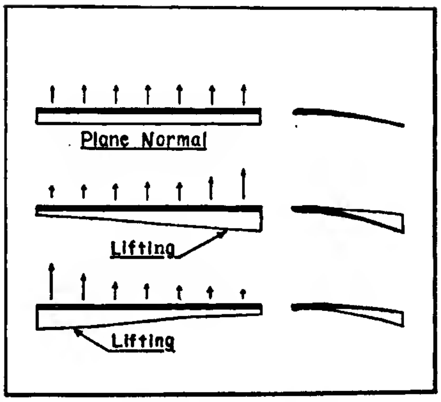


Diagram of Flexible Planes Used by Wrights

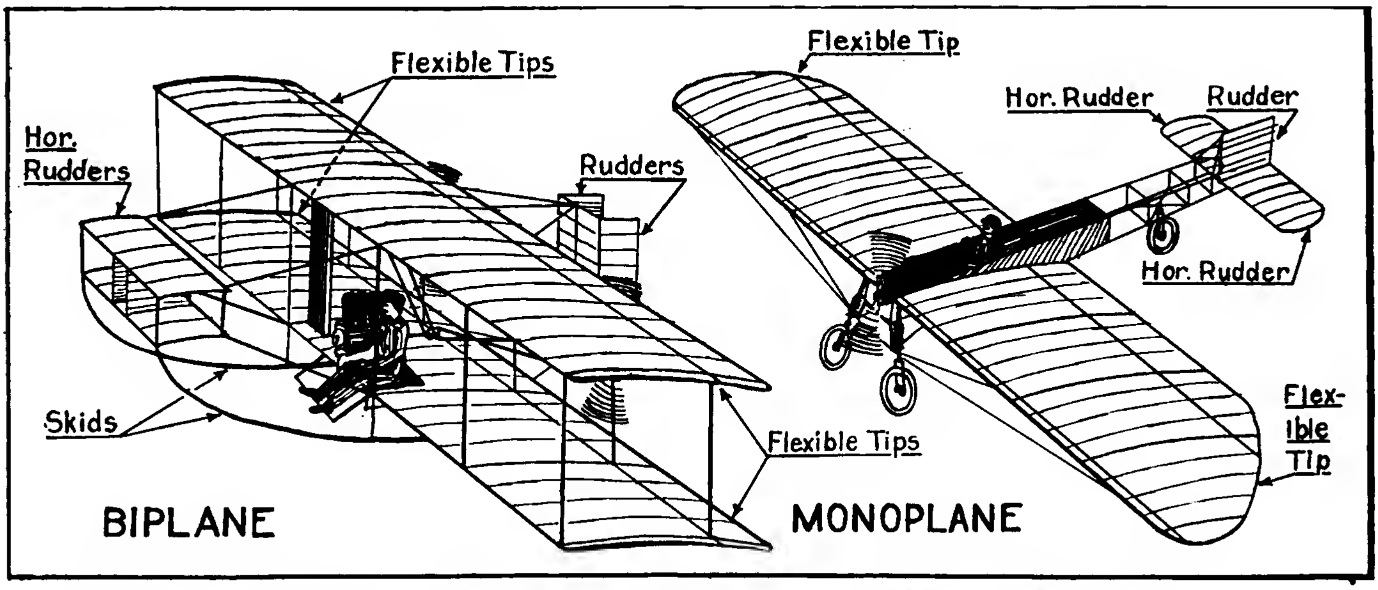
between a kite and an aeroplane, except for size, is that the kite is usually held stationary in a current of air, while the aeroplane moves itself and provides its own air currents. The supporting surfaces of the aeroplane, corresponding to the body of a kite, are usually called planes, though they are in reality curved. The terms monoplane and biplane may best be explained, however, by taking plane in its other meaning of "level"; thus a monoplane has its supporting surfaces in one plane or level, and a biplane in two planes.

The Wright brothers have done a great deal of experimental work, the results of which have been incorporated into their machines in many ways, some of them no doubt so subtly as to escape even expert notice. The principal feature of their machine, however, and the one on which their strongest patent is based, is the warping-wing principle. The purpose of this is to maintain the lateral equilibrium of the machine. Any sidewise tipping, such as is often caused by an irregular gust of air, cannot be corrected by any form of rudder, as the machine has no sidewise velocity. It is like a ship without "steering way." The Wright method of dealing with these deflections is to make the tips of the planes or "wings" flexible, so that at the will of the operator they can be bent to meet the air currents at a greater or less angle. The greater the angle, within limits, the greater is the lifting effect. Then if one side of the machine sinks down, the wing tips on that side are bent to secure a greater lifting effect, and that side is raised until the machine is again on a level. In practice, the levers and wires controlling the twisting of the wings are interconnected so that when the angle of one wing is increased, that of the other is lessened; thus the aeroplane is brought to the desired level by lifting the lower side and lowering the upper side.

Other aeroplanes, notably that of Curtiss, use small movable auxiliary planes, one on each side, to obtain the same result. These planes may be clearly seen in the picture of Curtiss' machine in THE AUTOMOBILE for August 19, page 301. Bleriot on his monoplanes uses the Wright method.

The use of skids instead of wheels on the Wright aeroplane, as well as the starting track and the tower with the falling weight to give the machine its initial impulse, are merely details. It might just as well—better, in the opinion of most experts—be made with wheels, and get its start by running along the ground.

None of these machines incorporate any device for maintaining stability automatically; the operator must not only steer in the usual sense of the word, but also he must control the elevation and prevent his craft from being tipped over to either side. Undoubtedly the greatest development in aeroplane design will be the invention of some means of keeping the machine on an even keel and headed in its original direction without the intervention of the operator. Such a device, successfully applied, would make aeroplaning as safe as automobiling, and as easy to learn. The most promising form appears to be some application of the gyroscope; at any rate, this is a great chance for some clever inventor.



Aeroplanes of Wright and Bleriot Types, Showing Arrangement of Flexible Tips and Horizontal and Vertical Rudders

EFFECT OF AUTOS ON ROAD SURFACES

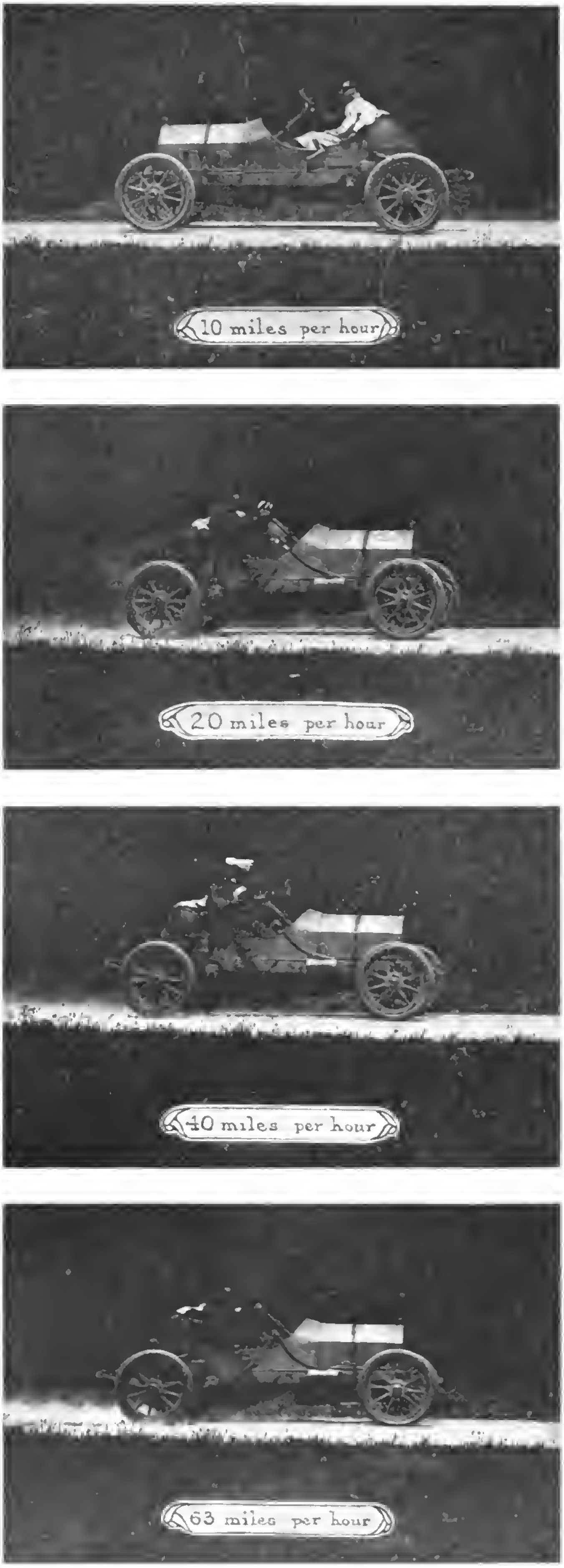
WASHINGTON, D. C., Aug. 30—The Department of Agriculture, through its bureau of Good Roads, has begun a series of experiments designed to show the effect of automobile traffic on the surfaces of highways. The accompanying photographs illustrate the results of the first tests, which were made on what is known as the Conduit Road. This highway extends through the northwest suburbs of Washington and is of the ordinary type, having a stone base surfaced with ordinary macadam. The automobile used had a speed capacity of rather over a mile a minute, and provision was made for timing it over a measured stretch. By the side of the road a camera with a shutter giving an exposure of but the two-thousandth part of a second was placed where a direct view of the roadbed and car could be secured.

The four different views taken are reproduced with this article. At a rate of 10 miles an hour no dust whatever was visible in the picture, apparently proving that this rate of speed has no effect on the surface of the highway. At 20 miles an hour a small quantity of dust was raised, seemingly by the action of the rear wheels alone. At 40 miles an hour a slight increase in the amount of dust raised can be observed. The last photograph, taken at a speed of 63 miles, clearly shows that the friction was very great. As might be expected, the front wheels of the car seem to have a very slight effect; no dust rising behind them except in the last trial, when a faint haze may be discerned.

Rear View of the Latest European Dustless Body

DUSTLESS BODY AT LAST DISCOVERED?

LONDON, Aug. 25—In a recent issue of THE AUTOMOBILE there were illustrated several examples of the "flush sided" or torpedo body, now so popular in England. Another type, embodying some new features, is shown in the accompanying photograph. The chassis is a standard 23-30-horsepower Austrian Daimler, with a wheelbase of 123 inches. The side view of the body reveals merely the ordinary torpedo construction, with the usual high doors. The novelty consists in the construction of the rear portion, which has a clear opening from the underpart of the body. It will also be noticed that the rear panels are curved around in a peculiar fashion. Both these features have been adopted after lengthy experiments by the builders, the Max Graddon Company, with a view to lessening the dust-raising qualities of the car. It is found that the vacuum usually existing behind the rear seats, which is the most potent cause of dust-raising, is entirely obviated by the provision of the "tunnel" arrangement, as the air sweeps freely around the corners of the seats. Observation fully confirms the maker's claim to almost complete dustlessness. An additional advantage claimed is that the car is considerably faster with this body than with a body of standard type and the same sectional area. The advent of these new bodies will be welcomed by all classes of road-users; for they not only do away with the trail of dust, but also with the clouds which frequently pour over the back.



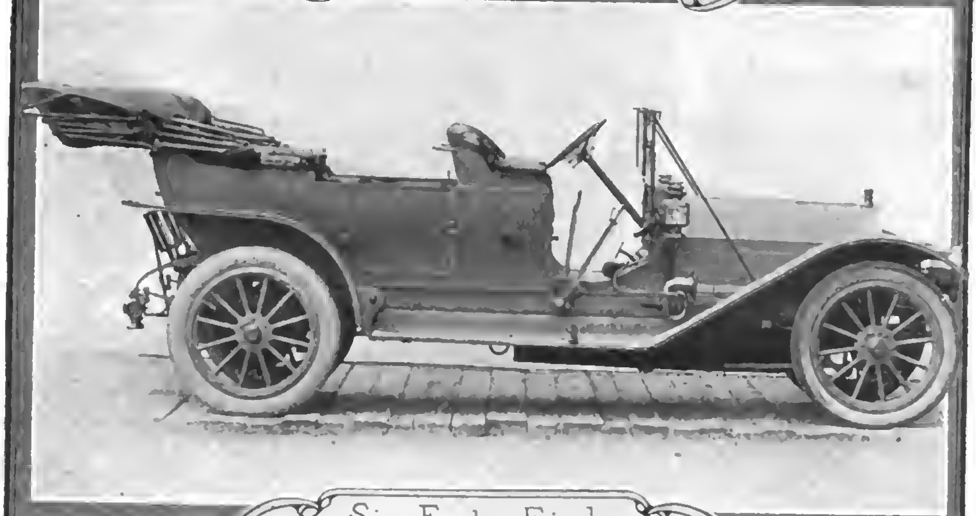
Showing Dust Raised at Four Widely Different Speeds

Pierce-Arrow for 1910

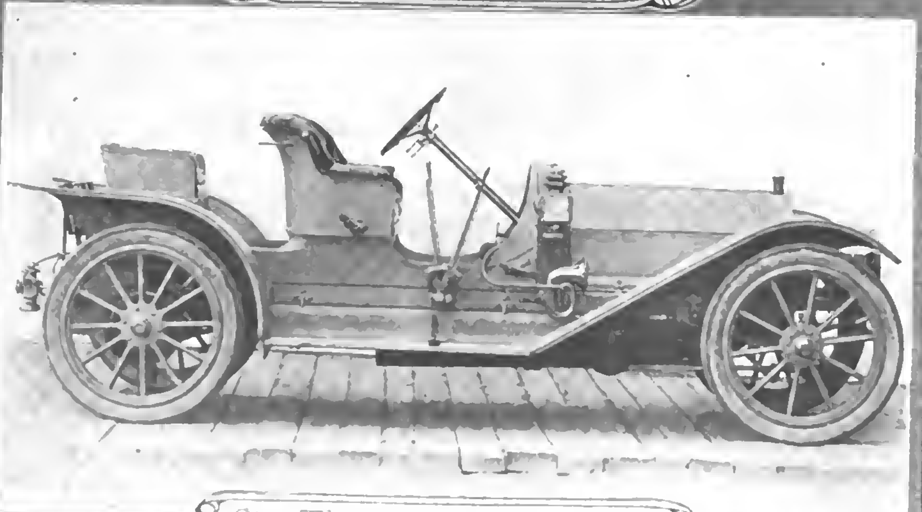
In view of the consistent development of the six-cylinder type of car in the hands of the Pierce-Arrow engineers during the past three or four years, the announcement that the Pierce-Arrow Motor Car Company, Buffalo, N. Y., will devote its entire energies to the production of sixes during the 1910 season, will not come as a surprise. In all probability, it will follow the same policy from now on, but what will be decided on a year hence is a matter for the future. Three models are listed, the Pierce-Arrow 6-36, five passenger car, the 6-48 and the 6-66. As may naturally be assumed, all three are of uniform design and are characterized throughout by features of design and construction that are essentially Pierce, their differences being almost entirely those of dimensions. The four cars which made such a brilliant record in this year's A. A. A. Tour were the very first representatives of the new 1910 series to come through at the big plant in Buffalo, and they were only on the road in the hands of their drivers a week or two in advance of the start from Detroit.

There are probably not more than two or three other American automobile builders in the field who have so faithfully adhered to a basic design for such a number of years, so that it is naturally out of the question to look for any radical changes. Of improvements there are many, and all of a nature that strikingly demonstrate how closely opportunities are sought to better things here and there in the constant effort to attain the goal that so many builders are seeking—the perfect car. The performances of the cars in past years have convincingly shown that they represented such a close approach to this ideal from the mechanical point of view till little was left to be desired. But in the building of such a large number of cars, new points are constantly to be gleaned in the exacting school of experience, and as many of these, as have, during the past year, successfully withstood the searching test to which every innovation is subjected at the Pierce factory, have been adopted as standard features of the 1910 product. That the Pierce Company has based its

Six-Sixty Six Pierce-Arrow Seven Passenger Touring Car with Top.



Six-Forty Eight Five Passenger Pierce-Arrow Tourer, Top Down



Six-Thirty Six Runabout for Three Baby of the Pierce Arrow Family

Six Cylinder Form and Three Horse-Powers

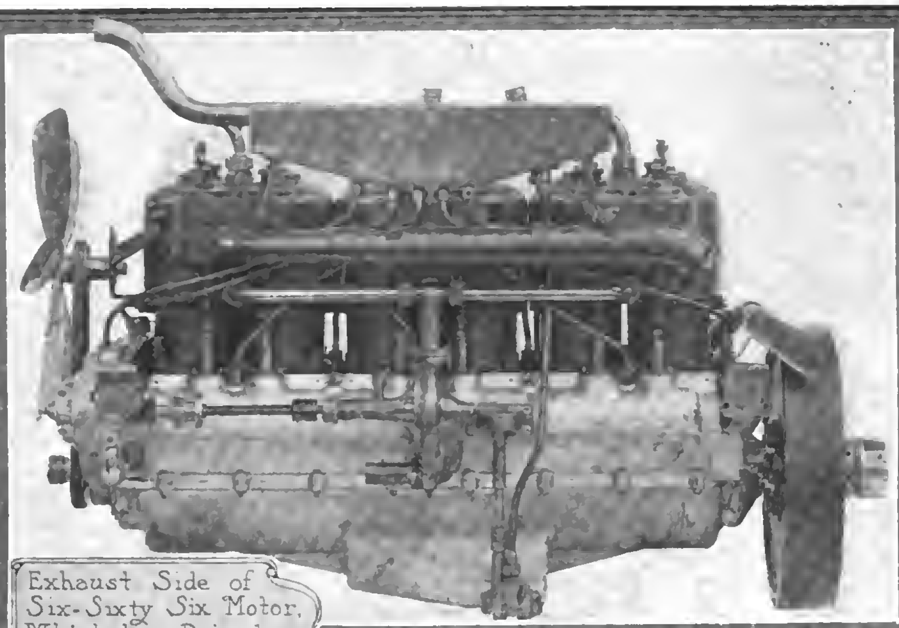
decision on a thorough knowledge of the situation where the six-cylinder car is concerned and has full confidence in the demand for this type, is quite evident from the fact that plans have been made to increase the output of Pierce-Arrow cars fully 50 per cent. over last year, when both fours and sixes were built.

As the three models listed for 1910 are practically identical in every respect, a description of one will suffice for all, and as all the essential features of the design have not undergone the slightest alteration, a resumé of the improvements will be of greater interest than a recital of the 1910 specifications.

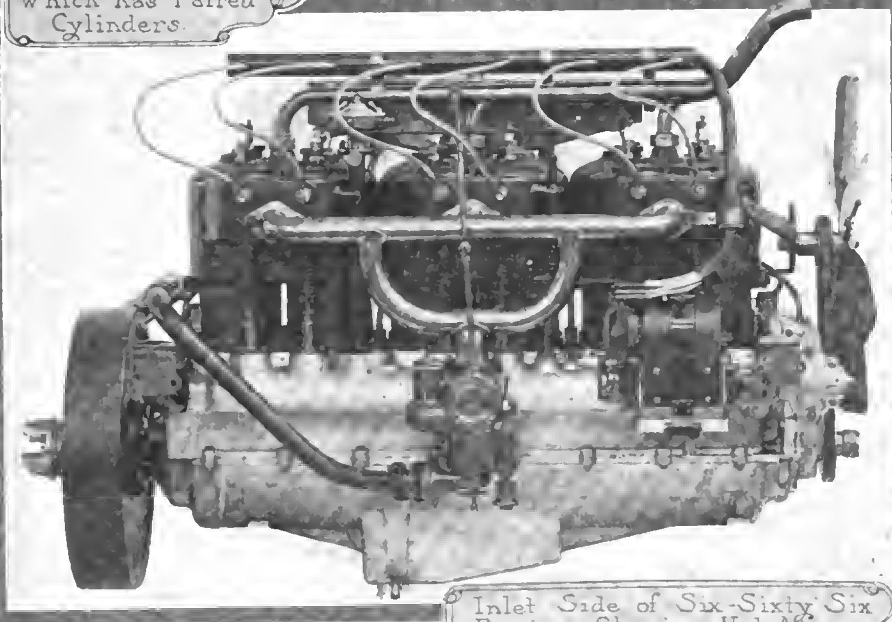
Aside from a slight increase in the dimensions of the cylinders, one of the chief changes in the Pierce motors has been the addition of an oil ring, or groove, at the lower end of the piston. The Pierce-Arrow circulating system of lubrication is so positive and forces such a quantity of oil to the bearings, that the baffle plates in the crank-case did not prevent an excess supply from reaching the piston and finding its way to the combustion chamber. Placing the oil ring in question on the pistons has added fully 50 per cent to the mileage obtainable on a single charge of lubricating oil.

The cylinder bore of the six-cylinder, 36-horsepower motor has been increased from 3 15-16 to 4 inches, while the motor dimensions of the 48-horsepower type remain the same as formerly. The motor of the 66-horsepower car has been practically redesigned since last year, the separately cast cylinders having been abandoned in favor of twin castings, making all motors uniform in this respect. The crank-shaft is still of the seven-bearing type, however, a liberal amount of bearing surface being specified for all the journals.

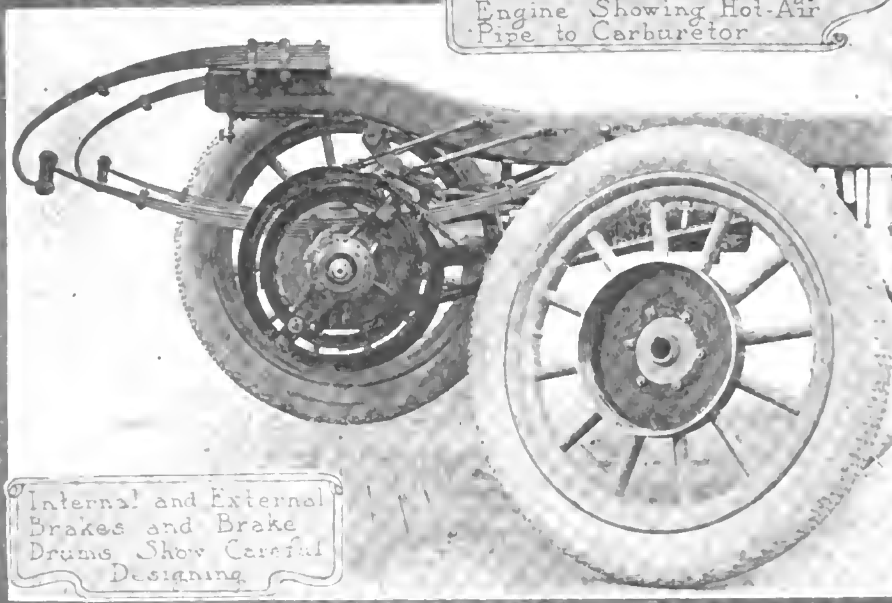
Specified on all models is the new type of carbureter—first adopted as standard last year, after a great deal of experimenting. It is of conventional design so far as the gasoline supply and spraying devices are concerned, but is fitted with a particularly ingenious type of auxiliary air valve, which is doubtless largely responsible for the extreme regularity of running



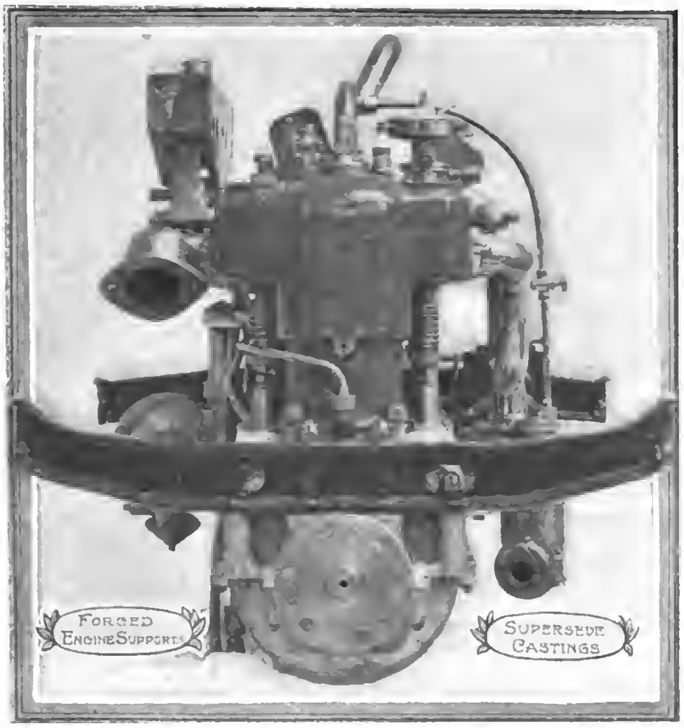
Exhaust Side of Six-Sixty Six Motor, Which has Paired Cylinders.



Inlet Side of Six-Sixty Six Engine Showing Hot-Air Pipe to Carburetor



Internal and External Brakes and Brake Drums Show Careful Designing



FORGED ENGINE SUPPORTS

SUPERSEDE CASTINGS

of the cars at all speeds. This air valve consists of a cylindrical chamber in the sides of which are placed vertical rectangular ports. These ports are covered by spring brass reeds, and are of varying dimensions, there being three in all. These reeds are in turn backed by flat leaf springs of varying tension, so that as the motor speeds to a point beyond the normal air supply, the first reed opens slightly until checked by the retarding influence of its spring: then more and more until fully open, when the next larger port begins to open, and so on until all are in action. This is very gradual and makes the carbureter extremely sensitive to changes of motor speed and load.

The Bosch magneto is retained as the service side of the dual system of ignition, a six unit set of plain Autocoils, synchronized by a master vibrator having been adopted for the emergency ignition system, in place of the six vibrator coils formerly employed. This greatly facilitates the adjustment of the battery ignition system, as but one vibrator has to be regulated. It is fed as usual, by a set of accumulators.

Doubtless the most important innovation in connection with the motor has been the adoption of the Spencer power air pump for inflating the tires. This is of a special design made for the Pierce-Arrow cars and is mounted vertically on the left hand side of the motor forward. It is bolted directly to a bracket on the side member of the frame and is arranged to be driven from the shaft that drives the water pump. A small bronze pinion is placed on the latter, and is intended to mesh with a gear of about two and a half times its size attached directly to the crankshaft of the twin cylinder pump. A ball and spring lock controls the position of the small movable pinion in the off and engaged positions, the latter being designed to be meshed by hand. The motor is stopped for that purpose and is then run slowly, not to exceed 300 to 600 r.p.m., at which it will suffice to inflate the largest tires to the maximum pressure required in a few minutes.

The remaining essentials of the motor remain unaltered, and as they are the same as have characterized Pierce construction ever since a multi-cylinder motor has been put out under this name, they are too well known to require description.

Some of the Transmission Improvements—The changes where this essential are concerned are simply those of slightly altered location. The housing of the gear set in each case has been raised slightly, 1-4 inch on the 36-horsepower car, and 3-8 inch on the other two models, and the shifting lever has been lengthened 2 inches on all models, to facilitate its handling. The arrangement of the foot brake and clutch levers has also been altered slightly, giving a great increase in the leverage and making it much easier to apply them. The gear-set is of the sliding type, selectively operated and gives four speeds forward and reverse, the shafts and gears being made from Krupp chrome nickel steel. The moving members are splined to their shaft, while the gears on the countershaft are bolted to flanges made integral with the shaft.

A change has been made from the Hess-Bright annular ball-bearings to Timken roller-bearings for the outer ends of the driving shafts of the live rear axle, in view of the ability of the roller type to withstand thrust stresses. This has also led to the exclusive use of Timken bearings for the front wheels, a change which entailed the use of entirely new steel stampings for the front hubs. Hess-Bright ball-bearings are used on all other moving parts, except the motor. Pressed steel has also been adopted for the brake drums and the dimensions have been increased in each case, in view of the slightly added power of the motors and the longer wheelbase of the cars, this increase in braking power averaging 25 per cent. Thicker Raybestos brake linings are also specified, and an improved arrangement of the brake hangers gives increased leverage with the same effort.

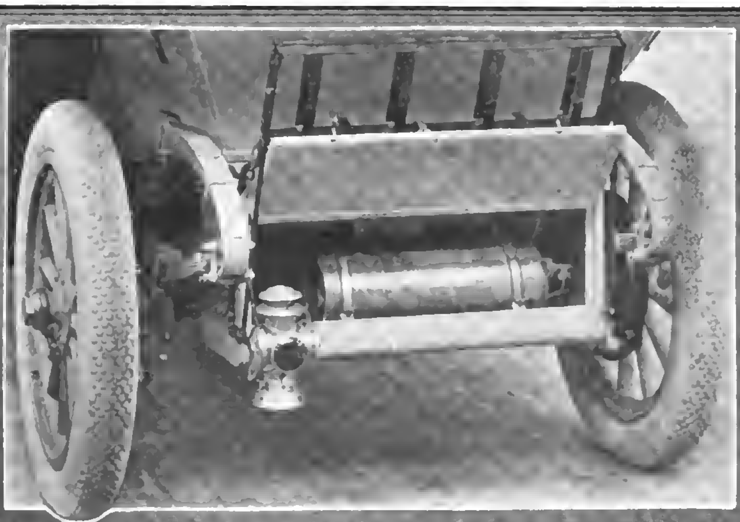
Chassis Changes Generally Are Few and Far Between—Wheelbases have been lengthened in every instance, the 36-horsepower car having been increased from 119 to 125 inches, while the 48-horsepower is now 134 1-2 inches, instead of 130, and the 66-horsepower model is 140 inches, instead of 135. The three-quarter elliptic springs first employed last year on the smaller cars have now been adopted as standard on all, and in order to preserve the height of the chassis at the same level, a dropped type of frame has been employed and the forward springs given slightly less arch. To compensate for the increased length of the car, the forward axle has been strengthened by giving it slightly heavier flanges.

The running boards have been made two inches wider throughout their length, and a sheet metal apron placed between them and the under side of the frame. This extends the entire length between the mudguards and completely encloses the sides of the car from front to rear. A new type of mudguard has been adopted, the forward ones being made with a straight slope to the rear, which facilitates the closing in of the sides. A 7-8 inch flange is now placed around all guards. A special housing is riveted to the forward end of the rear mudguard in order to encase the protruding end of the rear spring. Automatic grease cups are now provided on all spring shackle boats.

An additional lock has been placed on the ball thrust bearing supporting the steering column, and the latter has been given a slightly greater rake

TRANSMISSION PARTS AND FOUR SPEED GEAR ASSEMBLED

Air Pump for Tire Inflation-Driven from Camshaft.



Installation of Prest-O-Lite Gas Tank in Special Compartment at Rear Below Trunk Rack.

New Shaped Lamp Uses Either Gas or Electricity

on the touring and enclosed cars, this being a 50 degree angle on the 36-horsepower car, and 49 degrees on the other two models. The hollow type of dash has been adopted for the 36-horsepower car making all three uniform in this respect, while the use of bright brass molding has been abandoned, aluminum covered with paint being employed instead. In addition to the slightly altered angle of the steering column, the control levers have also been arranged so as to be much more convenient. The steering wheels have been increased to a diameter of 18 inches.

Increases in Tire Equipment—Doubtless the most striking changes to be found on the new cars consist in the greatly increased size of the tire equipment to be provided on the 1910 models. Pierce-Arrow cars have always been noted for the liberal factor of safety afforded by their tire equipment, and the increases have been made in keeping with this policy. The 36-horsepower touring car, landaulet and brougham will be fitted with 36 by 4 and 4 1-2-inch tires, instead of 34-inch as last year, while the 48-horsepower cars will have 36 by 4 1-2 and 37 by 5-inch front and rear. Although larger diameter tires are employed for the rear wheels, all are interchangeable on the same rims, so that a rear tire may be used on a front wheel where desired, or vice versa, in case of emergency. This would not be recommended except in such cases, as it would impose an additional strain on the differential on the rear and would tend to render the steering difficult when used in front. The tire equipment of the 66-horsepower car consists of 37 by 5-inch front and 38 by 5 1-2-inch rear on the touring and enclosed types, the miniature tonneau and roadster being fitted with 37 by 5-inch tires all round, the equipment of these types of cars in the 36 and 48-horsepower models also being slightly smaller than those mentioned for the touring and enclosed cars.

The runabout and miniature touring types are built on special chassis in each case, the wheelbases being shorter and the bodies not being interchangeable on any of the other chassis. The brougham and landaulet bodies are interchangeable with the five-passenger touring type of the 36-horsepower model, this being listed as a strictly five-passenger car while the enclosed and touring bodies of the higher powered cars are interchangeable on either of the chassis, a 48-horsepower touring or landaulet body fitting a 66-horsepower chassis and vice versa.

Chief among the remaining changes to be mentioned are those of equipment. In place of the gas generator formerly supplied, a large sized Prest-O-Lite tank has been substituted, and a special box hung from the frame at the rear has been designed to accommodate it. This box is kept locked, and as a special supply cock is placed in the feed line just outside of it to turn the gas on or off, it does not have to be opened except to receive a new tank when the old one is empty.

In place of the gasoline gauge formerly placed on top of the gravity fuel tank under the forward seat, a special sight gauge glass is now mounted on the dash in plain sight of the driver, and a small electric lamp and push button are supplied to illuminate it at night. The gasoline feed pipe to the carbureter is also supplied with a union at each end, thus greatly facilitating its removal.

During the past year the Pierce art department has been at work on the designs of new fittings, and the result is to be seen in the new hexagonal lamps, door handles and the like. These designs are exclusive on the Pierce cars and the same motif will be employed throughout in the ornamentation.

Not only do these have a distinctive and different shape, but they are different, in that they are fitted to use either or both electricity and gas. The regular gas burner is located in the usual mid-position, while back of it, and slightly higher, is located the bulb of the electric lighting system. This is a small one of tungsten filament, and will give a light fully equal to that of the compressed gas.

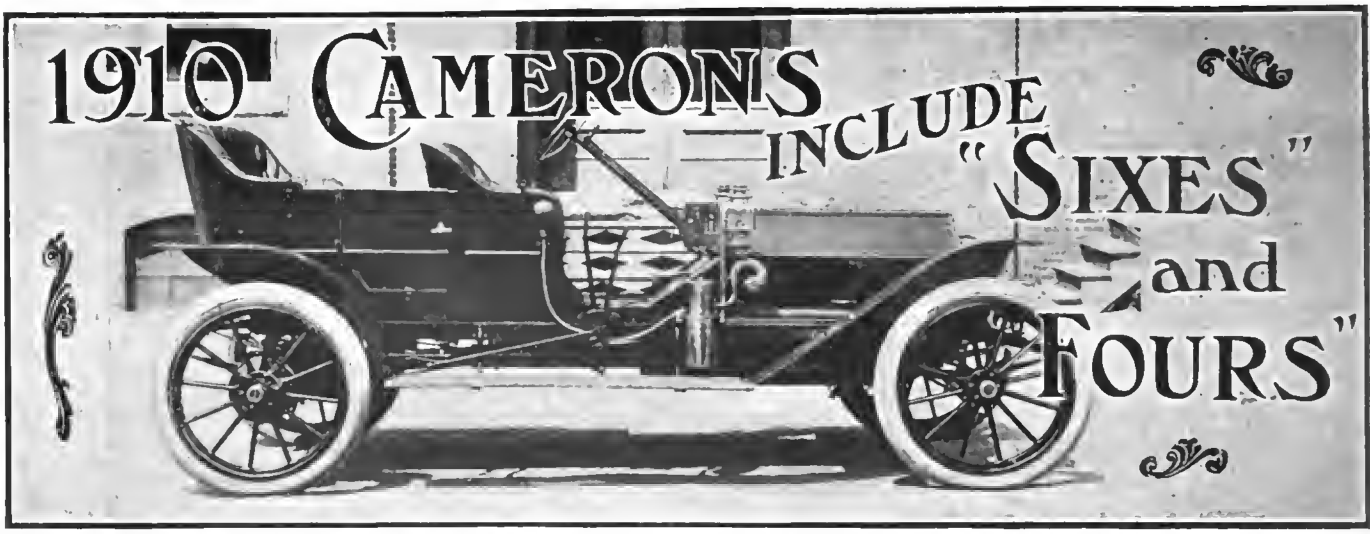
The lengthened wheelbases combined with the unusually large sized tires will make for increased easy riding, if that is possible on cars of the high grade of the Pierce-Arrow. The big six rear tires are probably as large as any now in use on a regular model. Several other cars have larger tires, but these are only sent ou on special order.

Something About Horsepower Ratings—In the following table it should be explained that the A. L. A. M. formula uses as a basis in computation a piston speed of 1,000 feet per minute. On this plan the number of revolutions of the 36 and 48-horsepower motors under the A. L. A. M. rating would be 1,262 revolutions and the 66-horsepower motor 1,090 revolutions. The nominal rating of the Pierce motors, according to various rating formulas, is about as follows:

	36	48	66
A. L. A. M.	38.40	48.6	66.20
Beaumont 750 Rev.	30.48	43.32	63.72
Beaumont 1000 Rev.	40.68	57.72	84.90
Royal Automobile Club	46.26	51.75	69.90

A general summary of the important motor dimensions, wheelbases and tire sizes of Pierce-Arrow cars is:

	36 H.P.	48 H.P.	66 H.P.
Motors	4 x 4 3-4	4 1-2 x 4 3-4	5 1-4 x 5 1-2
Wheelbases			
Runabout and miniature tonneau	119	128	133 1-2
All other styles	125	134 1-2	140
Tires			
Runabout and miniature tonneau	36 x 4	36 x 4 1-2	37 x 5
All other models, front	36 x 4	36 x 4 1-2	37 x 5
All other styles, rear	36 x 4 1-2	37 x 5	38 x 5 1-2



Six-Cylinder Touring Car Has a Long, Low, Rakish Appearance and Is Just as Fast as It Looks

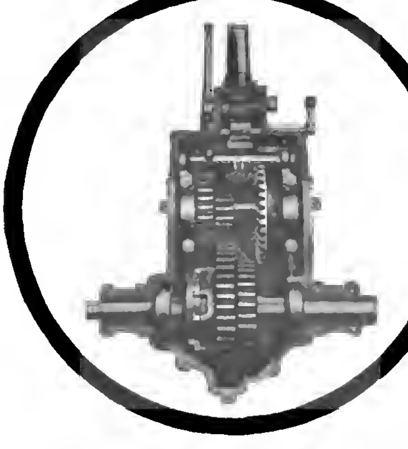
WEDDED as it is to the air-cooled engine and very light construction which goes with it, the Cameron Car Company, Beverly, Mass., and New London, Conn., will produce for the 1910 season both "Sixes" and "Fours," in a variety of runabout and touring car bodies, the former being preferred in the majority of cases. Not only will two separate and distinct types, such as a four and a six, be built, but they will be manufactured in two separate and distinct factories, each devoted to a single style and type of car. This should result in each one being superior to what it would be if the two were made under the same roof. The fours are manufactured at the Beverly plant and comprise five models, including two-passenger runabout, special two-passenger featherweight flyer, three-passenger roadster, four-passenger surrey with detachable rear seat, and standard touring car. The prices range from $950 to $1,100. The sixes are manufactured in the new plant of the Cameron Company located at New London, Conn., and the line comprises five models as above, all listing at $1,500.

It has been the policy of the Cameron Car Company from the very earliest days of its existence in 1902 to manufacture its cars complete in its own works, and this policy is being pursued in exactly the same manner to-day. The four and six-cylinder cars are manufactured in separate plants which build, from the ground up, all parts which go into their respective cars.

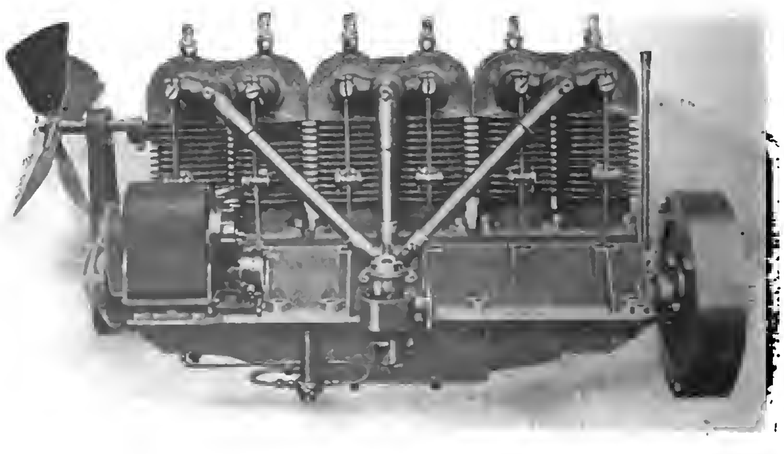
The motors for the coming season show no radical changes and are built along the lines on which Cameron has been working for the last seven years. Minor improvements will be found, but reference to the illustrations herewith will show that important features such as the system of air-cooling and location of valves remain the same as heretofore. The four-cylinder motor is 3 7-8 bore by 3 1-2 stroke, developing 24 horsepower, and the "Six" developing 36 horsepower. Both are regularly equipped with high tension dual system of ignition, which includes the magneto and auxiliary set of dry cells, gear pump, constant level oiling system of a very simple, effective design, oil being carried from a large chamber on the lower side of the engine base through a tell-tale on the dash and forced into the crankcase under a high pressure, where it is sprayed on shaft and connecting rod bearings. Thence it flows to the bottom of the case and lubrication is furnished to the cylinders by splash. The engine base is of aluminum, split horizontally in the center, the cylinders cast singly with radial fins.

Clutch is a self-contained cone of proportionately large diameter and easy angle of contact. Engine bearings are of nickel babbitt; camshaft bearings, case-hardened steel set in cast-iron bushing, and crankshaft rocker arms and all important small parts are of drop forged nickel steel. The wrist pin construction of these motors is the same as has been used by Cameron for years and is slightly different from that known to general practice, the wrist pins being steel drawn tubes, hardened and ground, with a hardened and ground connecting rod swinging directly upon them with no bushings whatever, thus giving two round surfaces as a bearing. These will run almost indefinitely without showing any signs of wear whatever. It is claimed that this construction will outlast half a dozen bronze bushings.

Transmission Rear Axle System—This is of the Cameron patented type, three speed selective, direct drive on all speeds. The six-cylinder system is slightly different from that used on the four-cylinder cars. This change will readily be understood by those who are familiar with the transmission. On the lighter



Six-Cylinder Transmission Is New



Inlet Side of Six-Cylinder Engine Shows Few Changes machines, that is, the four-cylinder line, the transmission carries three gears on the cross or jackshaft and one on the differential, while on the heavier transmission used in the six-cylinder cars, two gears are carried on the cross-shaft and two on the differential. While all of the six-cylinder models weigh less than 1,700 pounds, still this car is slightly heavier than previous models, and with the great power of the motor, of course, requires a heavier gear all round than the four-cylinder cars. The power is delivered from the engine to the rear wheels through a single universal joint to driving shaft and bevel gears, to the cross or jack-shaft, and finally, from the cross-shaft by wide face spur gears to the rear axle. The advantage gained in this construction aside from the fact that the gears, instead of being thrown into mesh sideways, are thrown directly together face on and rolled together with a natural motion, is the fact that the bevel gears never receive more than the engine pull, and being set up firmly in mesh in a solid steel frame running on adjustable ball bearings, have no chance of springing out of mesh under heavy load or showing any undue wear, which means loss of power to a bevel gear.


As the Four-Cylinder Touring Car Appears

In shifting gears, the arch carrying the gear set is first thrown forward in the case when the combination of gears wanted is thrown into line. When traveling crosswise in the case there is no strain against the gears to prevent sliding over. Gears are then brought together, face on, with a natural rolling motion which prevents jar, shock, or any injury to the gears themselves, as no strain of the engine pull can be put upon the driving gear until they are firmly in mesh and locked into position. The reverse gear stands idle except when in use, and is then thrown down in mesh from the top of the case. All gears are of unusually wide face and coarse pitch, are made up of drop forged blanks of chrome nickel steel, as are also the shafts. Ball bearings are used throughout the transmission and rear axle and are of annular type, of Cameron's own construction.

The application of drive to the chassis is the same as has always been used, that is, the drive is carried by a steel tube to a point directly back of the clutch. The distinct advantage claimed by this construction is that there is no tendency to lift on the chassis, but rather a straightforward push which holds the car steadily to the road even at extreme speed.

The rear axle itself is of the semi-floating type and equipped with internal expanding emergency brakes, also external contracting flexible bands on the wheel hub. The front axle is a seamless steel tube with drop forged ends and annular bearings used throughout the wheels. Frame is of pressed steel; springs are semi-elliptic front, full elliptic rear. Steering gear is composed of an adjustable enclosed rack and pinion.

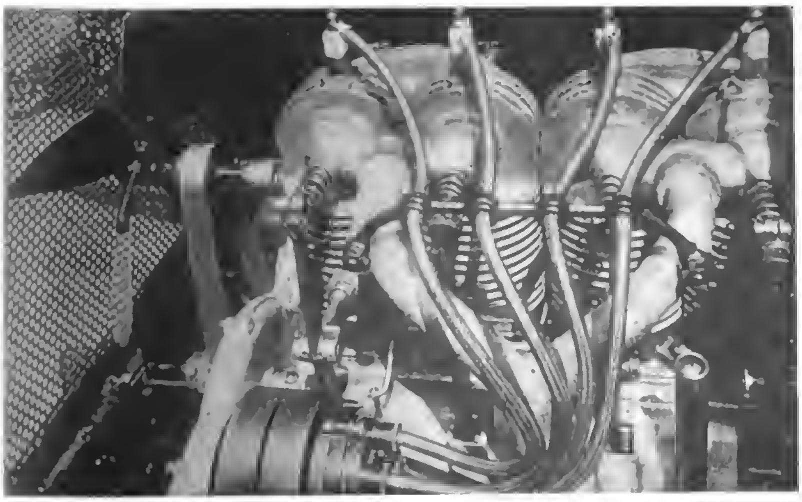
Road clearance of all models is unusually good, and while much greater than cars of similar type, still the center of gravity is kept down to a point below that of many other cars of their class by reason of the method of carrying the transmission and the hanging of the motor in its sub-frame.

The weight distribution is excellent, the motors being hung well back of the front axle, and this, with the method of applying power to the chassis, gives the cars extreme stability.

More About the Speed—All models are very fast, it being claimed that while 75 per cent of the purchasers will remark that a car doing "twenty-five miles an hour is sufficient for anybody," that there is too much red blood in the veins of the average American citizen to sit back and let anyone throw dust in his eyes if he can help it.

This result is not sought after but is obtained incidentally to the light-weight construction, which, to use a roundabout way of figuring, comes from the use of the air-cooled motor of high efficiency. That is, the engine gives such a high ratio of power to weight, that combined with extremely light other parts, the *ensemble* is of unusual lightness. So much is this the case that this car may not participate in races sanctioned under the new racing rules. This is brought about by the fact that the new rules specify a minimum weight, and in framing them up, this lowest admissible figure was set so low as to go below the figure actually attained by Cameron. So, it is that, while actually "hankering" for a chance to race the cars against other and natural competitors, this company has been obliged to either abstain or go out of its class and meet much higher powered cars, with which it does not compete naturally. So, this competition would show nothing worth while. The Cameron Company uses this argument in favor of a revision of the existing rules under which racing is conducted.

The company has expanded greatly in the last year and states that for the 1910 season it will be the largest producers of air-cooled four and six-cylinder cars in the United States.


Inlet and Ignition Side of the "Four" 24-Horsepower Motor


How It Looks from the Exhaust Side

THE AUTOMOBILE

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AVIATION'S UNUSUAL DEVELOPMENT

History has been made so rapidly in the new science of aviation that this staid old world is still rubbing its eyes in amazement, unable quite to comprehend what has happened. First Orville Wright dashed ten miles cross-country, over hills and ravines, carrying a passenger; one morning Louis Bleriot, with astonishing facility, flew across the English Channel; then the Rheims aviation tournament began, and since then miracle has followed miracle so swiftly that it has been difficult even to keep their record.

Last summer, when Orville Wright was making his first trials at Fort Myer, we declared our belief that the fundamental principles of aviation had been discovered, and that after perhaps a decade of experimenting and perfecting present designs it would be possible for the ordinary business man to buy an aeroplane and learn to operate it just as he now buys and operates an automobile. It seemed that the aeroplane was as susceptible of improvement as its forerunner on land, and that equal periods of time would bring equal development. Our prophecy was all too conservative. Not ten years, but a single twelve-month, has sufficed for that development. The progress which the automobile made between 1890 and 1900 the aeroplane has made between 1908 and 1909. Already there are half a dozen reputable firms in this country and abroad engaged in manufacturing aeroplanes as fast as their limited equipment allows, and their order-books are filled for months in advance. Prices range from $2,000 to $5,000. It is no longer thought necessary to guarantee flight; that is taken for granted.

No single feature of the Rheims meet has been so remarkable as the shortness of the training of many of the aviators, and the ease with which they learned to handle their machines. M. Bunau-Varilla, a youth of nineteen, received a Voisin aeroplane from his father as a birthday present; the other day he made a flight of 100 kilometers with the greatest ease. Rougier, a former automobile driver, scored in the height contest and incidentally flew 90 kilometers, with almost no preparation. Fournier purchased a Voisin machine, and after a few minutes' trial took up a friend as passenger and flew around the course. Ruchonnet, a foreman from the Antoinette factory, after some verbal instruction, made a good flight.

In spite of this comparative inexperience of the operators and the great number of machines present—it is estimated that 1,300 flights were made during the week—there was not a single fatal or even serious accident. It is a record of which any sport might be proud. Above all, the meet has conclusively demonstrated that the prospective aeroplanist needs no special talent, no long course of preparation; only a clear head and a steady hand.

THE PRESENT PRICE OF SPEED

Whether it be in the hazardous undertaking of "competing" in circular track racing, or in the more reprehensible practice of utilizing the public highway as a racecourse, it is plainly apparent these days that an alarming price is being paid for speed. Unfortunately, the spectacular performances of the few are magnified in the printing, with the result that the general public begins to ask if all automobilists are not more or less unseated in their reason when at the steering wheel. It is an unfortunate situation that has widespread advertising at the moment, with fatalities in and out of competition, and one cannot doubt but that the effect is decidedly injurious to the industry and pastime.

Many, harassed with natural timidity, are keeping off the roads because of the ever-expected appearance, round the turn in the road, of the man who deserves but seldom gets a jail penalty. In competition, the man who participates usually risks only his own life, though of late there has been, in several instances, inadequate means of safeguarding those who pay to watch a spectacle which not infrequently excels in blood-letting the sports of ancient Rome.

In most instances, it has become nothing more than a gate-receipts proposition, and the idea of betterment in the building of automobiles figures as of decidedly secondary importance. The manufacturers will do well to question the question of further support of mile circular track racing, while the automobile clubs can find a timely field of operations in ridding the road of its inconsiderate occupants.

Less of track sport and less of highway casualties are demanded for the good of automobiling; for the increasing list of killed and wounded is the worst kind of an advertisement, and one which is discouraging to the army of interested ones who have yet to become the possessors of motor-driven vehicles.

APPLICATION BLANKS OUT FOR ANNUAL A. M. C. M. A. SHOW

NEW YEAR'S Eve proved so fortunate an opening for the Grand Central Palace show in New York this year that Chairman R. E. Olds and his associates on the show committee of the American Motor Car Manufacturers' Association decided that they could choose no better date for the tenth show in 1910. The coming of the new year is always a gala occasion in New York, and automobilists and dealers like to combine the opening night of the show with the festivities which begin on Broadway at midnight. From the selling point of view, too, the date is a good one, as during the first week of the new year dividends amounting to $200,000,000 are disbursed by railroad and industrial corporations.

With the A. M. C. M. A. will also exhibit the members of the Importers' Automobile Salon, and the foreign cars will, as last year, be allotted space on the main floor. The Grand Central Palace show will thus be the only international show in America, and indeed, in the world, as it happens that there will be no Paris Salon this year.

Application blanks for space and diagrams of the floor arrangement have already been sent out to manufacturers who are expected to participate. This year the management has 72,000 square feet of floor space to dispose of, so that the exhibitors will be assured of better facilities than ever before. The main floor and part of the balcony floor will be devoted to American and foreign gasoline, steam and electric vehicles. Commercial vehicles and motorcycles will, as heretofore, be found on the balcony. The second balcony, with odd spaces elsewhere, will be given over to tire and accessory exhibits. The members of the Motor and Accessory Manufacturers have contracted collectively for several thousand square feet on the first balcony.

All applications for space received up to Friday, October 1, will have equal consideration in the first allotment on Friday, October 8. The allotment of space to the members of the Motor and Accessory Manufacturers will be made by that association, and the same plan will be followed for the members of the Importers' Automobile Salon. Members of the A. M. C. M. A. will have the first drawing for vehicle space other than that allotted to the Importers' Automobile Salon.

Associated with Chairman R. E. Olds, of the Reo Motor Car Company, on the show committee are S. H. Mora, Mora Motor Car Company; Benjamin Briscoe, Maxwell-Briscoe Motor Company, and H. O. Smith, Premier Motor Mfg. Company. The Importers' Automobile Salon will again be represented by E. R. Hollander, of the Fiat Automobile Company, and the Motor and Accessory Manufacturers will be cared for by David J. Post, of the Veeder Mfg. Company. The general management of the show will again be under the supervision of General Manager Alfred A. Reeves, of the A. M. C. M. A.

RULES FOR SAVANNAH-ATLANTA RUN

SAVANNAH, GA., Aug. 30—In connection with the widely extended movement for good roads in this State, and the large number of automobile contests planned for the opening of the Atlanta automobile show, there will be an endurance contest from this city to the scene of the exhibition in November. It will be held by the Savannah *Morning News* and the Atlanta *Constitution*, under the auspices of the Savannah Automobile Club, and will be known as the Georgia Highway Reliability contest. The start will be made from the De Soto Hotel, November 8, with a night stop at Milledgeville, and the finish will be at the Auditorium in Atlanta on the evening of November 9.

The rules as announced are much similar to those of the recent Glidden tour, embodying the principle ones with slight modifications necessitated by local conditions. The cars will have to be run on a definite schedule, with penalizations for lateness, will have to carry observers, and will be charged with time used in making repairs or certain adjustments. Three classes have been arranged, the first for cars catalogued at $2,000 and over, those selling above $1,200 but less than $2,000, and, third, those selling for less than $1,200. For each class there will be a cash prize of $335, with provision for a division of this sum among the drivers in case there should happen to be a tie.

1909 VANDERBILT CUP SEEMS ASSURED

NEW YORK, Aug. 30—Assurances that there will be a Vanderbilt Cup race this fall are now regarded as certainties. At Albany the Motor Cups Holding Company was incorporated today, "organized to promote automobile races for the silver cup donated by William K. Vanderbilt, Jr., and known as the Vanderbilt Cup, and for the gold cup donated by the Automobile Club of America, and known as the Grand Prize." The capital nominated is $5,000, and the incorporators include for the most part directors of the parkway. The names connected with it, at Albany, are: William K. Vanderbilt, Jr., Henry Sanderson, Colgate Hoyt, Harry Payne Whitney, Henry B. Anderson, Elbert H. Gary, William Pierson Hamilton, H. B. Hollins, Dave Hennen Morris and Mortimer L. Schiff.

The formation of this company is in line with the agreement reached by the A. A. A. and the A. C. A. last year by which the new company would promote the two great events over the Long Island motor parkway. Within the last few days the Manufacturers' Contest Association, composed of the automobile manufacturers, took a mail and telegraph vote as to what concerns would enter the Vanderbilt Cup contest, if it were organized and held this fall. It is reported that the results were surprisingly satisfactory.

FAIRMOUNT PARK RACE ENTRY LIST HALF FILLED

PHILADELPHIA, Aug. 30—Half of the number of cars which are permitted in the Fairmount Park 200-mile stock car race of the Quaker City Motor Club have been entered. Last week saw the number raised from six to ten, through the listing of two six-cylinder Thomas cars, a Benz and a Welch. All of these are Bergdoll interests, so that the young millionaire will have the greatest chance to win, if numbers count. The big Thomas cars will be driven repectively by Louis J. Bergdoll and Willie Haupt, the Benz by E. R. Bergdoll, and the Welch by Al Hall. Those entries made previously are: Acme, Leinan driving; Palmer & Singer, Walace; Simplex, J. F. Betz, 3d; Apperson, Herbert Lytle; Kline-Kar, and Lozier.

The charity feature of the event has attracted widespread attention, and many of the people most prominent in society, municipal and business circles will be found actively engaged when the end of the vacation season arrives. The University of Pennsylvania students have volunteered as ushers. The Globe Printing Company has donated all the printing of tickets for parking spaces and grand stand seats. If necessary, there are several local military organizations which may be called upon as guards, in addition to the 1,200 of the "finest" which the city authorities will have on the eight-mile course. Arrangements have been perfected for locating the repair and supply pits in front of the stands, thus giving the spectators a fine view of the quick action.

LOWERED FREIGHT CHARGES ON AUTOS

New York, Aug. 30—Through the efforts of the traffic department of the National Association of Automobile Manufacturers, a signal reduction in the freight rates on automobiles has been secured. Dealers, manufacturers, and the public, alike, will be interested in the announcement that, after October 1, the railroads will charge for shipments of single automobiles on an actual weight basis. Heretofore the rates have been made with a minimum of 8,000 pounds, for first-class freight, for all passenger machines with wheel bases exceeding 86 inches. As the majority of the popular-priced autos at present have longer wheel bases than this, there has been much complaint against a rating of 8,000 pounds for these light cars.

By the new arrangement there is claimed a more equitable distribution of the transportation charges, so that smaller machines will be taken at an equivalent of 5,000 pounds at first class. The charges will be increased only as the weight, size, and value increase. Similar changes will be made in the shipments of boxed or crated material, on which actual weight will apply, instead of the fixed medium. The new classification affects shipments originating in the Northern States east of the Mississippi river, thereby including practically the entire manufacturing belt. The Association's traffic department effected an arrangement on a similar basis with Western and Southern roads some time ago.

The entire automobile industry is represented in these matters by the N. A. A. M. traffic department, for it has an agreement with both the Association of Licensed Automobile Manufacturers and the American Motor Car Manufacturers' Association. J. S. Marvin is the general traffic manager, and the various automobile makers co-operate with him. To make the requirements of the industry known, Mr. Marvin attends the meetings of the railroad rate committees at various points, and thus keeps the automobile industry in close touch with transportation affairs.

TOLEDO'S AUTO INDUSTRY STILL GROWS

Toledo, O., Aug. 30—Through the organization of the Warner Gear Company this city gets another branch of the automobile industry, the third established here recently. The new concern has been formed by F. W. Warner, of Muncie, Ind., and arrangements have been made with the Overland Automobile Company to house it until a factory building can be erected. The machinery has been shipped and will be turning out gears as soon as possible. The Overland Company has given the new firm a contract for the manufacture of its gears and the new plant will be constructed on ground adjacent to the Overland factory. About 100 men will be employed at once and that gradually increased to the maximum of 500.

The third member of the trio, and the second established, is the Kinsey Manufacturing Company, which makes radiators, frames and sheet metal material. All three will be located on the same property, for the Overland interests have purchased five additional acres which will give space for several buildings. J. N. Willys, president of the Overland Motor Car Company, has stated that the force at the local factory will shortly be increased to 1,000, and that the greater part of the 1910 output will be produced in Toledo.

INDICATIONS OF INCREASING PROSPERITY

Indianapolis, Aug. 30—Messrs. Wheeler & Schebler advise that ground has been acquired in the rear of their present buildings, and contracts let for another addition to their plant. The new building will be of brick and reinforced concrete, three stories high, and will cover an area of 235 x 125 feet. This part of the plant will be devoted entirely to the assembling of Schebler carbureters, giving employment to 800 additional men. The entire plant is still running on a 24-hour schedule, the production of carbureters having reached 900 per day, and being expected to reach 1,000 per day within the next two weeks. Contracts have already been made to supply 220,000 Schebler carbureters for the 1910 season.

A MOST COMPLETE INSTRUCTION BOOK

To every owner of an automobile one of the most valued publications regarding the car is the instruction book issued by the factory. This is not simply because it may include hints for a novice, but because it has diagrams of the cars, and details of the construction. Especially is this true of one of the best instruction books issued this season, that of the Stevens-Duryea Company, of Chicopee Falls, Mass. The edition gives the details of the four-cylinder Stevens-Duryea cars so explicitly that one could be taken apart and assembled with no other guide. It is printed on heavy paper, and in as much style as would be given to the handsomest catalogue designed to sell machines.

Every part of the two models of Stevens-Duryea output with the four-cylinder chassis is listed, and its location indicated on photographs. The various assemblages, such as motor, transmission, rear construction, clutch, steering gear and axles are shown separately, and there are directions for the care and repair of them all. A most important part of the booklet is that dealing with the oiling systems, the various parts of the machine which need lubrication, and just how often they should be treated. Then there are detailed helps for finding any trouble or derangement, with directions as to the readjustment, being of special value in regard to the ignition and carburetion systems. By following the instructions given in the booklet there would be no need of hunting over an entire car to find the places for adjustment, for oiling and for taking up wear in the parts.

TEST RUNS BY THE WAVERLY ELECTRIC

Indianapolis, Aug. 30—Some interesting experiments were recently conducted by the Waverley Company to illustrate the different mileage that may be obtained by the same car under different road and service conditions. A Waverley coupe, equipped with a 30-cell, 11-plate battery, was sent with two passengers from this city to Noblesville and return, 51 miles, over ordinary country roads with several steep hills, and was then run about Indianapolis streets until the battery was exhausted. The total mileage was found to be 65.9 miles. The same car was used for the next test, but with a 30-cell, 15-plate battery substituted. Again the coupe was sent out, with two passengers, and running on the streets, rolled up a mileage of 90.1, which is regarded as exceptional. In the third test the car, this time with a 32-cell, 15-plate battery, ran to Terre Haute, 76 miles, and on Terre Haute streets until a mileage of 86 was attained. Then the same car was stripped to reduce weight, the coupe top being removed; with a 30-cell, 15-plate battery, and only the driver on board, it made 142 miles without recharging.

AMERICAN SAMPLE EXHIBIT AT BERLIN

Automobile and accessory manufacturers may be interested to know that arrangements have been perfected for opening a permanent sample exhibition in Berlin in the spring of 1910. The enterprise is in charge of the American Exhibition Company, 77 Broad street, New York, from whom blank applications for space and any desired information may be obtained. The aim of the exhibit is to demonstrate to European, and especially German, merchants and business houses the importance and excellence of American manufacturers, and to this end the German management will advertise the exhibition throughout the Continent, and will co-operate with American manufacturers and exporters in every way.

MOVING PICTURE SHOW "EN AUTO"

Columbus, O., Aug. 30—Albert Taylor, of Mt. Sterling, O., has devised a new use for the automobile, for since the wonderful growth of the moving picture business he has been carrying his entire outfit on an automobile truck. A machine with a capacity of three tons is used, and on this is loaded a tent and all the paraphernalia necessary.

How the Big New Atlanta Autodrome Will Look When Completed Ready for the November Races

AUTODROME WILL HAVE A $5,000 TROPHY

ATLANTA, GA., Aug. 30—The city of Atlanta is going to be asked to stand sponsor for the big $5,000 trophy that is to go to the winner of the star event of the races at the Autodrome in November. What is more, the people of Atlanta are going to be asked to take part in the presentation. This is all to be done at the request of the Atlanta Automobile Association. Not because the association wants any part of the expense borne by the people, but because it is believed that the citizens generally wish to take part in the donation.

It has been determined to give a $5,000 trophy to the driver coming in first in the big race, and on that trophy will most likely rest the seal of the city of Atlanta. It will be the gift of the city, and all the people will have an interest in the giving.

Mayor R. F. Maddox has named a committee to look after the trophy funds and to take charge of the matter for the city. The general council is expected to vote its approval of the gift.

CHEYENNE'S MOTORDROME A SUCCESS

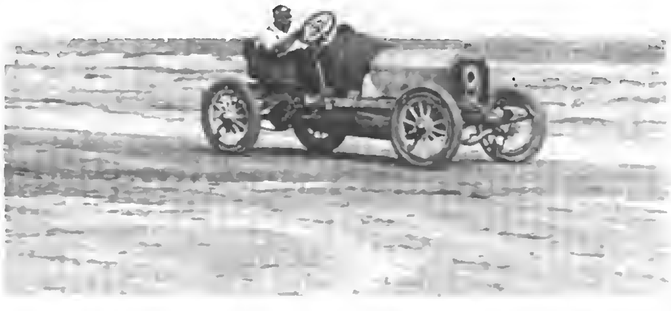
CHEYENNE, WYO., Aug. 27—The much-talked-of motordrome, built under the direction of the Cheyenne Motor Club, is considered to be a great success, and it will be much improved during the next few weeks. The great gathering in this city for the races, which were held here on August 17, has led local capitalists, as well as the members of the club, to enthuse over the prospects of making this the center for racing in the West. The Denver Motor Club was represented by a delegation of 200, who toured to this city in about 60 machines.

The two feature races last week were the one at 200 miles and the one at 25 miles, both well entered by a fast field. The long-distance event was captured by Martin Fletcher in a 40-horsepower Oldsmobile in 3:39:47, an average speed of about 58 miles per hour. The Marmon, driven by Harry Ball, was second, and the Renault, driven by Charles Basle was third. The other starters were: Moon, Harold Brinker; Colburn 30, Al Ingersoll; Colburn 40, Ernest Griffith; Buick, Gaston Morris. Basle, in the Renault, captured the 25-mile race, in 25:17, with the Oldsmobile second, in 25:59, and Ingersoll's Colburn third, in 27:36. Fletcher, in the Oldsmobile, was given official credit for the fastest four-mile lap, 3:40, or 65.4 miles per hour.

TEXANS RACE ON GALVESTON BEACH

GALVESTON, TEX., Aug. 28—A crowd of fifteen thousand people saw some fast racing on Denver Beach, near this city, last week. The five-mile course along the beach had been rolled hard and smooth by the waves, and many of the cars reached mile-a-minute speed. The popularity of the races came near proving their undoing, as the three policemen assigned were worse than useless to keep the course clear. After the first lap had been run the spectators swarmed out on the beach, and only opened a narrow passage as the speeding racers bore down on them.

The first event, a 50-mile free-for-all, was won by Belcher with a 50-horsepower Knox in 51:54 1-2, closely pursued by the 30-60 Stearns, driven by Kent. Captain J. W. Munn, who had entered a special car of his own construction, stripped a gear at the start. It is probable that even better time could have been made with a clear course. The motorcycles provided the fastest time, Hogans on an Indian covering 10 miles in 9:05 1-2. The last two races were run over a three-mile course. Dehyma, a young driver from San Antonio, won the second event with his Stoddard-Dayton in 22:05 1-2 for the 21 miles, in spite of the seven sharp turns. In the final, at nine miles, Dr. Gammon's E.M.F. beat a Buick in 11:40.



Knox, Which Won 50-Mile Free-for-All, Speeding on the Beach

Privately Owned Moon Cars in St. Louis Demonstration

"Made in St. Louis" was recently celebrated in that city. The line-up of Moon cars, two abreast, extended over two whole city blocks. This very large parade of locally made cars attracted an unusual amount of attention from the usually staid and quiet inhabitants of the Missouri city. This city has, however, despite the fact of its being staid and quiet, a very large number of machines in relation to its population, and what is more, the owners drive the cars themselves. The cars in the parade were mostly of the "45" type, since the new thirty is not yet being sent out for public use.

First Car from the Rider-Lewis Anderson Factory

Just 14 days after the installation of the new factory of the Rider-Lewis Motor Car Company, at Anderson, Ind., the first 1910 car was turned out. The capacity of the plant will be from 20 to 30 cars per day, and will soon be in full running order. The officers and employees of this hustling western company think that this is "going some" even for a hustling town. It is said that this same speed will be applied to the further production of the models for the ensuing year, which will be pleasing news to the many agents, who have already contracted for the factory output.

Seventy Feet Under Baltimore in a Winton Six Touring Car

W. L. Duck, manager of the Baltimore branch of the Winton Motor Carriage Company, recently took a party of friends for a ride in the new $1,500,000 sewer being constructed in that city. The tube is 5 3-4 miles long, its deepest section is 70 feet below the surface, the height 11 feet, and the width 12 1-4 feet.

MOON CARS ENTER THE $1,500 CLASS

St. Louis, Aug. 30—The popular $1,500 class has received another addition in the 1910 Moon "30," which the Moon Motor Car Company of this city will bring out as a running mate to its "45." The Moon engineers have been at work on the design of this car for the last two years, so that its production is undertaken with full preparation and forethought. In its general lines the "30" follows the usual Moon practice; many parts of the two models are interchangeable. The new car has not been skimped in any way to bring down the price. Its pressed steel frame is of a section 4 inches deep; it has 34-inch road wheels and a 1 3-4-inch crankshaft. A magneto is regular equipment. The change-gear gives three speeds, selectively operated, and is carried on the rear axle. About one thousand of these cars will be built during the coming year.

The Moon "45" for 1910 will be a continuation of the present model, with a few changes. The cylinder dimensions will henceforth be 4 3-4 x 5 inches; the wheelbase has been lengthened to 120 inches, and 36-inch wheels will be used.

Winton Prize Winner in Floral Parade

This car, owned and driven by Charles E. Bradfield, of Barnesville, O., won first prize in a floral parade held in that city recently. White roses were used chiefly in the decorations.

THE PIERCE WINNER'S TAIL LIGHT

New York, Aug. 30—In the showrooms of the Harrolds Motor Car Company, the New York agent for the Pierce-Arrow cars, is No. 108 Pierce roadster, which won the Hower trophy in the recent A. A. A. tour. There has been considerable contention since the finish of the contest as to the condition of the tail lamp of this car, and the Harrolds' officials are showing it to prove their claim that there has been a misunderstanding in the matter. It has been stated recently that this lamp was bent, that its bracket was in a similar condition, and that it is impossible to light it.

That this is a mistake, however, is shown by inspection of the protested part. The lamp and bracket are still covered with Kansas mud, and evidently no attempt has been made to repair it—if that had been necessary. The bracket is straight, as a comparison with those of touring cars on the show room floor shows. The lower half of the lamp—the part below the side lug—was evidently struck by something and bent slightly to the rear, but not loosened. The upper half of the lamp is as straight as it should be. The glass in the door was broken during the trip, but that the lamp would burn was proven by John S. Williams, who drove it in the tour, by the application of a match.

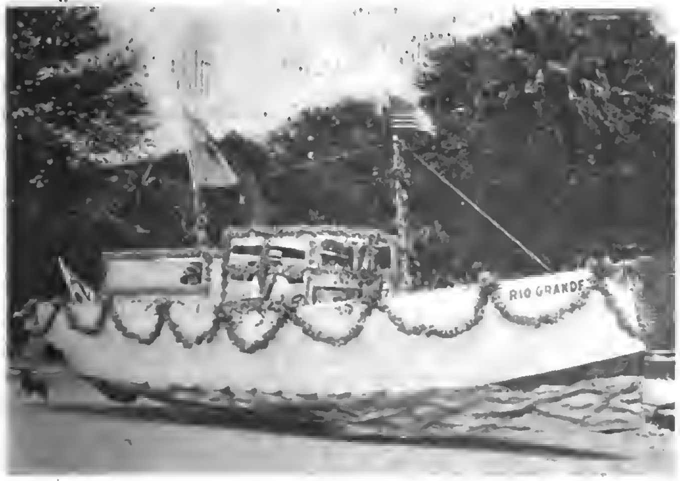
In regard to the statement that the Pierce-Arrow did not have to light its lamps all around in being tested, a Harrolds Company representative asks as to whether those cars which did light lamps were given their inspection at night. The lamps would thus be required by city regulations.

SUPERINTENDED BUILDING HER OWN CAR

When it came to building the car for Mrs. John G. Agar, of New Rochelle, N. Y., nothing else would do but that Mrs. Agar superintend the construction of the car, and, in particular, the body and trimming, herself. This was upon the occasion of the purchase of her annual car for the year 1909; that is, she has had so many Columbia cars, both gasoline and electric, that to the factory it seems as if she buys one every year. This latest acquisition is a distinctive car, in that it is one of the 50-horsepower Columbias, but three of these having been built by the Electric Vehicle Company, now the Columbia Motor Car Company. These three were powered with four-cylinder 5½ by 5½ engines, characterized by the usual make and break ignition and a number of new features not previously incorporated in Columbia cars. So well have these three cars done that the management is thinking seriously of adding this to the 1910 line as a high-powered leader. The Agar car, as shown above, was equipped with a five-passenger, close-coupled body, painted a dark blue with a stripe of lighter blue.

One of the Three 50-Horsepower Columbia Touring Cars

An unusual interest attaches to this car, for all of the final work upon it was superintended by a woman. It matters not that the chassis was all finished ready for the body when she took up her work, she should get the credit which belongs to her. The color scheme is an unusually beautiful one, also Mrs. Agar's idea, a very dark royal blue with a very fine hair line stripe of a lighter tint of blue. To the chassis, as well some interest attaches, since that, too, is out of the ordinary, being one of the only three fifty-horsepower Columbias ever built, these three being a special trial lot.



Decorated Premier Wins First Prize in Tampa Celebration

TAMPA TO HAVE AN AUTO RACE TRACK

TAMPA, FLA., Aug. 28—Among the several important instances incident to the phenomenal progress made by this city during the past eighteen months was the celebration of the Fourth of July. This took the form of a thanksgiving celebration in honor of the establishment of a regular weekly schedule by the Mallory Steamship Line between Tampa and New York City. The feature of this celebration was the automobile parade, in which over three hundred cars participated, all handsomely decorated. The procession made a tour of the city covering a little better than fifty miles of excellently brick-paved streets. The first prize was awarded to T. Edward Bryan, president of the Tampa Auto Club, and vice-president of the Tampa Board of Trade, who had his Premier "30" converted into an exact reproduction of the Mallory steamship *Rio Grande*, which was the first steamer to enter Tampa under the new schedule.

Within the past few days the Tampa Auto Club has purchased a tract of ',000 acres of land near the city, upon which it proposes to construct at once a five-mile auto race track.

Mrs. Kenneth R. Otis Gives Orphans an Outing

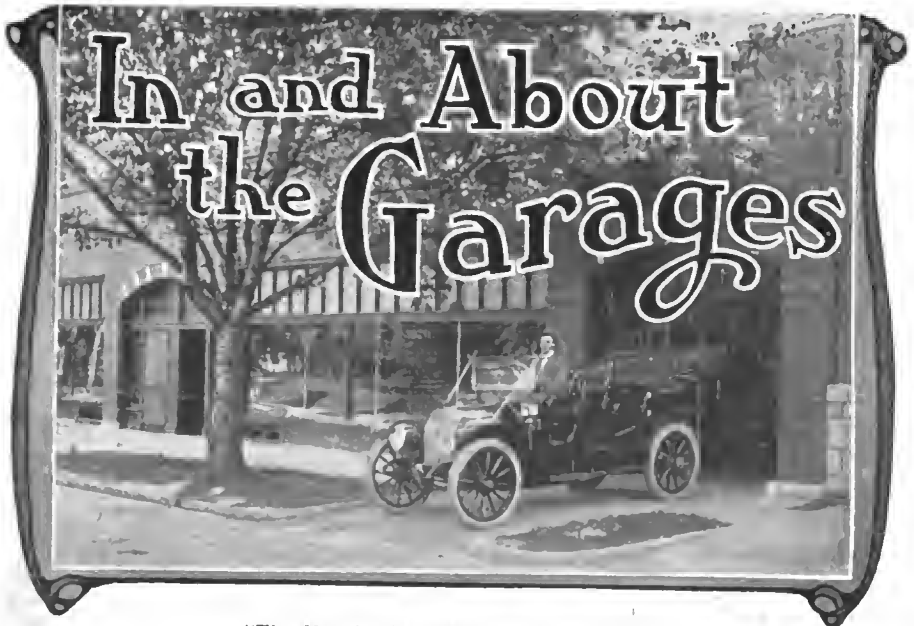
An impression that Mrs. K. R. Otis of Cleveland cares for nothing but breaking road records with her Stearns car is disproven by this photograph. It was taken during the recent Orphans' Day celebration in Cleveland, and shows Mrs. Otis seated in her car, surrounded by the orphan children whom she elected to show a good time on that particular day. Not only was the good time forthcoming, but Mrs. Otis, in the little ways peculiar to her sex, made the children riding in her car feel that they had an especially delightful day, more so than other children, who were so unfortunate as to be driven out for the day in cars handled by mere men. As usual, the car behaved perfectly, never once giving the skillful driver a chance to show how well she is acquainted with its mechanism nor an opportunity to display her skill in making impromptu roadside repairs. Mrs. Otis said that she enjoyed the day fully as much as any of the little charges in her care.

MAXIM VISITS OLD HOME IN A FRANKLIN

As illustrating the great strides made in invention in the later days is a trip made recently by Hudson Maxim, of gunnery fame, to his old home near Abbott, Maine. Forty years ago Mr. Maxim left his boyhood surroundings and made his way, as best he could over the rough paths, to the nearest town, and later to the big cities. His return, however, was under more auspicious circumstances, for he drove his six-cylinder Franklin touring car over Maine highways in as many hours as it had formerly taken days. In speaking of the trip, Mr. Maxim said: "The big Franklin took us from Indian Rest to Guilford in five hours' time."

Rushmore Lamps to Light the British King

This photograph shows the new English Daimler car with a Silent Knight engine which has just been purchased by King Edward VII of England. The car is equipped with Rushmore headlights, and is the second at the royal garage thus furnished. The picture was taken at the Goodwood races and the King is in the car.



"The Man in the Moon" is Henry Merrill

At the wheel of his Moon demonstrator, he is leaving the handsome garage of the Kansas City Moon Car Company, the Moon representative in Western Missouri, of which he is president.

HENRY, ILL., Aug. 30—The Henry Auto Company has recently completed one of the best equipped garages in this part of the State. It is a two-story brick building, with the basement acting really as the first floor. The main floor has its entrance direct from the street and is used by the salesroom, offices and garage departments. The lower floor is reached by an incline road on the exterior of the building, for automobiles, and is given over to the repair shop. The dimensions of the structure are 50 by 70, allowing ample space for the work of the concern. Inasmuch as it is situated upon the river bank, a considerable trade in motorboat supplies and repairing is carried on. A private heat and power plant is maintained, using electricity for power direct from the plant during the day, and from storage batteries at night, or when the dynamo is not being run. The shop is equipped with lathes, drill press, forge, emery grinder, air compressor and tank, and a full line of small and portable tools. The agency for the Ford, Rambler and Holsman automobiles is held, as well as for Ferro marine engines and Yale motorcycles.

UP-TO-DATE GARAGE—UP-TO-DATE CITY

KANSAS CITY, MO., Aug. 16—One of the handsomest show rooms and garages in the West is located at 3320 Main street, in this city. It is the local headquarters of the Moon Car Company, which is the exclusive agent for the Moon in Kansas City and vicinity. Henry Merrill, the president of the company, is the oldest dealer in Kansas City, and is the man at the wheel of the Moon demonstrator shown in the above photograph, which is just leaving the entrance of the garage. The company has had a very successful season and is making active preparations for the business of 1910.

Baltimore—A magnificent show room is being built by J. A. Rice, manager of Rice's Garage, Madison and North avenues. To make this improvement, 2,400 square feet of floor space which was formerly devoted to storage purposes, is being used. Manager Rice recently made an extended trip to the Welch factory in his six-cylinder Welch, covering almost 3,200 miles in the run.

Philadelphia—The Franklin Motor Car Company has given a contract for the construction of a machine shop and garage at 3430 Chestnut street. This will be made the headquarters and the present location at 143 North Broad street will be retained for show purposes.

Los Angeles, Cal.—Edward Gadden has had plans completed for the erection of a brick garage on Hope street, between Eleventh and Twelfth streets. It will be 50 by 157 feet in size, with cement floors, plate-glass front, reception and show rooms, shops, etc.

Jacksonville, Fla.—Frederick Philips has opened a new garage at the foot of Laura street, which is one of the best equipped in the State. He will hold the agencies of the Franklin, Chalmers-Detroit and Hudson. J. T. Mollard will be in charge.

New Haven, Conn.—The Wheeler & Wuesterfeldt Company has filed plans for the erection of a garage and automobile repair shop, to be built at Temple and George streets. It will cost about $21,000, and work will be commenced at once.

Valdosta, Ga.—Ground has been broken for a new garage and repair shop for A. A. Parish, at 116 and 118 West Central avenue. The buiding will be 60 by 90 feet in size and fully equipped with apparatus for storing and overhauling cars

St. Louis—The recently incorporated White Garage Company has leased the eastern half of the modern garage at 5023-25 Delmar Boulevard, and in addition to its garage business will have the agency for the White steamer.

Latrobe, Pa.—The Latrobe Automobile Company has opened a garage at Latrobe, 30 miles east of Pittsburg, on the main line of the Pennsylvania Railroad, and will have two good agencies.

Tampa, Fla.—The Southern Automobile Company has purchased the garage in the rear of the Almeria Hotel, and will conduct a general garage, repair and agency business.

Anderson, S. C.—J. S. Fowler has completed his new garage on West Benson street, and has opened it to the public. It is under the direction of J. C. Stribling.

Houston, Tex.—Lea, McKallip & Abbey have opened a new garage and salesroom at 714 Main street, and are acting as agents for the Jackson and Babcock cars.

Bolivar, N. Y.—A garage which will accommodate 30 machines will be built for Michael Healy on Belmont street. It will be 40 by 80 feet in size.

McPherson, Kan.—The McPherson Garage Company has occupied its new building on Main street. The building is of brick, one story, 50x120 feet.

Elizabeth, N. J.—Newton A. Barnett has opened the "Cranford" garage, with a capacity of 100 automobiles.

Henry Garage, with second floor down stairs.

A Squad of Ramblers Soon to Be Delivered Into Their Buyers' Hands

These cars were recently delivered to W. A. Nolan, of Grand Meadow, Minn., the Rambler agent for the vicinity, to be distributed among the prosperous Minnesotan wheat-growers. Automobiles are found on every farm in this part of the country.

Marmon Will Not Build Racing Cars—The Marmon car made its début in track racing at the Indianapolis meet, but the manufacturers state that they have never built racing cars, and have no intention of doing so. Three of the stock cars were put in the speedway events because the Marmon interests felt they should assist the home enterprise. The results, however, were exceedingly gratifying and cause for congratulation, because the machines again proved reliability, which has been shown many times on the road. One of the Marmons captured the 10-mile free-for-all, and another was third in the 15-mile handicap; but it was in the long-distance events that their best showing was made. In the 100-mile race there were two "Thirty-twos," and they took third and fourth places, making the century in 1:42:30—very nearly a mile a minute. In the 300-mile contest on the last day all three Marmons were running beautifully when the race was called off at the 225-mile distance. Only seven of the 19 entries were then left in the grind, three of them Marmons, and it appeared that they were sure of leading positions.

Additions to the Quaker City Auto Row—Before snow flies there will be at least two fine additions to Philadelphia's automobile district, one the building of the Dayton Motor Car Company at 253-259 North Broad street, and the other the new Horn & Hardart building at 242-248, just across the street. The Dayton Company's structure will be three stories high, 85 by 120 feet in dimensions, and thoroughly equipped from basement to roof with facilities for sales business, garage, repair shop, and patrons' and chauffeurs' club rooms. The main part of the Horn & Hardart edifice will be occupied by the local branch of the Winton Motor Carriage Company. It too will be three stories high, and its size will be 75 by 180 feet, of reinforced concrete. A recent addition to the row was the local branch of the Continental Caoutchouc Company, at 154 North Broad street, with S. S. Poor as manager.

Grout Showed Well in Hill Climb—At the recent hill climb of the Chicago Motor Club at Algonquin the 32.4-horsepower Grout was one of the class winners. The time of the cars in the formula class was taken in connection with the weight of the car and driver, with the piston displacement, and the result was a handy win for this car. Its percentage for its work upon the two hills combined was 8.03, with a leeway of 0.41 points between it and the second car, one of 8 more horsepower. Not only did it win through the combined formula, but the record on each hill was better than its competitors. In the plain time events it ran in a class with cars of greater power, finishing third.

New Buildings at Thomas Factory—Extensive building operations are now going on at the plant of the E. R. Thomas Motor Company in Buffalo. Factory No. 1 is being enlarged by the erection of a structure of saw-toothed type, 200 feet long, and plans are being made for building a separate factory, 280 feet long, 100 wide, and three floors high, in which to manufacture taxicabs. The latter will be erected only in case the concern is unable to secure for the work a suitable plant already built. Recently the officers of the company were treated to a trip down the river on a steamer and a clambake at Edgewater.

Rain Increases Texas Automobile Sales—A soaking rain during the latter part of the first week in August so increased the sales of automobiles in Dallas, Texas, that increased sales forces were made necessary. The assurance of heavy crops was brought by the water, and farmers immediately bought on futures. It has been stated on good foundation that 50 sales resulted from this reason alone. In spite of the great production planned by the factories, the dealers complain that they cannot secure deliveries fast enough.

Hoyt Electrical Company Expands—The Hoyt Electrical Instrument Works at Penacook, N. H., has purchased a piece of land on Main street with a frontage of 100 feet, on which to build a modern fireproof garage and salesroom. The increased business in electrical instruments has necessitated the entire use of the factory in this line. The new garage will be on a street which is part of the central trunk boulevard being built through to the White Mountains.

Grout Wins Two Prizes in Run—In the recent sociability run between Schenectady, N. Y., and Bennington, Vt., Mrs. C. T. A. Howe, of the former place, driving a powerful Grout touring car, won the prize for women drivers as well as the second prize in the competition. In the latter case her time was three hours and 46 minutes, and that scheduled was three hours and 51 minutes.

"Red Head" Now Copyrighted—The unique trade-mark adopted by the Emil Grossman Company, of New York, for its spark plugs has been copyrighted in the United States Patent Office, both the name and the design of the boy mascot, with his impish grin, being thus protected. The Emil Grossman Company says that 106 jobbers in this country are now handling the plug.

Columbus, O.—The Love Garage Company has recently been incorporated with a capital of $5,000 to operate a general garage business on West Fifth avenue. The incorporators are: Fred E. Love, James P. Love, R. E. Love, W. H. Furgeson, and H. J. Powell. The new concern takes over the business formerly conducted as a partnership by several of the incorporators.

New York to El Paso in an Auto—An interesting journey overland was started in New York last week, when C. A. Root left in his Packard car for El Paso, Tex. He stated that he hoped to travel 250 miles every day, if possible. The car is equipped with Continental tires, selected, according to Mr. Root, "because of their long wearing qualities."

Testing First 1910 Velie—H. G. Moore, secretary and sales agent of the Velie Motor Vehicle Company, Moline, Ill., is making a long trip to test the first of the 1910 product. Last week he reached Columbus, O., and ran to Cincinnati. The car is standing the hard run in fine shape, showing up well in tests of climbing and speed.

Great Western "in the Swim"—The Kansas City (Mo.) branch of the Model Automobile Company has evolved a picture postal showing a man fishing from the tonneau of a Great Western car, which is standing up to the hubs in a rushing stream. It is quite a clever bit of advertising, and should bring many inquiries to the hustling agent.

IN AND ABOUT THE AGENCIES

Selden, Philadelphia—The Selden car is the latest comer to Philadelphia's automobile row, having just been installed in handsomely fitted quarters at 336-338 North Broad street. The Selden Car Company of Pennsylvania, which is the official title of the new enterprise, has for its president L. S. Caswell, who has been identified with the Selden patent since 1897 and has occupied the position of sales manager at the Rochester factory. W. B. Alley is vice-president, and Fred. E. Dyer, treasurer.

Winton, Philadelphia—The Philadelphia branch of the Winton Motor Carriage Company will soon have a new home twice the size of its present headquarters. The building now occupied at 246-248 North Broad street is to be torn down and replaced by a more modern structure. Temporarily, Manager A. E. Maltby and his force will seek other quarters, but they will return when the new building is completed. It is expected to be ready for occupancy on January 1.

Morgan & Wright, Atlanta, Ga.—Morgan & Wright announce a change in the location of the Atlanta branch, having just taken possession of the premises at 50 North Pryor street. Herbert Starnes has succeeded the Alexander-Seewald Company as manager. Mr. Starnes is one of the oldest employees in the M. & W. service, and has acted as its southern representative in the States of Kentucky, Tennessee, Mississippi, and Alabama for several years.

Columbus Concern Enlarges—The Central Ohio Motor Car Company, which has the Columbus agency for the Velie and Hupmobile, has equipped a top and machine shop at its headquarters, 61 East Spring street. The plant is already in operation. C. Roy Clough is general manager.

Franklin, San Francisco—The new San Francisco branch of the Franklin Automobile Company has secured temporary quarters at 404-406 Golden Gate avenue, which it will occupy until January 1.

PERSONAL TRADE MENTION

Arthur T. Stewart, of Philadelphia, manager of the automobile wearing apparel department of MacDonald & Campbell, will sail this week for Europe. This is Mr. Stewart's annual trip to secure the newest styles from the foreign capitals. To bid him farewell, a dinner was tendered last Thursday evening in the Quaker City. Prominent automobilists and newspaper men were present at Turf Villa, on the banks of the Schuylkill, to give him a rousing send-off.

Paul L. Snutsel, foreign representative of C. F. Splitdorf, sailed on last Saturday for an extended trip to London, Paris, Turin, Barcelona, and Brussels. In each of these cities Splitdorf branches have been established to better care for a constantly increasing European trade in this company's magnetos and electrical specialties.

George T. Gould, who has been connected with the Rainier selling force in New York for the past year, has been appointed New England agent for the Rainier cars, with headquarters in Boston. He has already entered the field in that city, and has obtained show rooms and garage space on Boylston street.

H. N. Dunbar has been appointed manager of sales of the Mutual Motor Car Company, of Pittsburg, the agent in that city for Stearns cars. For the past year Mr. Dunbar has been in charge of the sales of the Gabriel Horn Manufacturing Company of Cleveland.

Harold A. Buzby, secretary and sales manager of the Keystone Lubricating Company, manufacturers of Keystone grease, is making a tour of the company's Western branches at Chicago, Denver and San Francisco. He will return about September 1.

Robert G. Pilkington, for 10 years a specialist in the design of commercial gasoline automobiles, has been placed in charge of that class of work for the Studebaker Company in Detroit.

Henry Goodman, who for the past five years has represented the Waverley Company in New England and New York State, has tendered his resignation, with future plans as yet undecided.

SWINEHART COMPANY ELECTION

Akron, O., Aug. 30—At a meeting of the stockholders of the Swinehart Clincher Tire & Rubber Company, the following officers were elected: President, J. A. Swinehart; vice-president and general manager, W. W. Wuchter; secretary, C. O. Baughman; treasurer, R. A. May. Mr. Swinehart will sail about October 1 for Europe to attend to the interests of the concern across the Atlantic, and in his absence, the active management will be in the hands of Mr. Wuchter. The latter for the past five years has been the general superintendent of the Firestone Tire & Rubber Company, and will now give his experience to the interests of the Swinehart Company. It is the intention to eventually embark in the manufacture of a pneumatic tire which is now being developed.

MODEL COMPANY NOW GREAT WESTERN

Peru, Ind., Aug. 30—A name which has been very familiar in this city during recent years will go out of existence on Wednesday. It is that of the Model Automobile Company, which will be changed to the Great Western Automobile Company, but with no alteration in the ownership or management. The new name, according to factory officials, indicates that the concern will continue its business along broader planes.

CHANGES IN THOMAS BRANCHES

Buffalo, N. Y., Aug. 30—The E. R. Thomas Motor Company, manufacturer of Thomas Flyers, has established a branch in Chicago, temporarily located at 1325 Michigan avenue until the new Thomas building is opened further up the Row. Cal T. Paxson, who has had charge of the Thomas retail department in this city, has been appointed manager of the new house, and has taken as his assistant Gaylord Warner of Kansas City.

Cal T. Paxson

Arthur W. Haile

Arthur W. Haile, formerly Mr. Paxson's assistant in the local sales work, has succeeded him as manager. Mr. Haile has had three years' experience in this line in Buffalo. The new branch in the Windy City is the third Thomas direct representation opened, the others being in New York and Boston.

CHANGES IN CONTINENTAL PERSONNEL

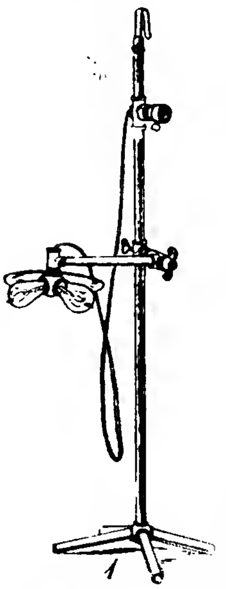
With the opening of several new branches and the appointment of sales manager well known in the trade, J. M. Gilbert, manager of the Continental Caoutchouc Company, has materially strengthened his selling organization. O. S. Tweedy, formerly manager of the Chicago branch of the Diamond Rubber Company, and recently connected with the Federal Rubber Company, has been appointed sales manager, with home offices at 1788-90 Broadway, New York. E. E. McMasters has been made the sales manager for the West, and J. H. Sheldon a similar position in the East. The new branches are located in Boston and Philadelphia, the first under the management of E. E. Kidder, located at 895 Boylston street. The Quaker City house is located at 154 North Broad street, under the direction of S. S. Poor.

A Prominent Car and Its Equally Prominent Producers and Sellers

Officers of the Chalmers-Detroit Motor Company and its latest product—the Chalmers-Detroit "Forty" for 1910. In the front seat at the wheel is H. E. Coffin, vice-president and designer, and beside him is Hugh Chalmers. In the tonneau are Messrs. Bezner, Brady, and Counselman; also Carl H. Page, the New York City dealer

Information for Auto Users

Aladen Portable Light Stand—Owners and chauffeurs who have ever tried to make adjustments by the light of a ceiling lamp, or who have had their hand lamps, after being carefully draped over the dashboard, suddenly fall on the cylinder head and suffer a smashed bulb, will appreciate this portable light stand brought out by the I. J. Smith Mfg. Co., 4283 Park avenue, New York City. The light itself consists of a cluster of four bulbs, backed by a reflector, and furnished with 15 feet of cable and an attachment plug to go in an ordinary electric lamp socket. The cluster is carried on a doubly jointed arm, similar to those often used in draughting rooms, so that it may be adjusted to throw its light in any direction. The arm in turn is carried by a 6-foot stand of steel tubing, with a broad base, and may be slid up and down and clamped at any desired height. The top of the stand is provided with a hook, by means of which it may be hung from the ceiling. Thus a steady and powerful light may be thrown on any part of the mechanism of the car from any desired direction. The cluster of lights may also be detached from the stand for use as a hand lamp.



ONE POSITION OF THE STAND.

The wire which connects the stand with the plug is held clear of the floor, so that it will not trip up any one working around the machine and will not be worn out. As a convenience this little stand is far more valuable than its size and cost would indicate.

Veeder "Odo" Has New Gear—The new model of the Veeder odometer, known as Form B, is equipped with a spiral driving gear, for which the Veeder Mfg. Co., of Hartford, Conn., claims many advantages. The gear has a much wider face than that formerly used, which gives a greater wearing surface and allows for end play; at the same time this makes close endwise adjustment unnecessary. Nevertheless, the gear has all the advantages of the old narrow gear, as it cuts easily through mud and dirt, and the spiral teeth eject any obstructions that may come between them. The gear is made of steel, with cut teeth, and despite the hardest kind of usage will last almost indefinitely. The bearings, too, are improved, and are much heavier than those of the 1909 model. The new gear is especially adapted for service on trucks and other heavy vehicles. The body of the odometer remains unchanged. The Veeder Mfg. Co. is now supplying the trade with this type of instrument at the same list price as last year's type of Form B.

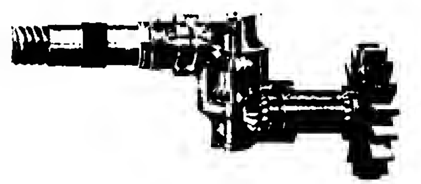
In this respect the Veeder company is following its usual policy of constant improvement.

"Guide" Electric Auto Lamps—Another believer in the future of electric automobile lighting is the Guide Motor Mfg. Co., of Cleveland. This company makes an extensive line of electric lamps and searchlights for automobile use, and also for motor boats. One of the special features found in "Guide" lamps is the dust-proof front, which prevents obscuring or tarnishing of the reflector. Tungsten bulbs are used in all lamps. To give some idea of the numerous styles in which these lights are made, it may be said that the "Guide" line includes three different types of headlights, three of side lamps, one of which is illustrated herewith; two tail lamps, a meter lamp and a dome light for closed cars, all made in several sizes; besides searchlights and side lights for boats. In addition to lamps, the company handles the Elba and Kremlo storage batteries, which, unlike the usual ignition battery, are built for high discharge rates and are thus adapted to lighting use, as well as the K-W magneto.

The many advantages of electric lights are becoming more and more generally recognized. They are clean, odorless and easily operated; they are perfectly reliable, not being affected by the wind nor liable to leakage or clogging; and they are, above all, safe for use around gasoline, as they have no naked flame. The only objection to them hitherto has been their expense, and this has now been obviated by improved bulbs and batteries, and, even more, by the use of mechanical generators.

THE "GUIDE" HEADLIGHT—DUST-PROOF AND EXTREMELY NEAT.

Stewart & Clark Swivel Joint—One of the features of the 1910 Stewart Multipolar Speedometer, made by the Stewart & Clark Company, of Chicago, will be a ball-bearing swivel joint, which eliminates the bends in the flexible drive shaft, permitting it to be carried back along the frame of the car direct to the speedometer. The X-ray view shown herewith reveals several interesting structural details. The joint, as will be seen, consists of two pairs of bevel gears, one gear of each pair being carried on a vertical spindle. This spindle forms the main axis, about which the sleeve carrying the end of the drive shaft can swing freely. The two horizontal shafts, connected with the drive pinion and the shaft, respectively, each run on two rows of balls. The two bevels on the vertical spindle are cut from one blank, and run on a long plain bearing. The whole construction is, of course, oil and dust-proof, assuring long life to the wearing parts. The joint as a whole is patented, and will be an exclusive feature of the Stewart & Clark product.



X-RAY VIEW OF STEWART SPEEDOMETER JOINT.

"Aplco" Electric System—The Apple Electric Company, of Dayton, O., has perfected an electric lighting system to be used in connection with its familiar ignition dynamo, which offers many points of interest. This machine is distinctly a dynamo, such as is used in large power stations; as its magnets are non-permanent, but excited by field coils, there is no danger of their weakening. The armature is multipolar, with 21 sections; the commutator has two combination gauze-graphite brushes set at 45 degrees from the vertical. The maximum output of the dynamo is 12 amperes. A storage battery of 30 ampere-hours' capacity, if used for ignition only, or of 60 to 100, if used for lighting as well, is connected to the dynamo through an automatic cut-out. The dynamo is provided with a governor and a load regulator, which makes possible a direct drive from a variable-speed automobile motor. The construction of the dynamo is very neat and workmanlike.

The Apple company also supplies the various accessories necessary for electric lighting, including the lamps themselves, plugs, switches and wiring. Gas and oil lamps may readily be converted to electric by means of special fittings. Preferable to this, however, is the use of lamps specially designed for electric work, and these dispense with the useless ventilators and so make a dust-tight construction.

The booklet published by the Apple company shows a number of ways of attaching the dynamo, some one of which will be found suitable for almost any car. One ingenious way is by silent chain from the hub of a gear-driven fan. The dynamo comes fitted with either a spur pinion, a sprocket or a conical leather friction pulley; any of these drives is satisfactory and any one of them may be had on order.

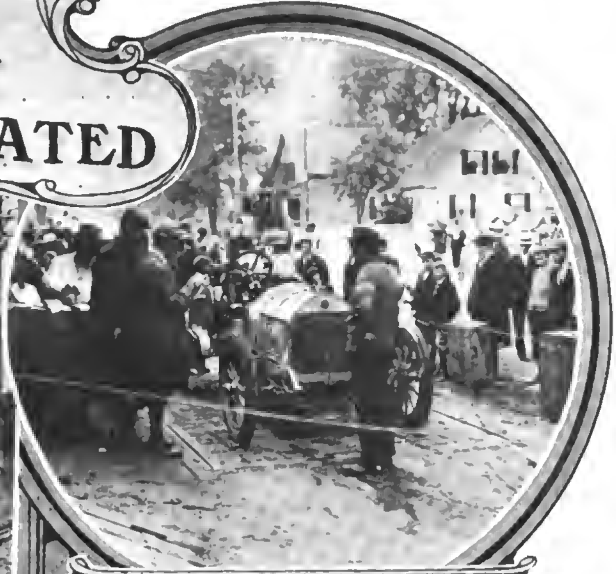
INDEX TO ADVERTISERS

VOL. XXI NEW YORK—THURSDAY. SEPTEMBER 9, 1909—CHICAGO No. 11

THE AUTOMOBILE

LOWELL'S CARNIVAL SUCCESSFULLY INAUGURATED

In front of Official Headquarters



Where the Contestants Weighed In

Crowd which Packed the Stands

LOWELL TROPHY—318 MILES

HOW THEY FINISHED

Finish	Driver	Car	Time
1	Robertson	Simplex	5:52:01 2/5
2	Poole	Isotta	6:13:37 1/5
3	Parker	Fiat	6:22:21 3/5
4	Burman	Buick	6:25:44
5	Basle	Renault	6:36:47 2/5

LOWELL, MASS., Sept. 8—George Robertson to-day again made clear his right to the American speed championship by his hard-fought victory in the National Stock Car Championship. His Simplex car, the same one which had seen much service in 24-hour races, covered the 318 miles necessary to win the Lowell cup in 5 hours 52 minutes 1 2-5 seconds, at a speed which averaged 54.2 miles an hour. After many vicissitudes at the start, Robertson seemed to have a good lead at the two-thirds mark. Shortly after that point, however, Grant and his Alco began to creep up. Robertson secured a little more lead in the twenty-seventh round, but in the twenty-eighth ignition troubles fell heavily on him and he had to allow his rival to take the lead. Stopping at the pits, he changed spark plugs, consuming in all four minutes. And, then, when Grant had success almost in his grasp, he met with misfortune. One of his tires blew out on the hair-pin turn, and almost at the same time a driving chain broke. He was compelled to look on idly while Robertson dashed past into his former position, and while Poole, Parker, Burman and Basle took the remaining places. The two Knoxes, the American and the Lozier were still running when Referee Hower declared the race at an end. The many thousand spectators went home much pleased with the racing, but disappointed at not having seen the Presidential box occupied by one

Starter Wagner-President Speare

Officials Who Faithfully Performed Their Arduous Duties

McMurtry, Edwards, Beecroft

William Howard Taft. The President's absence was the sole disappointing feature of the day, and one which no one has been able to explain satisfactorily. Although he had not actually promised to attend, his well-known liking for the sport and the nearness of Beverly made the supposition lie strongly in that direction.

All Was Activity as the Big Cars Started

Sixteen cars assembled soon after nine o'clock in the official avenue between the grandstand and the press stand. The scenes for the hour following were infectiously animating in the crisp Autumn air, tempered by the rays of Old Sol showered from a cloudless sky. Gradually the enormous grandstand accumulated its load of humanity. The fair sex supplied artistic costumes in generous quantity, displaying all the colors of the rainbow, and a few never seen in nature. The music of the band chimed with the roaring exhausts of the impatient speed craft, which the energetic Wagner was arranging in two lines with the skill gained by long experience. President Heinze, of the Lowell Automobile Club, who has been active in all the preparations, looked on with an anxious eye, praying that the day would end without accident of any sort. Now and then he glanced in the direction from which the Chief Executive of the United States might appear, for the assurance had been fairly positive that President Taft would drive over in his car from the Summer capital at Beverly. The presidential box had been prepared, and its tenantless condition told a story of expectancy.

Bent upon their various duties, President L. R. Speare of the A. A. A. and Chairman F. B. Hower of the Contest Board circulated in the stretch, from which occasionally the clear-voiced Prunty made an announcement. Stevens, Wright, Webb, Broadwell and others of some degree in the affair were in evidence.

As the hour for the start approached there was great dismay in the Buick camp, for Strang, the winner of many previous contests, who had drawn number one, had not appeared. Ten o'clock came, and still no word or sight of the speedy Buick. So it was that the first to face Starter Wagner was Drach with the low-hung American, its number "2" standing out boldly on the big square hood. It leapt away at the word with a roar and a cloud of blue smoke, and Hughes, the plucky driver of the Allen-Kingston, brought his machine to the line. The others got the word at 30-second intervals; No. 4 Buick, Burman, No. 5 Alco, Grant; No. 6 Isotta, Poole; No. 7 Fiat, Parker; No. 8 Knox, Belcher; No. 10 Knox, Shaw; No. 11 Fiat, De Palma; No. 12 Simplex, Robertson; No. 14 Knox, Downey; No. 15 Stoddard-Dayton, Shaw; No. 16 Apperson, Lytle; No. 17 Buick, Chevrolet; No. 18 Lozier, Cobe, and No. 19 Renault, Basle.

Robertson of Vanderbilt Cup fame called forth the plaudits of the crowd, and Lytle, Chevrolet, Grant, Poole and De Palma were not strangers to the enthusiastic fans. Strang's failure to start caused much disappointment, as he won the races here last year when he was driving an Isotta. Racing Manager Pickens of the Buick team later received word that Strang, *en route* to the starting line, had come in violent contact with a telegraph pole and had bent his front axle. However, he succeeded in making repairs, and later appeared on the course. All the other entrants, except those who had previously been scratched, appeared and got away in good shape.

STORY OF THE LOWELL TROPHY RACE BY LAPS

First Lap—All cars survived the opening lap, with Buick, Burman, passing Allen-Kingston, Hughes, and Knox, Shaw, falling back two places. Buick, Chevrolet, made the fastest circuit, its time being 10:41, and by this performance moved up two places. Otherwise there were no changes.

Second Lap—Now the changes came thick and fast. Chevrolet had the best of it in time, which meant that he was in the lead, with Lytle only a second behind.

Third Lap—Robertson forged to the front during this round, his figures for the total being 32:14, with Burman next in 32:38. Chevrolet had gone to the bad, just finishing the lap with a broken frame. No. 3 Allen-Kingston stopped for tires.

Fourth Lap—Robertson retailed his lead, with Burman still in pursuit. Soon after the latter passed Strang unexpectedly appeared and passed the starting point, apparently having repaired his damaged car. He started with a 45-minute handicap.

Fifth Lap—Robertson and Lytle were the chief contenders, with the Simplex timed at 53:43 and the Apperson at 53:56. Burman was third in 54:34, with Grant less than a minute behind.

Sixth Lap—Fourteen seconds separated Robertson and Lytle on this round, with Grant third and Burman apparently in trouble.

Seventh Lap—Only eight seconds intervened between Robertson and Lytle, and the fight could not have been prettier. One second over a minute behind was Grant and the Alco.

Eighth Lap—Lytle got past Robertson and the Jack Rabbit had nine seconds advantage on the round. Grant remained in third place.

Ninth Lap—Just half a minute represented Lytle's lead over Robertson, with Grant still hugging third over a minute behind.

Tenth Lap—Tire troubles on the backstretch caused Lytle to lose his lead, and when he came around to the pits, he took on two spare shoes. Of course Robertson moved up, his margin becoming ten minutes less ten seconds. Grant could not help advancing a notch. The Simplex had averaged 58.8 miles an hour for the 106 miles traveled.

Eleventh Lap—This proved to be an unfortunate round, for two contenders joined the down-and-outers, Lytle's Apperson suffering from a broken camshaft and Shaw's Stoddard-Dayton from a damaged axle. Chevrolet's Buick and Belcher's Knox had already disappeared. Thus there were thirteen of the original seventeen still in the running.

Twelfth Lap—With Lytle out of the reckoning, Robertson increased his lead over Grant. Parker's Fiat was in third place less than a minute ahead of Poole's Isotta.

Thirteenth Lap—Robertson's speed now showed an average of 58.3 miles an hour, and he had over three minutes lead on Grant, who in turn led Poole by about five minutes. Parker had his troubles in this round, coasting to the pits with a fire aboard from an overflow of oil. This was extinguished with little damage, but he had lost his good position.

Fourteenth Lap—Robertson had added to his advantage until it totaled 4 minutes 35 seconds, with Grant six minutes ahead of De Palma, and Poole eight minutes behind the Fiat pilot.

Fifteenth Lap—Robertson lengthened the gap by nearly three minutes more. De Palma drew closer to Grant, and Poole installed himself comfortably in fourth place.

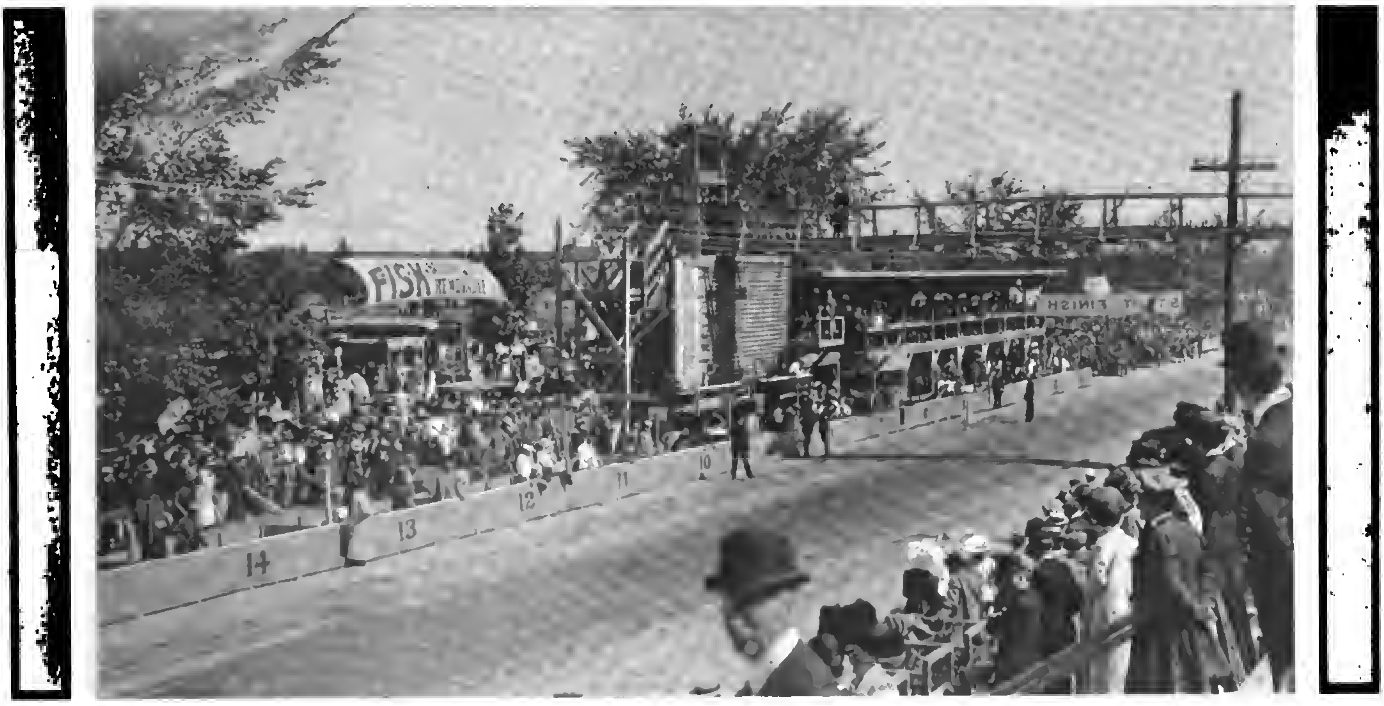
Sixteenth to Twentieth Laps—Robertson stopped for supplies all round at the conclusion of this lap. At this time, he had a lead of 9 minutes 52 seconds on Grant's Alco. Grant had lost ground until his lead over De Palma's Fiat was but ten seconds. Poole still held the fourth notch.

Twenty-first to Twenty-fifth Laps—In the twenty-first lap Robertson's margin was but 1 minute 1 second, and Grant had bettered his position materially. De Palma held fast to third, and Poole and Burman were fourth and fifth respectively. In the next lap, Grant hauled up on Robertson until he was only 55 seconds behind. Again in the twenty-third lap Grant climbed still further and cut off three more seconds of the lead, and in the next cut off five more. De Palma was 7 minutes 25 seconds behind Grant. At this point the Allen-Kingston hit a tree at the hair-pin turn and retired. Robertson completed his twenty-fifth lap in 4:46:37, increasing his lead on Grant to 55 seconds.

Twenty-sixth to Thirtieth Laps—In the twenty-sixth Grant continued to gain and in the twenty-seventh got past Robertson and opened up a lead of 3 minutes 25 seconds. With this he seemed to have the race well in hand, but at the hair-pin turn his chain broke and a tire came off. Robertson again took the lead, finishing his twenty-eighth lap in 5:24:48. The contest then slackened, for De Palma, now the runner-up, was 7 minutes 25 seconds behind the leader. The Isotta was half an hour behind. Beginning his last lap, Robertson could hardly have lost. At 3:58 he dashed past the grandstand the winner, in the time of 5:52:01 2-5. He had lapped the De Palma Fiat, which had just stopped at the pits to change spark-plugs and take on water. De Palma made his twenty-nine laps in 5:54:26, and seemed to have second place cinched, but on his last lap he was delayed and it cost him the place. Poole's Isotta broke into second in 6:13:37 1-5. Parker finished third and Burman and the Buick fourth. Basle and his Renault, a famous 24-hour race champion, could do no better than fifth. The times of Parker and the Fiat, Burman and the Buick, and Basle were 6:22:21 2-5, 6:25:44, and 6:36:47 2-5, respectively. Knox No. 10 was still running on its 28th lap when the contest was called off, and American No. 2, Knox No. 14, and Lozier No. 18 were on the 26th lap at the flag.

TABULAR STORY OF THE LOWELL TROPHY RACE

No.	Car	Driver	First Lap	Tenth Lap	Twentieth Lap	Finish
12	**Simplex**	Robertson	10:33	1:48:36	3:43:09	5:52:01
6	**Isotta**	Poole	11:47	1:53:11	4:04:40	6:13:37
7	**Fiat**	Parker	11:38	1:52:58	4:22:05	6:22:21
4	**Buick**	Burman	11:05	2:17:10	4:10:32	6:25:44
20	**Renault**	Basle	12:03	2:05:33	4:20:38	6:36:47⅖
11	**Fiat**	De Palma	11:01	1:58:48	3:53:11	
5	**Alco**	Grant	10:53	1:49:48	3:53:01	
10	**Knox**	Shaw	12:34	2:19:12	4:37:59	
18	**Lozier**	Cobe	11:36	2:57:48	5:11:21	
2	**American**	Drach	10:47	2:34:45	5:16:21	
14	**Knox**	Downey	12:23	2:36:20	5:40:15	
1	**Buick**	Strang	56:23	2:42:17		
3	**Allen-Kingston**	Hughes	11:39	2:57:37	Out in 23d.	
16	**Apperson**	Lytle	10:57	1:50:26	Out in 11th.	
15	**Stoddard-Dayton**	Shaw	12:15	1:56:30	Out in 11th.	
17	**Buick**	Chevrolet	10:41			
8	**Knox**	Belcher	11:30			



Ample Width of Stretch and Notable Detail in Arrangement Were Features That Made the Carnival Memorable

Michelin Tire Camp Had a Big Force of Experts

SPECIFICATIONS OF CARS IN THE BIG RACE

CLASS 1—DISPLACEMENT, 451-600

No.	Car	Driver	Mechanic	W'ght	Bore	Stroke	Displacement
1	Buick	Strang	Larsnauer	2,405	4.5	5.0	318.0
2	American	Drach	Kachline	2,985	5.75	5.5	571.3
3	Allen-Kingston	Hughes	Dustan	3,115	5.5	6.0	570.2
4	Buick	Burman	Grennon	2,440	4.5	5.0	318.0
5	Alco 6-Cylinder	Grant	Lee	2,975	4.73	5.52	578.2
6	Isotta-Fraschini	Poole	Anderson	2,805	5.71	4.73	483.1
7	Fiat	Parker	Scudellary	2,895	....	....	.....
8	Knox	Belcher	Jahn	2,370	5.0	4.75	373.2
10	Knox	Shaw	Winton	2,317	5.0	4.75	373.2
11	Fiat	De Palma	Pozzo	2,760	....	....	.....
12	Simplex	Robertson	Ethridge	3,095	5.75	5.75	597.3
14	Knox	Downey	Feinberg	2,730	5.5	5.5	522.7
15	Stoddard-Dayton	Shaw	Hart	2,595	5.25	5.75	498.0
16	Arperson	Lytle	Bates	2,730	5.75	5.75	597.3
17	Buick	Chevrolet	Nelson	2,440	4.5	5.0	318.0
18	Lozier 6-Cylinder	Cohe	Horan	3,415	4.62	5.5	554.4
20	Renault	Basle	De Mand	2,740	5.12	5.52	451.6

PROGRAM TO CONCLUDE CARNIVAL

Although the automobile races on Monday, Tuesday, and Wednesday form the most spectacular part of the week's events, they are not by any means the only ones on which the citizens of Lowell rely for the success of their carnival. There are other events which to many will be even more interesting than the spectacular contests of the racing automobiles. The devotees of motor boating will have their especial day on Thursday, September 9, when a race on the Merrimac River is scheduled. This is open to boats of 30 feet length and over, and the distance is 100 miles. The race will start at the pontoon bridge.

Friday, a number of motorcycle races will be conducted under the rules and auspices of the Federation of American Motorcyclists, on the automobile race circuit.

Matson Breaks In a Young and Promising Driver

LOWELL—THE CARNIVAL CITY

By John A. McKenna, Sec.-Treas. Lowell Automobile Club

The city of Lowell has no Revolutionary history, although it is situated in the historic old county of Middlesex. It occupies a territory set apart at various times from the towns of Chelmsford, Dracut, and Tewksbury. The vertebrae column of the "Spindle City" is the mile of brick cotton factories that line one bank of the Merrimac River. It really got its backbone before the rest of the body politic developed; and to-day, when a municipality of 100,000 people has grown about the mills, the cotton factories remain one of the sights of the city. Visitors who desire to inspect such mills as are in operation can do so by applying at the counting rooms for a guide. While certain of the secret processes of manufacture are guarded, corporation officials are always willing to admit strangers within their walls.

Persons interested in manufacturing will also find the Lowell Textile School well worthy of inspection, and members of the faculty will be glad to explain the several branches of cotton, woolen, and chemistry that are taught there. The institution stands upon a commanding location beside the Merrimac River, just beyond the Moody street bridge, and is but a short distance from the entrance to the boulevard. It was founded by the State, and receives annual grants from the State and the city, but has also received large gifts through private generosity. It ranks as the most complete textile school in the country.

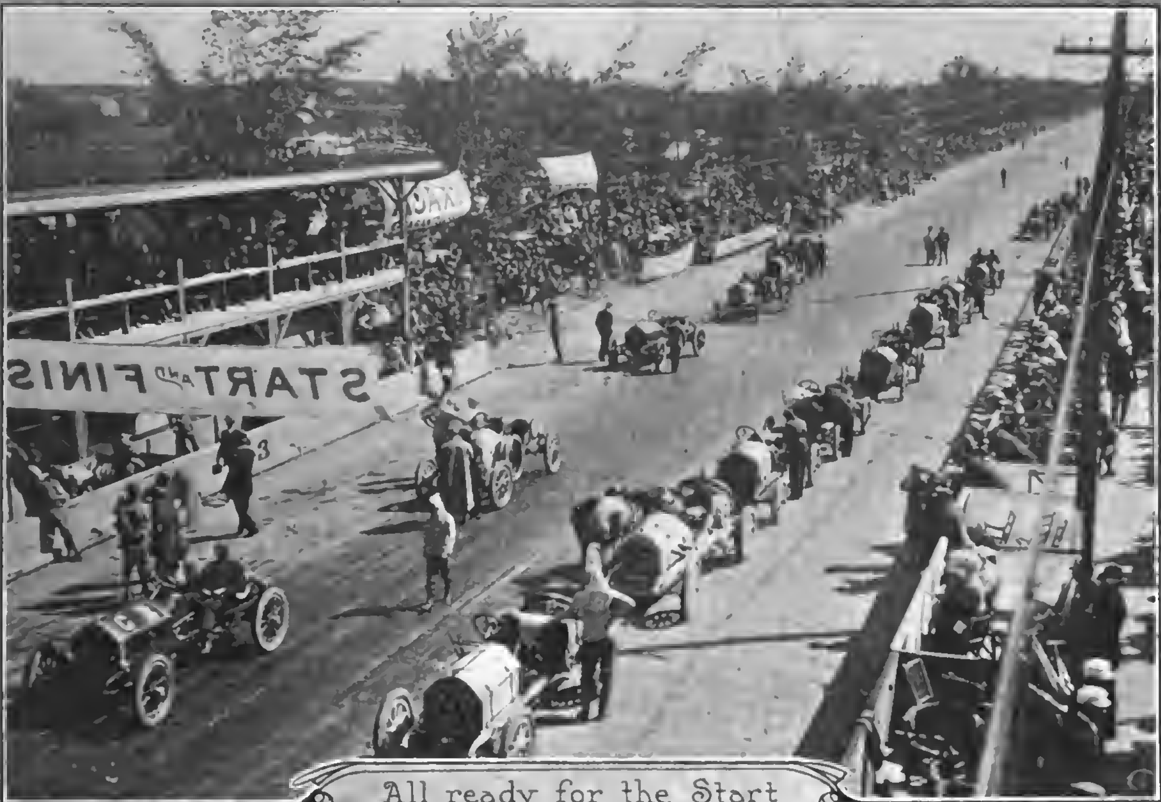
On Pawtucket street, three minutes' walk from the Pawtucket bridge, is the old Spaulding House, occupied as a clubhouse by the Daughters of the American Revolution, who have restored it upon its original lines. This was a tavern at the beginning of the last century, and is an excellent example of the architecture of that period. Another interesting old house that has been restored recently is the building in Worthen street, occupied by the Lowell Art Association. It was in this house that James McNeil Whistler, the artist, was born, and the clubhouse will eventually contain an art collection. The building is about two minutes' walk from City Hall and the Memorial Library, both handsome granite structures well worthy a passing inspection, and an equal distance from upper Market street, now the center of a flourishing Greek colony of 8000 people. Just back of Market street is the new Greek church.

The monument and statue that stand in City Hall Park mark the resting place of two members of the Sixth Massachusetts Infantry who lost their lives in the Baltimore riot, on the 19th of April, 1861. They and two comrades were the first volunteer soldiers to give their lives in the Civil War. In Lincoln square, reached by way of Chelmsford street, stands a monument dedicated this year to the memory of Abraham Lincoln, the gift of the school children of Lowell. It is a granite shaft with a bronze bas-relief by Bela L. Pratt, the Boston sculptor. The homestead of the late Major-General Benjamin F. Butler is a fine old building, partly Colonial, set in an attractive estate bordering on Andover street. The State Normal School, reached by taking a Broadway car, is an excellent example of modern educational buildings, and is surrounded by beautiful grounds. Pawtucket Falls, just below the entrance to the Boulevard, dams the Merrimac River in order to divert its waters into the canals that supply water power to the larger factories and machine shops. These canals are often visited by engineering students, so notable was their construction.

There are several Lowell clubs, three of them housed in substantial quarters. The Yorick Club occupies a large three-story brick clubhouse at Dutton and Moody streets. The Highland Club has a sightly building in the Highlands. The Vesper Country Club occupies the hundred acres of Tyng's Island, and has a handsome new clubhouse in addition to its rambling and picturesque old buildings that served the members for years.

Many inviting trolley trips are offered to the old Middlesex towns that lie in the circle just beyond the city, and there are two lake resorts that attract thousands of people weekly in the summer: Lakeview, a half hour's ride from the city, and Canobie Lake Park, an hour's ride away in southern New Hampshire.

HOW THE SMALL CARS CONTESTED FOR HONORS



All ready for the Start

LOWELL, MASS., Sept. 6—The automobile carnival opened to-day with the light car sweepstakes for Classes 2, 3, and 4, and Burman, Knipper, and Chevrolet, two on Buicks and one on a Chalmers-Detroit, each added another trophy to his collection. Magnificent weather was granted for the event, and the crowd began early to assume record-breaking proportions. So large and so enthusiastic was the assemblage, indeed, that the start of the race had to be delayed half an hour before a clear course could be secured.

Lorimer's Chalmers-Detroit came first to the line at 10:30, and dashed away at Starter Wagner's command. Shaw's Knox, Stoecker's Benz, Strang's Buick, Dingley's Chalmers-Detroit, Burman's Buick, Belcher's Knox, and Sharp's Sharp-Arrow followed at 30-second intervals. Coffey and his Columbia led Class 3, and Chevrolet's Buick, Knox's Atlas, Harroun's Buick, Davis' Moon, and Pepperday's Mercedes took up the pursuit at their given intervals. Of the smallest cars, Class 4, Grenon's Buick was first away, followed by Sickinger's Maxwell, Knipper's Chalmers-Detroit, DeWitt's Buick, See's and Costello's Maxwells, Matson's and Gelnaw's Chalmers-Detroits, and Disbrow's Buick.

In a few minutes the crowd in the grandstand rose to its feet to see the leading cars dash down the backstretch. Then the familiar cry of "Car coming!" arose. It was Lorimer, driving his Chalmers for all it was worth, as the time of 10:58 for the circuit attested. The Benz, Dingley's Chalmers, and then the Buicks of Burman and Strang dashed past in close order. Chevrolet and Coffey, of Class 3, had both passed the Sharp-Arrow, and gave promise of setting a speedy pace for the small cars. Shaw's Knox and Harroun's Buick both stopped at the grandstand supply pits, giving the crowd its first chance to see the well-drilled mechanics at work under pressure. Knipper's Chalmers led Class 4, with Grenon's Buick second. The Moon, too, stopped at its supply pit.

Lorimer held his lead well in the second round, completing the two circuits in 21:34. Dingley's Chalmers held fast to second place, and Strang's Buick came third. In Class 3 Chevrolet's Buick had jumped into third place in the dash past the grandstand, making it easily first in its class.

The third lap gave Lorimer an even greater lead, as he still continued his marvellous speed. Dingley followed his teammate, though at some distance; Stoecker's Benz was third, and Burman's Buick fourth. At the same time Chevrolet had rolled up a big lead in Class 3, his three rounds being completed in 33:18, only a minute and a second slower than Lorimer's. The Columbia struck a telegraph pole on the backstretch, but Coffey and his mechanician walked away unhurt. Lorimer made his fourth lap in 10:49, the fastest on record, and his time for the total distance was 43:08. Strang's Buick had jumped into second place, its time being 46:28. Stoecker's Benz and the Sharp-Arrow also had passed Dingley. In Class 3 Chevrolet was leading, followed by Harroun. Knipper and Matson had it all their own way in Class 4.

The same relative positions continued throughout the fifth lap, except that in Class 4 Costello's Maxwell replaced Matson's Chalmers as runner-up. Knipper stopped in front of the grandstand for water, providing a bit of unconscious comedy. Chalmers No. 47 took on a new tire. Word was received that the "C" Knox had run off the course at the lower turn and was badly damaged. Several persons were slightly injured. The "K" Knox had trouble and stopped for some time at the pit.

Lorimer's Chalmers finished its seventh lap, 74.2 miles, in 75:07 elapsed time, thus still further increasing its lead. Strang's Buick remained second. In Class 3 Chevrolet led Harroun by 11 minutes, and Knipper's Chalmers had a good four minutes over Costello's Maxwell in Class 4.

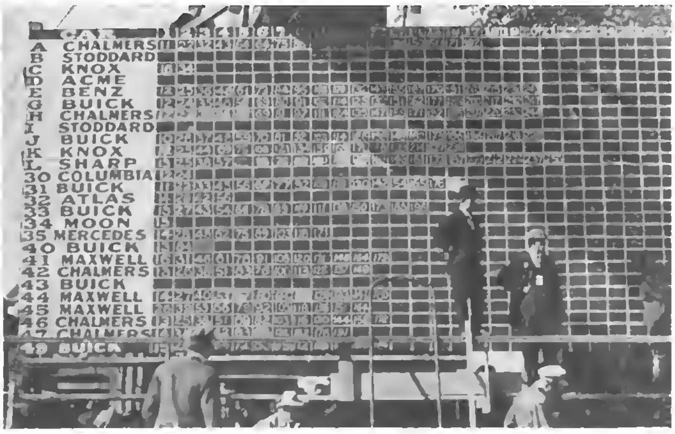
Chalmers Led at Half the Distance—When he completed his tenth round, half the race, Lorimer had nearly a lap on his

Burman Winning the Vesper Club Trophy in Class 2—Stoecker's Benz Which Finished Second Shown in Foreground Close to Fence

nearest competitor, the Strang Buick. Chevrolet lapped Harroun in Class 3. Lorimer gained still more in the eleventh, having nearly eight minutes on Strang and a little more on Burman. The Chalmers was running fine and averaging 60 miles an hour. Knipper's Chalmers made ten laps in 2:04:49, and with only two laps to go, seemed to have its class trophy won. At the end of the eleventh in Class 3, the Chevrolet and Harroun Buicks had things pretty much their own way. Davis drove his Moon off one of the turns of the backstretch, wrecking it, and the only remaining competitor was the Mercedes.

When Knipper next passed the grand stand he got the green flag for the last lap, having made eleven laps in 2:16:48. He finished in 2:28:43 for the 127.2 miles. Costello's Maxwell had a hard tussle with Disbrow's Buick, but the latter lost a wheel nearing the end of the last lap, letting Matson, too, slip ahead of him into third place. Costello's time was 2:44:01, Matson's 2:52:16, and Disbrow's 2:53:37. A protest was lodged to the effect that Knipper's car did not carry its hood for the entire distance, but Referee Hower subsequently ruled that this fault did not merit disqualification. Knipper drove a consistent race and well deserved his victory.

Chevrolet meanwhile was steadily reeling off laps in eleven and twelve minutes, and began his last round three laps to the



The Big Score Board That Told the Story of the Laps

good of Harroun. As nothing happened to disturb him, he took the race for the Yorick Club trophy, in the time of 2:56:17 for the 159 miles.

Burman Supplants Lorimer in Big Race—Lorimer's Chalmers kept on clipping off laps close to ten minutes until the eighteenth round. He was more than a lap ahead of Burman when at the end of the stretch, he lost control of his car, which skidded across a front lawn into a piazza on which were seated a dozen persons. No one was hurt, but the car was put out of the contest. Burman and Stoecker had a hot duel, which the former eventually won, crossing the line in 3:49:08. Stoecker stopped to change a tire, and that proved his undoing. His time was 4:02:55. Dingley and his Chalmers nosed out Strang for third place, after more fast work. It was an exciting finish, which kept the crowd constantly on its feet until the last car had crossed the line.

A GREAT DAY FOR THE LITTLE FELLOWS

Lowell, Mass., Sept. 6—Three races were fought out on the opening day in what seemed to the thousands of onlookers to be one contest. The victor in the field of eight, which made up class 2 for the biggest cars in the filed of 23 starters, was a Buick expertly handled by Robert Burman, who covered the 212 miles in 3 hrs. 49 min. 8 sec., averaging close to 56 miles an hour. Second ran a Benz driven by Stoecker from Germany, over a lap behind the winner, with a Chalmers-Detroit in charge of Dingley a close third. Not far in the rear came Strang and another Buick. In the Vesper Club trophy event, the cars had total piston area that ranged from 301 to 450 cubic inches.

Lorimer at one time apparently had the race won with a Chalmers which subsequently left the road on the 18th lap. By consistent and daring driving Lorimer had gained over a lap by the tenth circuit, his average being close to 60 miles an hour. His only stop was in the 17th round, when he took on gasoline and water, but neglected to obtain oil. This failure really brought with it the fatal consequences which killed the Chalmers' chances of winning. On the back stretch, when running at top speed, a piston seized owing to insufficient lubrication and not only broke the crankcase, but pushed the rear cylinders off. The cylinders fell into the steering gear in such a manner as to render the car uncontrollable and the car dashed into a nearby porch.

There came an epidemic of Buicks in the 231-300 class, Chevrolet running away with the Yorick Club trophy and having team-mate Harroun as the closest pursuer. A small Mercedes at the helm of which sat one Pepperday completed ten rounds, with the down-and-outers consisting of Moon, Columbia, and Atlas.

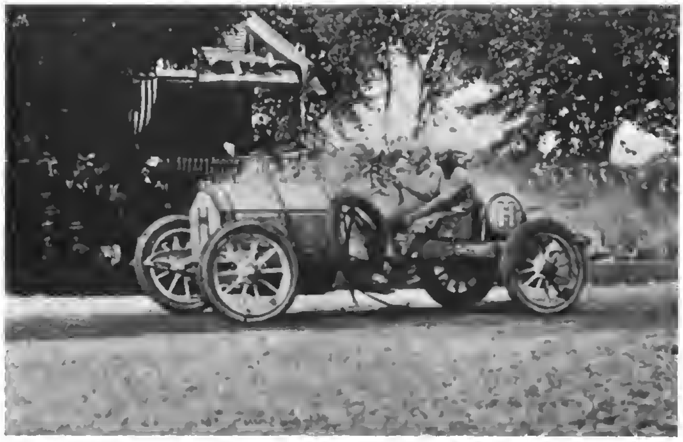
In the struggle of the littlest chaps—161-230 cubic inches—the Chalmers piloted by Knipper gained the Merrimac Valley trophy, though its loss of the bonnet for two laps caused a protest which gave Chairman Hower and his board associates a knotty point to decide. After a two-hour consideration this decision was announced:

The protest against the Chalmers-Detroit car, No. 42, for not carrying a hood at all times during the contest has been duly considered by the contest board and its decision is as follows: It seems that the hood fell from the car on the second lap on one of the curves of the back stretch, and that the car did not stop, but proceeded on its way. On the next lap the driver and mechanician made efforts to locate it, but failed. On the following lap it was discovered in a field, picked up by the driver and mechanician, and replaced on the car. The committee in investigating the case found that at the place where the hood was dropped it would have been dangerous for the car to have stopped within any reasonable distance. The committee also found that the hood was dragged away by boys. It was discovered by a nearby camper, who carried it to an open field near the road and placed it in plain sight. Taking all matters into consideration, the committee believes that the driver used all diligence in trying to locate the hood, and therefore the protest is not sustained.

Arthur See and a Maxwell made up the combination which figured as the runner-up, with another of the sturdy youngsters next, in charge of Costello. Joe Matson's Chalmers occupied fourth, with Sickinger's Maxwell and Grenon's Buick also among the finishers of the 127 miles.

While the enormous grand stand had some vacancies, due perhaps to New England thriftiness and endurance—one could get alongside the course for 25 cents and then stand or bring along your own camp-chair—there must have been close to a hundred thousand spectators scattered around the ten-mile circuit. While some minor catastrophies punctuated the racing nothing of a real serious nature happened. Shaw's Knox skidded at a turn, capsized a lunch stand, and turned turtle. In the mix-up several persons were more or less bruised. In the plunge from the road by Lorimer's Chalmers, one woman was knocked from a chair and, of course, badly scared. In other mishaps the results were small. The Columbia's swipe at a telephone pole put it out of commission, and DeWitt's Buick became a non-contestant at the same turn where the Knox came to grief.

To-day has been a day for the lower medium-priced machine in that the cars in the 161-230 piston displacement showed a better average performance than did those machines in the 231-300 class or the still bigger ones in the 301-450 category. The little fellows carried off the highest honors—nine of them started in their race and seven finished, the two to drop out being a couple of model 10 Buicks. The 301-450 class took second place in that eight of them started in their race and six finished, only a Chalmers Forty and Knox model R dropping out. The 231-300 cubic inch piston displacement class fared worst in that of the six starters only two were running at the finish, the other four, namely, Columbia, Atlas, Moon, and Mercedes having dropped out for one trouble or another.



Dingley in Chalmers-Detroit Who Landed Third

It must be remembered that the distances covered by these three classes differed very widely, the small class traveling but 127 miles, the second class 159 miles, and the big class 212 miles. Of the twenty-three that started fifteen finished and eight failed. Of the eight that fell by the wayside six went out directly because of breaking car parts and two were eliminated partly through breakages and partly due to an accident such as striking a bank or skidding into a ditch.

Here in a nut shell is the elimination list: Buick broke a rear wheel; Buick injured a rear axle; Columbia broke a steering knuckle; Moon had trouble with a stopped gasoline line; Mercedes broke a pump-driving shaft; Chalmers broke a crankcase; Atlas threw and had injured beyond repair on the road, two rear-wheel detachable rings; and Knox crushed a rear wheel when it struck the bank making the turn to the homestretch.

In the multiple-entry class, the three Maxwell Q specials carried off the palm in that all three finished, this being the only make of car with more than one entry in which all finished. Of the five Chalmers that started, four finished; five of the seven Buicks that started finished; and one of the two Knoxes. There were six individual entries, that is, six different makes of which only one car of each was entered. Of these six only two finished.

Start of the Winners of First and Second in Class 4 (Merrimac Valley Trophy)—Knipper's Chalmers and Sickinger's Maxwell

Matson Makes a Quick Change of Tires at Roadside

Knipper (Chalmers-Detroit) Merrimac Trophy Winner

namely, the Sharp Arrow and the Benz; Moon, Mercedes, Columbia and Atlas not completing their respective races. The entry list showed an unusually varied assortment of names. Many manufacturers who do not ordinarily take part in racing entered representative cars. Although this added greatly to the interest of the race, this elimination looks as though the newcomers had not made proper preparation.

There Were Few Stops at the Pits

There were only fourteen stops made in front of the grandstand repair pits in the three races. Belcher in Knox K was the heaviest grandstand loser, his two stops totalling 17 minutes, all due to ignition troubles. The first stop was for 6 minutes, when the coil was tested and a couple of new spark plugs used. This did not remedy the trouble, and on the following lap a 17-minute stop was made when it was discovered that a tooth or two on the magneto gear were stripped and a new gear was used and the motor retimed. A complete set of new spark plugs were put in on the magneto side.

Not a single one of the other contestants had to make two stops at the pits. Only one of the Maxwells stopped in the entire race, and that at the end of the second last lap, when No. 45 driven by Costello had to rope up the auxiliary gasoline tank on the side of the chassis, the brackets supporting it having broken. Two minutes and 24 seconds were lost. No. 47 Chalmers lost 2 minutes in taking on a couple of spare tires and adding water. "H" Chalmers lost 3 minutes taking on water, gasoline, oil, and tightening the clutch spring. No. 42, winner in the small race, stopped for water, adjusted the carbureter, and took on a spare tire, losing 1 minute. The only stop made by the Benz was 40 seconds to take on a spare tire. No. L Sharp Arrow lost 1 minute 10 seconds taking oil and strapping on an extra tire. Burman in "J" Buick lost 37 seconds taking on oil. Strang in "G" Buick required 1.5 minute for oil and taking on a right rear tire. Chevrolet lost 1 minute by having to take on oil, a spare tire, and jack. No. 33 Buick, in the same class and driven by Harroun, had a 2-minute stop to change spark plugs. No. 32 Atlas was but 50 seconds taking oil and water. Moon No. 34 lost 4 minutes adjusting the carbureter.

MECHANICAL DATA OF CARS IN MONDAY'S RACE.

No.	Car	Driver	Mechanic	W'ght	Bore	Stroke	Displacement
	CLASS 2—DISPLACEMENT, 301-450						
A	**Chalmers-Detroit**	Lorimer	Kiiker	2,295	5.0	4.75	373.2
C	**Knox "R"**	Shaw	Dennis	2,317	5.0	4.75	373.2
E	**Benz**	Stoecker	Kraemer	2,790	4.73	5.31	365.0
G	**Buick 16-B**	Strang	Larsnauer	2,430	4.5	5.0	318.0
H	**Chalmers-Detroit**	Dingley	Richards	2,315	5.0	4.75	373.2
J	**Buick 16-B**	Burman	Grennon	2,240	4.5	5.0	318.0
K	**Knox "R"**	Belcher	Jahn	2,345	5.0	4.75	373.2
L	**Sharp-Arrow**	Sharp	Sharp	2,240	5.0	5.0	392.8
	CLASS 3—DISPLACEMENT, 231-300						
30	**Columbia**	Coffey	Kowalker	2,245	4.5	4.75	298.9
31	**Buick 16-A**	Chevrolet	Nelson	2,240	4.36	5.0	298.5
32	**Atlas**	Knox	Dufault	2,535	4.5	·.5	286 2
33	**Buick 16-A**	Harroun	Heinemann	2,155	4.36	5.0	298.5
34	**Moon**	Davis	Rockfort	2,460	4.56	4.5	294.3
35	**Mercedes 18-28**	Pepperday	McBride	1,820	3.94	5.11	248.7
	CLASS 4—DISPLACEMENT, 161-230						
40	**Buick 10**	Grennon	Litchfield	1,605	3.75	3.75	165.6
41	**Maxwell Special**	Sickinger	Doorley	1,505	3.87	4.0	188.6
42	**Chalmers-Detroit**	Knipper	Schnoor	1,927	4.0	4.5	226.3
43	**Buick 10**	De Witt	Swizert	1,525	3.75	3.75	165.6
44	**Maxwell Special**	See	Wright	1,520	3.87	4.0	188.6
45	**Maxwell Special**	Costello	Conover	1,500	3.87	4.0	188.6
46	**Chalmers-Detroit**	Matson	Auder	1,960	4.0	4.5	226.3
47	**Chalmers-Detroit**	Gelnaw	Riker	1,975	4.0	4.5	226.3
49	**Buick 10**	Disbrow	Gerard	1,535	3.75	3.75	165.6

The scheme of allowing a couple of pit attendants to work in replacing tires or adding gasoline, water, and oil proved a good one, and the four men working on a car at once was an inspiring sight as compared with the tired driver and mechanic seen at road races in the past.

Joe Downey (Knox) Coming Up the Rise from "The Dip"

Lorimer Just Before Accident Which Cost Him Race

CLASS 2—COMPETING FOR VESPER CLUB TROPHY.

No. Car / Lap / Miles	1 10.6	2 21.2	3 31.8	4 42.4	5 53	6 63.6	7 74.2	8 84.8	9 95.4	10 106	11 116.6	12 127.2	13 137.8	14 148.4	15 159	16 169.6	17 180.2	18 190.3	19 201.4	20 212
J Buick	10:28	26:07	36:56	47:55	58:48	69:55	81:06	92:09	103:16	114:45	125:27	136:24	147:40	161:58	173:27	185:33	195:45	206:51	217:51	229:08
Bob Burman.	10:28	15:39	10:49	10:59	10:53	11:07	11:11	11:03	11:07	11:29	10:42	10:57	11:16	14:18	13:29	12:06	10:12	11:06	11:00	11:17
Frank H. Lee.																				
E Benz	12:30	25:29	36:26	48:17	60:32	72:34	84:22	96:15	108:06	119:54	131:43	143:30	155:18	167:14	179:05	191:03	203:00	215:08	230:00	242:55
Ernest Stoecker.	12:30	12:59	10:57	11:51	12:15	12:02	11:48	11:53	11:51	11:48	11:49	11:27	11:48	11:56	11:51	11:58	11:57	12:08	14:52	12:56
Fritz Kraemer.																				
H Chalmers-Detroit	11:50	23:22	34:49	46:20	57:47	76:17	80:40	96:39	111:00	123:46	135:00	147:13	159:23	171:16	182:19	195:17	207:24	219:48	232:15	244:19
Burt Dingley.	11:50	11:32	11:27	11:31	11:27	18:30	14:23	15:59	14:21	12:46	11:14	12:13	12:10	11:53	11:03	12:58	12:07	12:24	12:27	12:04
Harry Richards.																				
G Buick	12:05	23:53	35:20	46:24	57:31	68:45	79:51	91:08	102:25	113:37	125:19	139:20	150:43	162:12	177:27	188:58	200:27	216:53	232:27	246:34
Lewis Strang.	12:05	11:48	11:27	11:04	11:07	11:14	11:06	11:17	11:17	11:12	11:42	14:01	11:23	11:29	15:15	11:31	11:29	16:26	15:34	14:07
Louis Larseneur.																				
L Sharp-Arrow	12:41	25:27	38:00	50:43	63:22	75:43	88:04	100:19	112:40	124:45	136:48	148:57	161:08	173:21	187:04	199:21	211:33	223:35	237:12	249:50
W. H. Sharp.	12:41	12:46	12:43	12:43	12:39	12:21	12:21	12:15	12:21	12:05	12:03	12:09	12:11	12:13	13:43	12:17	12:12	1[illegible]:02	13:37	12:38
W. J. Sharp.																				
K Knox	12:21	24:39	43:34	58:42	74:47	108:44	121:07	133:35	149:57	162:45	175:43	188:29	199:26	214:13	226:32	239:12	Still running.			
Fred Belcher.	12:21	12:18	18:55	15:08	16:05	23:57	12:23	12:28	16:22	12:48	12:58	12:46	10:57	14:47	12:19	12:40				
Wm. Jahn.																				
A Chalmers-Detroit	10:58	21:34	32:17	43:08	53:45	64:24	75:02	85:38	96:17	107:04	117:47	128:25	139:01	149:50	160:29	171:09	182:26	Out on 18th lap.		
Lee B. Lorimer.	10:58	10:36	10:43	10:51	10:37	10:39	10:43	10:31	10:39	10:47	10:43	10:38	10:36	10:49	10:39	10:40	11:17			
Thos. Kirker.																				
C Knox	15:43	34:15	Out.																	
Fred Shaw.	15:43	18:32																		
Albert Dennis.																				

Total distance, 212 miles.

CLASS 3—COMPETING FOR YORICK CLUB TROPHY

No.	Car / Miles / Lap	10.6 1	21.2 2	31.8 3	42.4 4	53 5	63.6 6	74.2 7	84.8 8	95.4 9	106 10	116.6 11	127.2 12	137.8 13	148.4 14	159 15
31	**Buick**	11:14	22:10	33:18	44:14	55:34	66:44	77:30	92:28	103:25	114:43	129:52	142:25	153:45	165:05	176: 7
	Louis Chevrolet.	11:14	10:56	11:08	10:56	11:20	11:10	10:46	14:58	10:57	11:18	15:09	12:33	11:20	11:20	11:12
	Joe Nelson.															
33	**Buick**	12:48	27:23	42:46	54:42	66:17	77:32	88:42	100:00	111:25	137:50	149:34	161:44	173:07	184:42	195:51
	Ray W. Harroun	12:48	14:35	15:23	11:56	11:35	11:15	11:10	11:18	11:25	26:25	11:44	12:10	11:23	11:35	11:09
	J. A. Heineman.															
35	**Mercedes**	13:50	27:34	47:37	61:33	75:26	89:21	103:12	117:37	132:07	170:53	Out—broken oiler shaft.				
	Tom Pepperday.	13:50	13:44	20:03	13:56	13:53	13:55	13:51	14:25	14:30	38:46					
32	**Atlas**	13:56	27:36	41:31	55:52	Out.										
	Elmer G. Knox.	13:56	13:40	13:55	14:21											
	Louis Dufault.															
30	**Columbia**	12:12	23:47	Out.												
	John J. Coffey.	12:12	11:35													
	John Kowalker.															
34	**Moon**	15:03	Out.													
	F. J. Davis.	15:03														
	T. Rockfort.															

Total distance, 159 miles.

CLASS 4—COMPETING FOR MERRIMAC VALLEY TROPHY

No.	Car / Miles / Lap	10.6 1	21.2 2	31.8 3	42.4 4	53 5	63 6	74.2 7	84.8 8	95.4 9	106 10	116.6 11	127.2 12
42	**Chalmers-Detroit**	12:40	25:32	39:11	51:16	63:25	75:46	87:35	100:28	112:33	124:49	136:48	148:43
	Wm. Knipper.	12:40	12:52	13:39	12:05	12:09	12:21	11:59	12:53	12:05	12:13	11:59	11:05
	Karl Schnoor.												
44	**Maxwell**	14:25	26:44	39:53	52:40	66:39	80:05	94:23	106:41	120:05	133:29	150:46	160:11
	Arthur See.	14:25	12:19	13:08	12:47	11:59	13:26	14:18	12:18	13:24	13:24	13:17	13:25
	Elery Wrights.												
45	**Maxwell**	13:10	26:03	39:15	52:39	65:37	78:40	91:54	105:02	118:03	136:18	150:50	164:11
	Thos. Costello.	13:10	12:53	13:12	13:24	12:58	30:03	13:14	13:08	13:01	18:15	14:32	13:10
	Geo. Conover.												
46	**Chalmers-Detroit**	12:46	25:22	38:24	51:18	68:56	81:56	102:40	116:15	130:05	143:33	157:53	172:16
	Joe M. Matson.	12:46	12:36	13:02	12:54	17:38	13:00	20:44	13:35	17:25	13:28	14:20	14:23
	J. R. Aude.												
49	**Buick**	15:00	28:39	44:15	58:06	71:49	85:18	98:49	112:18	125:45	139:13	152:52	172:37
	L. A. Disbrow.	15:00	13:39	15:36	13:48	13:43	13:29	13:31	13:29	13:27	13:28	13:39	19:05
	Geo. Girard.												
41	**Maxwell**	16:30	30:49	46:09	61:19	76:10	91:03	105:44	120:15	134:42	149:20	163:54	178:34
	Wm. Siekinger.	16:30	14:19	15:20	15:08	14:53	14:53	14:41	14:31	14:27	14:38	14:34	14:50
	Martin Doorley.												
47	**Chalmers-Detroit**	13:59	30:41	44:15	62:21	82:37	96:15	112:34	131:44	148:42	161:42	175:36	191:17
	Frank Gelnau.	13:59	16:42	13:34	18:06	20:16	13:38	16:19	19:10	16:58	13:00	13:00	16:71
	James Riker.												
40	**Buick**	13:13	Out—broken wheel.										
	J. J. Grennon.	13:13											
	F. Litchfield.												
43	**Buick**	Did not finish first lap.											
	Geo. DeWitt.												
	L. Swizert.												

Total distance, 127.2 miles.

POSITION BY LAPS IN CLASS 2.

No.	Car	Driver	Laps 1	2	3	4	5	6	7	8	9	10	11	12	13	14	5	16	17	18	19	20
A	[illegible]	Loumer	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Out		
C	[illegible]	Shaw	8	8	Out.																	
B	[illegible]	Stoecker	6	6	4	5	5	4	5	4	4	4	4	4	4	4	4	4	4	2	2	2
G	[illegible]	Strang	4	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4
[illegible]	[illegible]	Dingley	3	2	2	2	3	6	3	5	5	5	5	5	5	5	5	5	5	4	3	3
[illegible]	[illegible]	Burman	1	7	5	4	4	3	4	3	3	3	3	2	2	2	2	2	2	1	1	1
[illegible]	[illegible]	Belcher	5	4	7	7	7	7	7	7	7	7	7	7	7	7	7	7	Still running.			
[illegible]	[illegible]	Sharp	7	5	6	6	6	5	6	6	6	6	[illegible]		6	6	6	6	6	5	5	5

POSITION BY LAPS IN CLASS 3.

No.	Car	Driver	Laps 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
[illegible]	[illegible]	Coffey	2	2	Out.												
[illegible]	[illegible]	Chevrolet	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
[illegible]	[illegible]	Knox	5	5	2	3	Out.										
[illegible]	[illegible]	Harroun	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2
[illegible]	[illegible]	Davis	6	Out.													
[illegible]	[illegible]	Pepperday	4	4	4	4	3	3	3	3	3	3	Out.				

POSITION BY LAPS IN CLASS 4.

No.	Car	Driver	Laps 1	2	3	4	5	6	7	8	9	10	11	12
[illegible]	[illegible]	Grennon	4	Out										
[illegible]	[illegible]	Sickinger	8	7	7	6	6	6	6	6	6	6	6	6
[illegible]	[illegible]	Knipper	1	2	2	1	1	1	1	1	1	1	1	1
[illegible]	[illegible]	DeWitt	Did not complete lap											
[illegible]	[illegible]	See	6	4	4	4	3	3	3	3	3	2	2	2
[illegible]	[illegible]	Costello	3	3	3	3	2	2	2	2	2	3	3	3
46	[illegible]-Detroit	Watson	2	1	1	2	4	4	5	5	5	5	5	4
47	[illegible]-Detroit	Gelman	5	6	5	7	7	7	7	7	7	7	7	7
49	[illegible]	Disbrow	7	5	6	5	5	5	4	4	4	4	4	5

Picturesque Camp of Chalmers-Detroit Forces

Where the Renault Team and Cars Were Housed

OLDFIELD EXCELLED IN MILE STRAIGHTAWAYS

LOWELL, Sept. 7—Mile-a-minute speeds were much in evidence to-day in the mile trials held this afternoon over the Pawtucket Boulevard. The start was near Dunbar avenue and the finish at the grandstand. The course record of 45 seconds, for a flying start, was broken by Barney Oldfield, driving the Benz Grand Prize car, as well as by "Herb" Lytle with the Apperson Jack Rabbit which will be No. 16 in to-morrow's long race for the Lowell trophy. Christie was an onlooker, his speed craft being hors du combat at the moment.

The big Benz made two trials. In the first, the time was 41 seconds flat, but in a second attempt this was bettered by traveling the distance in 39 9-10 seconds, an average speed of ninety miles an hour.

The straightaway course has a bend in it about half-a-mile from the start, which considerably reduced the speed of the high-powered machines. The surface, which was very oily, contributed somewhat more to the slower times made than anticipated. As it was impossible to make a flying start at high speed because of the tortuous approach to the starting line, few of the big cars could get up to their top-notch speed before reaching the start. At the finish, the cars had to be slowed down before the finish, otherwise the turn at the end of the boulevard could not be negotiated.

Considerable interest was removed from the day's program by the absence of Walter Christie and Lewis Strang. Christie's front-driven car was disabled early in the day by a broken shaft, while Strang's Earthquake did not run out of the shop.

Events 1 and 4 were scratched, as there were no entrants. Events 2 and 3 were walkovers for the Jackson and the Matheson respectively. The summary:

EVENT 2—$1,251 TO $2,000

Pos.	Car No.	Car	H.P.	Driver	Time
1	No. 3	Jackson	40	E. P. Blake.........	1:03 8-10

EVENT 3—$2,001 TO $3,000

1	No. 9	Matheson	50	J. R. Willadsen.....	1:02 2-10

EVENT 5—OVER $4,000—(ROLLING START)

1	No. 16	Apperson ...	50	H. H. Lytle.........	0:52 8-10
2	" 7	Knox	60	Fred. Belcher	0:55 3-10

(STANDING START)

1	" 16	Apperson ...	50	H. H. Lytle.........	1:02 7-10
2	" 7	Knox	60	Fred. Belcher	

EVENT 6—FREE-FOR-ALL—(STANDING START)

1	No. 8	Benz	120	Barney Oldfield	0:51 2-10
2	" 17	Buick	30	Louis Chevrolet	0:58 9-10
3	" 20	Columbia	34	J. J. Coffey.........	0:59 9-10
4	" 4	Matheson ...	50	Neil Wahlen	1:03 8-10

EVENT 7—451 TO 600 CUBIC INCHES—(STANDING START)

1	No. 17	Buick	30	Louis Chevrolet	1:01 6-10
2	" 5	Knox	60	Fred. Belcher	1:02 9-10
3	" 14	Knox	60	Joe Downey	

EVENT 8—301 TO 450 CUBIC INCHES—(STANDING START)

			Cub. in.		
1	No. 17	Buick	318.0	Louis Chevrolet	0:59 5-10
2	" 14	Knox	522.7	Joe Downey	1:01 1-10
3	" 5	Knox	373.2	Fred. Belcher	1:02 1-10

EVENT 9—231 TO 300 CUBIC INCHES—(STANDING START)

1	No. 31	Buick	298.5	Louis Chevrolet	1:03
2	" 33	Buick	298.5	Ray W. Harroun....	1:07
3	" 30	Columbia ...	298.9	J. J. Coffey.........	1:12 8-10

EVENT 10—161 TO 230 CUBIC INCHES—(STANDING START)

1	No. 40	Buick	165.6	Bob Burman	1:07 7-10
2	" 43	Buick	165.6	Geo. DeWitt	1:08 1-10

EVENT 11—MISCELLANEOUS TRIALS—(FLYING START)

			H.P.		
1	No. 8	Benz	120	Barney Oldfield	0:39 9-10
2	" 8	Benz	120	Barney Oldfield	0:41
3	" 16	Apperson ...	50	H. H. Lytle..........	0:44 4-10
4	" 17	Buick	30	Louis Chevrolet	0:49 9-10
5	" 33	Buick	30	Ray W. Harroun....	0:52 2-10
6	Touring Car	Knox	60	Louis A. Disbrow...	0:57 7-10
7	No. 2	Berkshire ...	40	S. H. Clapp.........	1:02 9-10

POINTS OF INTEREST ALONG THE COURSE

By LEWIS E. MacBRAYNE, Chairman Publicity Committee.

ALONG the Merrimac Valley course, over which the racing cars speed to-day in contests of national interest, the Indian once pitched his tent to fish for salmon, and the pioneer planted his corn on the plantations that had just been cleared. But this was long ago. The course offers points of interest to those who are historically inclined. The old road that leads across the boulevard to the pontoon bridge once connected with a ferry that plied across the Merrimac before any bridge was built, and between the boulevard and the backstretch there still stands the old Durkee house, which was a tavern in Revolutionary times. Many a stage coach from New Hampshire bound for Boston, in the good old days, has pulled up at this quaint hostelry, which was famous for its dinners in those days.

Continuing up the river, the boulevard runs parallel with Tyng's Island, now the property of the Vesper Country Club. Here the old chief of the tribe of Indians that had lived in the valley, Wannalancit, spent his remaining days after his people became scattered in 1665; and across the river just above the island may be seen the old Drake mansion, stoutly defended by Colonel Jonathan Tyng during King Philip's War, when every other settler had been driven back to the vicinity of Boston. The colonel was a son of Major General Edward Tyng, whose descendants all became noted Indian fighters.

Passing by the "Hairpin turn," and on over the hill at the beginning of the backstretch of the course, you will come to an old red house that stands corner to the road, across from the brook. It was built by Solomon Gilson in 1783 and is still owned by one of his descendants. Two houses below on the east side of the road stands the William Sherburne house, built by one Blood in 1780. It is recorded that "he was a victim of the 'Merino fever' and had it bad. He was said to be the only man who made any money at the time, but it developed later that he did not get his profit from his sheep, for after he moved away an outfit for making counterfeit silver dollars was discovered."

Going on again, a small frame house will be noted between the road and the boulevard. It was built more than 150 years ago, and its near neighbor, the old D. P. Coburn house, has stood for more than a century. The little red house opposite the Tyng's Island road, now owned by D. L. Page, of Lowell, was built on the race course at Mud Pond, and was moved bodily over to its present location by Nathaniel Coburn in 1775.

The Haskell Butterfield house, now used for a Summer School of Languages, was built about 1750, while the Butterfield house just beyond dates from 1790. Between the years 1725 and 1775 this quiet country road was the most populous part of Tyngsboro, and many a scene of social festivity occurred in these and many other old mansions long since destroyed.

On the part of the course on the backstretch within Lowell is a portion of fine old county road still lined by many of the trees planted in the days of the Revolution, while upon either side will be found the homesteads reared in the days when farms were several miles in extent, and the northern boundaries were described in the deeds as "the wilderness."

THE COURSE AS SEEN FROM A RACING CAR

LOWELL, MASS., Sept. 5—Accepting the invitation of the Chalmers-Detroit race manager, Harry Bill, a representative of THE AUTOMOBILE was taken over the course in Lorimer's "Blue Bird." This began at about six o'clock Friday morning, when at the judges' stand the writer took the mechanician's seat and prepared for what he expected would be a lively ride. For protection against the biting wind and stones, the scribe was togged with racing hood and rubber coat.

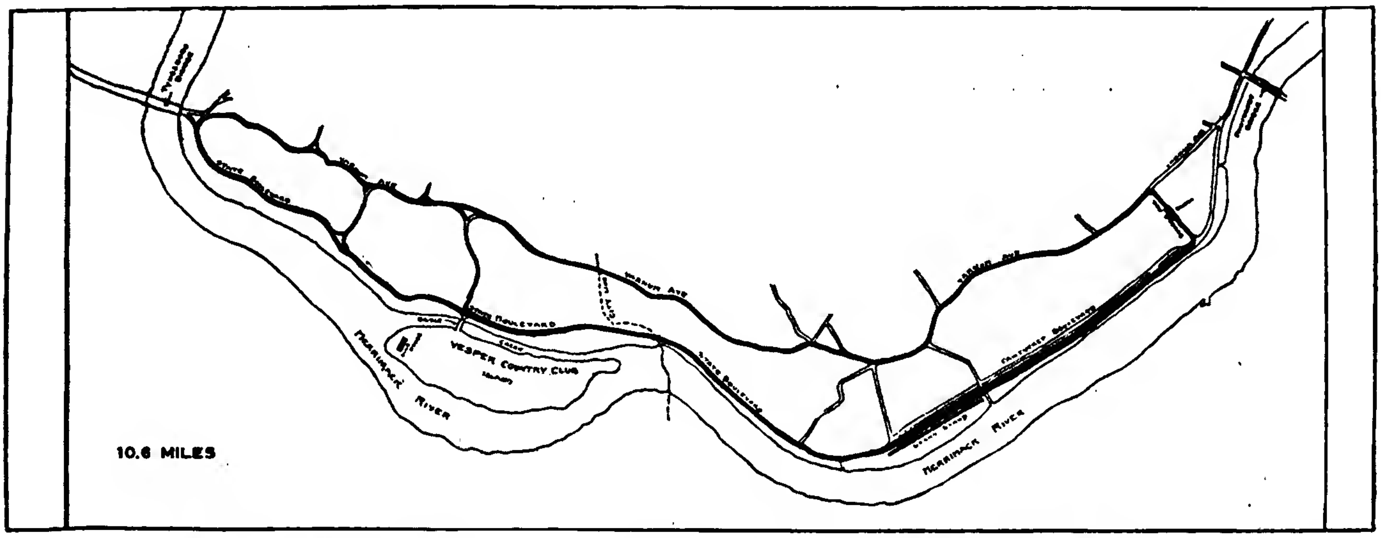
From the grandstand to the hairpin turn the road is macadam and thoroughly oiled. To dry up the oil, fine gravel was put on the road, which made it very uncomfortable for the contestants at high speeds, as the small stones were hurtled with the force of bullets almost directly into the faces of the crews. Unless radiators are protected by screens, there is danger of injury by flying stones actuated by passing cars.

From the start to the hairpin turn, about four and a half miles, there are fourteen turns, including one of the "S" variety. With the light Chalmers and skillful driving, Lorimer was able to negotiate these at nearly full speed. Although we skidded considerably, it was not so much but that a good driver could take care of his car perfectly.

Up to the hairpin turn, the road is perfectly level, and we easily held a seventy-mile-an-hour gait despite the curves. Not so on the backstretch, which contains thirty-five sharp turns and also includes five difficult "S" combinations. The so-called "Dip of Death" is also on this stretch. So difficult, in fact, is the back part of the course that it takes a speedy car and skillful driver to average much better than fifty miles per hour.

Just after leaving the hairpin turn, and before one can gain headway again, a long, sharp hill is encountered which necessitates a lower gear on many of the cars. The "Blue Bird," however, mounted this hill at a forty-mile pace on high gear. From the top of the hill until Dunbar avenue at the eastern extremity of the course is reached, the road is very tortuous and hilly. The "Dip" occurs about half the distance from the hairpin to Dunbar avenue turn and is a precipitous drop of thirty-seven feet in about a hundred yards. The sensation when going down this on a racing car is that of a descent in an express elevator in a skyscraper, or perhaps an emphasized roller-coaster. Altogether, the descent would not have any terrors if it were not for a turn at the fort and a quick ascent, beyond, which requires that the turn be taken wide open.

When we went over the course in our early morning practice, the car often skidded diagonally across the road, so viciously did Lorimer attack the turns. The last mile and a half of the backstretch are macadam, but the electric car track runs up the center of the road, calling for care when cutting across the road to take the turns. The turn from Varnum avenue, which forms the backstretch, into Dunbar, which connects Varnum with the Boulevard, is rectangular. The other end of Dunbar avenue at the Boulevard also offers a right-angle turn. These two turns were taken very fast, as the Chalmers can be skidded into the other



Map of Course Shows Location of Curves on Backstretch and Fine Straightaway Leading Past Grandstand road by appropriate braking. Lorimer drove the car at high speed until very close to the turn, then applied the brakes quickly, and the car seemed to take its direction as we slowed down. When in the turn we were facing down Dunbar avenue an application of power stopped the skid. This action was repeated at the other turn. From Dunbar avenue down to the grandstand, the Boulevard is wide and permits of as high speed as can be made. We did about seventy-five miles an hour, and for the first time on the run one realized the speed at which these cars can travel. One had to gasp for breath and the car seemed to be striving to push the back of the seat against you.

For the lap our time was clocked by one of the newspapermen as twelve minutes. This was equivalent to about eleven and a half, where a flying start and finisb can be made.

SOME GOSSIP OF THE MEET AND THOSE INVOLVED

Michelinites Had an Attractive Garb—In contrast to the nondescript dressing in most of the pits, was the serviceable half-uniform worn by the providers of Michelin tires. Khaki suits and blue shirts, with a dash of yellow in cap bands, made a neat combination.

Prunty's Far-Reaching Voice—Adding much to the enjoyment of the grand stand occupants, as well as a source of appreciation by the press, were the clearly-enunciated announcements of the silver-tongued Peter Prunty, imported from the metropolis for the occasion.

Technicists of National Repute—In David Beecroft and F. E. Edwards, of the Chicago Motor Club, and A. L. McMustry, of the Automobile Club of America, there existed a competent trio of technicists who, in the car examinations, conscientiously applied the stock car rules as they now exist. It is a good guess that the 1910 definitions will show some changes.

Heinze Was the Man in Demand—If anything went askew or anything reqnired attention, the man searched for was the indefatigable Heinze, the carnival president, who was here, there and everywhere at all times. To John O. Heinze credit belongs for the creation of a great race meet, and the city of Lowell is now known far and wide for its progressive automobile spirit and ability to provide for one of the most successful series of competitions ever held here or abroad.

Hower as a Referee—The meet signalized the initial appearance of Chairman Hower in the referee's role, the reason for his taking the position being the national character of the racing. 'Tis understood that Chairman Hower has had his fill of honors in the competitive field of automobiling, and some time ago he gave utterance to the statement that he would not seek or accept a continuation in office. Even those who have disagreed with Hower credit him with energy and persistence.

Press Arrangements Excellent—Under the direction of Lewis E. MacBrayne, chairman of the publicity committee, the arrangements for the men who told the story of what happened could hardly have been improved upon. There was plenty of room in the capacious press stand, an abundance of wires and operators, with refreshments available when the workers felt the need. To make comfortable and facilitate the activities of those who write the tale is wisdom for the management of any affair, be it great or small.

President Speare Unobtrusively Prominent—One who had no small part in the proceedings was Lewis R. Speare, the A. A. A. chief executive. New England supplies much strength to the national body, and its scenic grandeur and miles of excellent roadway attract thousands of auto tourists. There is as much pride of country as in the more vociferous West, but it is expressed in a lower though no less determined key. President Speare is a Bostonian with a family-tree that finds its roots in the landing of the Pilgrims, and his accession to the leadership of the A. A. A. naturally found much New England approval.

The Door of Opportunity—In the races of 1908 there assisted in the guarding of the course, Patrolman George H. Brown. In the races of 1909 Mayor George H. Brown and Mrs. Brown, his former stenographic secretary, surveyed proceedings from the municipal box in the grand stand. Of course, it must be said that the present mayor made an exceptional patrolman, and the opportunities of politics did the rest, in opening the abrupt door to the mayoralty of a manufacturing city. His candidacy was not taken seriously until too late, and then the votes were in process of being counted.

"Lowell's Vertebrae"—A mile of brick cotton factories that line one bank of the Merrimack river, is what Secretary John A. McKenna, of the local automobile club, called "Lowell's vertebræ" in the historical sketch of the city, which has a hundred thousand folks, and includes about 8,000 Greeks who live in a section by tbemselves. One can see the house in which Whistler, the artist, was born, and also the former homestead of Gen. B. F. Butler. The old Spaulding house, once used as a tavern and now occupied by the Daughters of the American Revolution, is referred to as an example of the excellent architecture of colonial days.

Some Thrifty New Englanders Who Profited—Certainly such a catchpenny opportunity never before arrived in New England. Several times bigger, actually, than any country fair or circus, because of the number on the scene, and much bigger, theoretically, because of the class of those in attendance, the field for merchandising appealed to both the peripatetic fakir and the thrifty native as the chance of a lifetime. Everything that Yankee wit, stimulated by prospect of profit, could think of, was for sale, and the prices were low. One man near the grandstand cut away prematurely a portion of his crop of corn in order to have parking space for a few cars, and no resident on the course was of too high estate to lease his ground to the sightseers. At Roberts' corner, one native had a fence of unbarked posts and wires, manifestly put up in a hurry. On the lawn within the fence were several signs: "Private Grounds—no trespassing"; "Autos and teams $1 parked here"; and these were cunningly flanked by the official sign of the Lowell Automobile Club, reading: "Danger! Keep Back of This Wire!" The owner probably expected the club sign to drive everyone inside his property line at a profit to him, but he had a merry time trying to live up to his "no trespassing" sign. He did a good business, though, and so did a neighbor who charged the sporty populace for a foothold on his stone fence, which was not at all of that New Jersey variety which dissolves the foothold.

"WALKERS" FOR CONNECTICUT HIGHWAY

HARTFORD, CONN., Sept. 7—For the inspection of the State trunk highways, there will soon be fully installed a system almost as thorough as on a railroad. State Highway Commissioner James H. MacDonald has arranged to keep the newly constructed macadam sections under constant surveillance, having men whose duty is to watch the roads and when any little breaks appear fix them, and then report accordingly. The asphaltic oil, which was purchased recently, is now being distributed, work starting at Meriden, and the treatment will be closely watched. A great many automobiles travel over the routes through that city and the oil is to allay the dust rather than as a constructive binder.

Old Boston Post road from Greenwich to the Rhode Island border is being improved, including two of the worst sections of road in this State. The Saybrook Ferry road, which is generally considered bad, is also being repaired, and the East Lyme stretch over the river is likely to be bettered very shortly.

STOCK CARS FEATURE WILDWOOD'S LABOR DAY RACES

WILDWOOD-BY-THE-SEA, N. J., Sept. 6—No speed records were broken this afternoon in the maiden meet of the youthful North Wildwood Automobile Club, but with 28 separate dashes over the mile stretch on Ocean avenue there was a well satisfied crowd of spectators and club members. For two and a half hours, the broad roadway was roped off for the contests and there were sufficient machines all told on hand to furnish a good day of fast sport. The regular Labor Day crowd of many thousand people was also in evidence, but there was no trouble in keeping them back for the route of the autos, and, in fact, the entire management of this event elicited great praise. The new clubhouse has made this Jersey coast resort more of a rendezvous for the automobilists from the Quaker City and neighboring points than ever before.

Willie Haupt, in the six-cylinder Alco, and Joseph Parkin in a six-cylinder machine of his own make, were the star performers, and, with the exception of the Parkin, all the competitors were stock models. Packards, Peerless, Cadillac, Overlands, Fords, Mitchells, Acme, and Pullman took part actively, and interspersed with the races between the four-wheelers there were some exceptionally fast ones for motorcycles. The Lowell carnival evidently kept some of the regular Wildwood entries away and prevented the possible lowering of records. The day was a perfect one for speed, except for a head wind, and that difficulty was overcome by allowing the fastest of the cars to show their abilities in both directions.

It was the wind direction and the running over the course both with it and against it that gave Willie Haupt the honor of the fastest time of the afternoon. In the time trials the Parkin was sent down the mile first, and its time caught at :54 4-5 as against the :55 seconds of the Alco 70. When the officials gave the motorcyclists the privilege of running with the wind, with a difference of five seconds in their time, it was agreed to allow Haupt and Parkin to do likewise. The former was thus able to win out, for his big car reduced its time to :51 1-5 seconds, an average of 70.3 miles per hour, while the Parkin's record was :52 4-5. In the free-for-all, however, the latter finished the mile fully 40 yards ahead of the Alco, in :55 1-5. These two machines were the only under-the-minute ones present, although Parkin sent a Packard roadster down the line in a minute flat. What was lacking in sensational speed was made up in the exciting finishes, for in a number of the events the machines were remarkably well matched and crossed the line with but a few feet or inches separating.

R. A. Jackson's Mitchell 20 just managed to nose out H. F. Hunter's Overland in the $1,250 and under event, with the 22-horsepower Ford, driven by E. S. Byam, but a length in the rear. The winner's time was 1:18. The Cadillac's victory over the Mitchell in the $1,251 to $2,000 class was similarly close, the former covering the distance in 1:10. Another eyelash race was witnessed in the triangular contest between the Peerless, Acme, and Packard in a special event—put on to fill a gap for cars in the $3,001 to $4,000 class, which did not appear. The Peerless, belonging to Ben Griscom, was driven by R. H. Nimms and was but a scant wheel length ahead of the Acme, driven by J. W. Ely, while the latter was but 10 yards ahead of J. W. Beck in the Packard. Another filler was a match race between a 40-horsepower Pullman, driven by J. L. Brown, and a 30-horsepower Overland, with H. F. Hunter at the wheel. The York-built machine won by about 20 yards, its time being 1:11 4-5. A consolation event brought out all the non-winners and was annexed by Beck's Packard in 1:23, with Joe Parkin in a Mitchell and Byam in the Ford as runners-up.

Pos.	Car	H.P.	Driver	Time
	GASOLINE STOCK CARS, $4,001 TO $5,000			
1	Packard	30	Jos. Parkin	1:05 3-5
2	Packard	80	Geo. Meeley	
	GASOLINE STOCK CARS, $1,251 TO $2,000			
1	Cadillac	80	Frank Paxson	1:10
2	Mitchell	40	Cherie Borie	
3	Mitchell	80	Jos. Parkin	
	GASOLINE STOCK CARS, $1,250 AND UNDER			
1	Mitchell	20	R. A. Jackson	1:18
2	Overland	30	H. F. Hunter	
3	Ford	22	E. S. Byam	
	SPECIAL EVENT			
1	Peerless	30	R. H. Nimms	1:08
2	Acme	48	J. W. Ely	
3	Packard	30	J. W. Beck	
	MATCH RACE			
1	Pullman	40	J. L. Brown	1.11 4-5
2	Overland	30	H. F. Hunter	
	CONSOLATION RACE			
1	Packard	30	J. W. Beck	1:23
2	Mitchell	30	Jos. Parkin	
3	Ford	22	E. S. Byam	
	TIME TRIALS			
1	Alco	70	Willie Haupt	:55 :51 1-5
2	Parkin	50	Jos. Parkin	:54 4-5 :52 4-5
3	Packard	30	Jos. Parkin	1:00
4	Peerless	30	R. H. Nimms	1:03
5	Cadillac	30	Frank Paxson	1:05
6	Packard	30	J. L. Fritz	1:06 2-5
	FREE-FOR-ALL			
1	Parkin	50	Jos. Parkin	:55 1-5
2	Alco	70	Willie Haupt	
3	Cadillac	30	Frank Paxson	

MINNEAPOLIS AUTOISTS HAVE EXHIBITION

MINNEAPOLIS, MINN., Sept. 4—This city will open the automobile exhibition season next week, in connection with the State fair, for a mammoth auto show will be held in the new grandstand building. This huge concrete structure has an exhibition room 300 by 150 feet in size, one side of which is composed entirely of windows. The following makes of cars have been placed upon the list: American, Pope-Hartford, Reo, Holsman, Chalmers-Detroit, Hudson, Thomas, Velie, Elmore, Inter-State, Pullman, Winton, Peerless, White, Cadillac, Rapid, Black, Columbus, Frayer-Miller, Mora, Halliday, Mitchell, Chase, Minneapolis, Regal, Midland, Pennsylvania, Richmond, Jackson, Maxwell, Hupmobile, Brush, Schacht, Detroit, Wilcox, McIntyre.

Hundreds of people visit this fair during the week, and the automobile and accessory concerns always do an immense amount of business. On Saturday there will be races on the track.

STATE GOVERNORS INTERESTED IN ROADS

The replies from Governors and Mayors of many States and cities to invitations asking that delegates be sent to attend the second annual National Good Roads Convention bear eloquent testimony to the growth of the Good Roads movement in all parts of the country. Although the tentative program and invitations were issued by the A. A. A. committee only a week ago, favorable responses have been received from the Governors of twelve States.

Governor Patterson, of Tennessee, sent a particularly interesting letter, stating that he had called a Good Roads convention in his own State to be held at the same time as the National Convention, and would also be represented by several delegates. The other States from which representatives have been promised are New York, Maine, Wisconsin, North Carolina, Maryland, Indiana, Arkansas, Nebraska, Kentucky, Iowa and Illinois.

Aeroplanes in Actual Contest at Rheims

by W. F. Bradley

Three Aeroplanes Racing Down the Homestretch at Rheims—Latham, Lefebvre and Bunau-Varilla

BETHENY, near Rheims, Aug. 30—Old Glory floats in the front row of a line of sheds facing the aviation ground on which the world has been shown that the aerial way is established. When the American team took up its quarters in the wooden establishment reserved for it, Glenn H. Curtiss pronounced conditions ideal for the aeroplane; his friend and assistant, Ward Fisher, passed a favorable judgment on the two sleeping rooms in the rear; Tod Schriver, ex-circus performer, now skilled mechanic and indispensable helper, did not care much what the accommodations were, but he must have Old Glory floating from the roof. A Rheims department store furnished the Stars and Stripes; Schriver scrambled to the top of the building, planted the flag, and the crowd came immediately. There is not an American on the ground who has not done his best to break through the line of gendarmes carefully guarding the enclosed camp where aeroplanes and aviators are housed. Many of them have succeeded either legitimately or otherwise in procuring passes that allow them to get a closer look at the flyers. All day long it is a procession of people from the other side of the water anxious to look at the machine and wish its pilot good luck. Cortlandt Field Bishop, as stockholder in the Herring-Curtiss Company and president of the Aero Club of America, is daily on the spot. The American automobile world is well represented by Jefferson De Mont Thompson, treasurer of the Long Island Motor Parkway; Roy D. Chapin, of the Chalmers-Detroit Company; H. L. Kittredge, of the Peerless Company, who has just been touring Europe on a 1910 Peerless, and various others. Royalty is not missing, many a member of the ruling families of Europe dropping in to see Curtiss and the American machine. President Fallières on his short unofficial visit found time to greet the American aviator and wish him success in the races.

There are thirty-eight aeroplanes on the ground, and as each one has a shed as large as the average suburban dwelling house a good idea of the size of the camp can be obtained. Some of the companies, as in the case of the Curtiss team, have fitted up their quarters as if for a permanent stay, with comfortable sleeping rooms in the rear, prints and flags on the wall, and an air of orderliness and cleanliness everywhere. Others let the aeroplane have all the space, leaving the shed at night stoutly barricaded and in the care of a watchman. Others again live in a piggish style, with a camp bed on the grass-covered floor, or with merely a mattress thrown inside a packing case, while butter and sardines and canned beef are mixed up indiscriminately with mechanics' tools, oil and grease; to complete the confusion a couple of horses may be stabled in one corner.

Down the line, a few yards from the Curtiss headquarters, is the Bleriot establishment. Though the two men have not yet exchanged a word directly, for Bleriot is ignorant of English and Curtiss has not been known to utter a word of French, there is a mutual sympathy and admiration between the two. Unlike the generally accepted description of the Frenchman, Bleriot is cold, calm, unemotional, possessed at the same time with a quickness of action and a stronger determination than most men. Bleriot was out for the Gordon Bennett cup and the speed test. Curtiss crossed the Atlantic with the same object in view. Thus though they are admirers they are also rivals. Curtiss puts his faith in a biplane, practically identical with the one with which he made flights at Morris Park and on Long Island, but equipped with a new eight-cylinder motor developing 30-35 horsepower. It is a light, handsomely constructed machine, with a lot of original details about it that call forth the admiration of the experts. Bleriot's best apparatus is a No. XII monoplane—the twelfth in the long series of machines he has constructed—fitted with an 80-horsepower E. N. V. motor.

This aeroplane is larger and much more powerful than the one which crossed the English channel. The wing surfaces are flexible and are mounted at the fore end and on the upper portion of a long metal chassis. Below them is a platform carrying the motor and the wide seat for pilot and one passenger. The space is so great that a second passenger could be accommodated without much difficulty. The eight-cylinder engine is of the V type, with cylinders cast separately, machined inside and out and capped with a jacket obtained by a system of copper deposit. This avoids the use of an independent head, with joints than can rarely be kept tight when running at full power for any length of time. To enhance its chances of success the engine is fitted with double ignition by high-tension magneto and storage batteries, both sets of plugs being in the head.

The drive is taken from the forward end of the crankshaft to a propeller shaft carried in ball bearings just below the wing, by means of a chain. The propeller, a two-bladed wooden one, is geared down about one-third. On the standard machine the gasoline tank is carried within the upper and lower surfaces of the wing, the fuel, of course, flowing down to the carbureter by gravity. As this machine will also be used in the endurance test a very much larger tank has also been fitted under the pilot's seat, holding enough fuel for a four hours' trip in the air. All controls with the exceptions of the vertical rudder, operated by the feet, are combined in a single steering column mounted on a universal joint and consequently capable of being turned in any direction. Throttle and spark advance levers are fitted just below the steering wheel. The gasoline pressure pump and supplementary oil pump are at the pilot's right hand.

Bleriot has a second and similar machine fitted with a powerful three-cylinder Anzani motor, which like the first has transmission by chain to a ball bearing shaft carrying a two-bladed wooden propeller. It was with this machine that he qualified for the Gordon Bennett cup, but was later unable to get much speed out of it. The motor persistently heated despite all the attention given to it by the mechanics. After a thorough examination by Anzani it was discovered that it was geared too low. Thus constantly racing with a higher gearing very satisfactory results were obtained. The same type of motor, but of much smaller size, was employed on the cross-Channel flight and is fittetd to three duplicate machines used here. Anzani disposes his three cylinders fan-wise, connecting all three rods to one crank and employing internal flywheels as in the standard type of single-cylinder vertical motor.

Up to the present the most successful motor here is, strangely, the newest and most freakish. It is an air-cooled Gnome with seven cylinders, which revolve together with the crankcase, the hollow crankshaft being stationary. Up to the present this motor has never "laid down" in a race. Practically every part is machined out of solid bars of nickel steel. Even the cylinders are produced in this way, being first roughly shaped out, their fins formed and profiled so as to give greater depth at the top than at the base; then the inside is hollowed out, giving a shell very much lighter than can be obtained by casting and at the same time of greater strength than any cast cylinder.

The method of attaching is original, each of the cylinders passing through a hole bored for it on the face of the circular nickel steel crankcase. They are secured by a locking ring on the inside of the case. With the cylinders and case revolving together the tendency is for the former to be pulled out of their case. A locking ring round the base within the casing is therefore all that is necessary. The exhaust valves are in the cylinder head, operated mechanically. The inlet valves are in the piston head, operated automatically. The crankshaft being fixed and hollow is employed for the admission of the explosive mixture into the crankcase and through the piston head valves into the combustion chamber. Ignition is by a standard type of high-tension magneto specially geared to provide seven sparks for each two revolutions of the engine.

There are a few machines here using practically a standard type of automobile motor somewhat lightened for aerial work. Henry Fournier was one of these, with an Itala of four cylinders developing 40 horsepower and lightened in its accessories only. Even the radiator was the absolutely standard type as used on automobiles. Vivinus furnished a practically standard type of four-cylinder automobile motor for aeroplane work, fitting it to two of the machines entered by Henry Farman.

Up to the present it has been impossible to learn any really practical lessons regarding the respective merits of the standard heavy and the special light-weight motor. In both classes there have been striking successes and partial failures. One point that has been clearly proved is that it is not really necessary to obtain a feather-weight engine in order to rise from the ground.

Castor oil is very extensively employed for lubricating the aeroplane motors. Bleriot uses it exclusively for both his small and large motors. All the Gnome engines use it for the main bearings. Employers of pure castor oil are unanimously of opinion that it is excellent as a lubricant. The only objection that can be raised against it appears to be that its smell is objectionable. Certainly the camp here at times smells as if a drug store had been set on fire.

America's share of the honors of the meet has been sufficient to show that this nation means to keep in the foremost rank of the new invasion of the air. There were some who thought that America's first and last word in aeronautics was the Wright brothers, and that the European nations, especially France, with her hosts of experimenters, would quickly regain pre-eminence. They have learned their mistake. The Wright machines played a prominent part in the meet, and Lefebvre, Tissandier and Lambert were among the most successful of the aviators, but Curtiss alone could easily have upheld the reputation of his country. In actual number of victories his machine was surpassed by Latham's Antoinettes and equalled by Farman's machine of his own construction, but the impression produced by the swift and sure "Golden Flyer" was second to none.

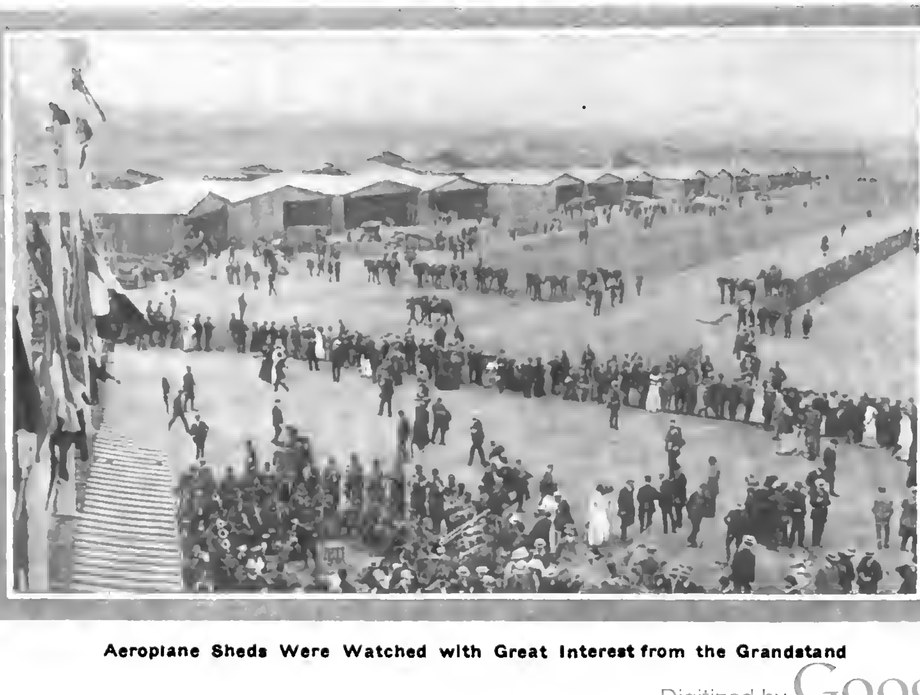
LEFEBVRE KILLED TESTING AEROPLANE

Juvisy-sur-Orge, France, Sept. 7—E. Lefebvre, who took a prominent part in Rheims week, was killed to-day by a fall while testing one of several new Wright aeroplanes which were being prepared for delivery. He was flying at a height of only 20 feet when the machine swerved sharply downward and struck the ground with great force. The cause of the accident is unknown.

WRIGHTS BUY LAND FOR AERODROME

Springfield, O., Sept. 6—Wilbur and Orville Wright have purchased about 700 acres of land at Tippecanoe City, near here, to use for their experiments with aeroplanes. It is reported that the brothers will erect an extensive factory and begin to manufacture their aeroplanes on a commercial scale.

Roy D. Chapin and Glenn Curtiss



Aeroplane Sheds Were Watched with Great Interest from the Grandstand

RESULTS OF WINNIPEG AGRICULTURAL MOTOR TRIALS

THE Winnipeg Industrial Association conducted its second farm-motor competition with an entry list of 22 machines, of which 18 took part in the trials, and unusual interest was aroused both among the manufacturers and the farmers. The tests comprised a two-hour brake run, and demonstrations of hauling and plowing, and the machines were also carefully examined with respect to design and construction, accessibility and protection from mud and dust, ease of operation, and clearance of working parts from the ground. The type included both internal combustion and steam; the former were divided into three classes, according to horsepower.

For the brake test a special rope-brake had been constructed by the engineer in charge, and this was applied to each mottor in turn. Careful records were kept of the load applied and the speed of the motor, its consumption of water and of coal or wood, if steam, and of gasoline or kerosene, if internal combustion. These tests averaged in length two hours. The hauling demonstration was held over a soft and gravelly piece of ground half a mile long, which was traversed about ten times by each machine. The load, distance, time, fuel consumed, and drawbar pull were recorded. The plowing test was extremely interesting, although the results depended as much on the plows as on the tractors. Full results of all the tests are given in the table appended below.

Official Records of the Entries and Results in the Second International Trials for Agricultural Motors held at Winnipeg, from the 8th to 17th July.

Class A, Internal Combustion (20 h.p. and under); Class B, Internal Combustion (20 h.p.—50 h.p.); Class C, Internal Combustion (over 50 h.p.); Class D, Steam.

Class	Entry No.	Makers	Cylinders: Number	Cylinders: Diameter (in.)	Cylinders: Stroke (in.)	Pulley: Diameter (in.)	Pulley: Face (in.)	Drivers: Diameter (in.)	Drivers: Face (in.)	Total width over drivers (ft. in.)	Capacity of fuel tank	Capacity of water tank	Weights: Total	Weights: On drivers	Cash price f.o.b. Winnipeg ($)	Brake tests: H.p. developed	Revolutions engine pulley	Water used gallons	% Water used	Fuel used	% Fuel used	H.p. hours per unit of fuel	Running time (min.)
A	6	International Harvester*	1	8	14	26	8½	56	12	7 8	25	26	9800	7100	1700	19·7	249	4·18	7·9	1·47	8·9	13·4	120
	15	Avery Co.†	4	4¾	6	9¾	8	41	15	7 6	26	72	9000	[illegible]	3000	17·9	[illegible]	7·8	100	4·6	21·6	8·6	120
	13	Marshall Sons and Co.‡	6	7	7	15	7	56	16	8 8	20	15	14800	—	3000	—	—	—	—	—	—	—	—
B	8	Russell and Co.†	2	8	10	26	10½	[illegible]	26	6 8	42	71	17150	13000	2400	30·2	311	7·2	10·5	[illegible]	[illegible]	8·8	91
	7	International Harvester*	2	8¼	15	[illegible]	10½	[illegible]	20	6 6	26	26	13000	9000	2200	22·6	254	4·22	9	3·7	14·9	11·9	120
	10	Kinnard Haines Co.	4	6¼	7	20	9	54	12	8 1	26	120	12975	—	2250	20·7	[illegible]	3·2	4·8	7·8	26·8	8·8	115½
	17	International Harvester	2	8¼	15	26	10½	70	12	6 8	26	64	12500	9000	[illegible]	24·2	[illegible]	9·8	17·6	8·8	15·6	12·4	120
	21	International Harvester‡	1	[illegible]	15	26	10½	15	26	6 6	15	20	12000	9400	2200	15·9	[illegible]	14·5	26·6	8·6	14·4	15·8	120
C	7	International Harvester	2	9¼	14	26	10½	72	12	—	26	97	20000	14000	2700	40·0	[illegible]	23	31·6	12·1	22·4	7·6	120
	6	Gas Traction Co.	4	6	8	15½	9	26	12	—	27	—	12600	9000	2700	—	—	—	—	—	—	—	—
	8	Marshall Sons and Co.†	4	7	7	20¾	10	76	26	16 6	61	73	[illegible]	16970	3400	29·5	[illegible]	21·6	20	15·4	26·2	7·6	120
	16	Kinnard Haines Co.*	4	7½	8	20	15	26	26	6 6	21	250	13000	—	2700	45·6	[illegible]	6·4	2·2	10·9	27·7	8·4	120
	15	International Harvester‡	1	26	15	20	10½	72	15	—	27	71	13000	19400	3400	25·6	262	15	15·5	5·6	15·1	11·3	120
D	1	J. I. Case Co.*	1	12	12	40½	16	64	26	19 10	lb. 3000	300	40000	[illegible]	4000	37·6	[illegible]	[illegible]	130·0	700	26	20	175
	6	M. Rumely Co.	6	7½	14	[illegible]	12	64	40	12 8	1600	400	[illegible]	—	2974	102·6	[illegible]	771	139·0	1054	74	10·4	115
	11	Marshall Sons and Co.	1	9¼ 7¼	12	37	10	78	20	11 8	[illegible]	300	28000	17000	3250	—	—	—	—	—	—	—	—
	14	Russell and Co.†	2	11	12	42	14	26	26	11 6	275	450	[illegible]	[illegible]	3400	26·6	311	426	27·0	442	20	20·3	120
	20	Avery Co.‡	2	7	10	40	12	70	26	11 0	1700	320	40000	21120	3800	72·8	254	210	101	218	20	18·1	120

*1st. †2nd. ‡3rd. Fuel consumption is stated in Imperial gallons (277·27 cub. in.) or 100 lb. of coal.

Class	Entry No.	Makers	Brake tests: Mean effective pressure	Water evaporated per lb. of coal	Lb. of water per h.p. hour	Hauling tests: Load hauled	Average drawbar pull	Distance travelled (ft.)	Fuel used	Time hauling (min.)	1,000 ft. lb. per unit of fuel	Drawbar h.p.	Drawbar h.p. / Brake h.p.	Water used	1,000 ft. lb. hauled per gal. water	Ploughing tests: Ploughs: Number	Ploughs: Width (in.)	Acres ploughed	Time ploughing—minutes	Average drawbar pull	Water used	Fuel used	Fuel per acre
A	6	International Harvester*	26	—	—	12870	1850	[illegible]	2·64	106½	[illegible]	10·4	[illegible]	8.7	—	8	13	1·60	73½	1520	[illegible]	[illegible]	1·6
	15	Avery Co.†	46·9	—	—	7004	816	[illegible]	5·40	117	[illegible]	9·7	·542	9·7	—	3	14	1·66	26	1300	[illegible]	[illegible]	[illegible]
	13	Marshall Sons and Co.‡	—	—	—	12870	1050	21440	10·21	111½	2400	9·7	—	26	—	3	14	1·10	[illegible]	[illegible]	—	[illegible]	[illegible]
B	6	Russell and Co.†	44·7	—	—	[illegible]	[illegible]	19700	6·10	70½	6707	15·1	·516	13·5	—	4	14	1·7	121½	[illegible]	—	[illegible]	[illegible]
	7	International Harvester*	26	—	—	[illegible]	[illegible]	19700	4·26	128	[illegible]	[illegible]	[illegible]	6·2	—	5	14	0·17	117	[illegible]	10·6	2·26	[illegible]
	15	Kinnard Haines Co.	23·6	—	—	19400	[illegible]	24120	[illegible]	20	[illegible]	17·0	[illegible]	15	—	6	14	[illegible]	101	[illegible]	0·6	[illegible]	[illegible]
	17	International Harvester	20·4	—	—	17000	1778	[illegible]	[illegible]	107½	[illegible]	11·8	[illegible]	[illegible]	—	8	14	1·3	86½	[illegible]	—	[illegible]	[illegible]
	21	International Harvester‡	15	—	—	18000	1750	[illegible]	[illegible]	115½	6007	12·6	[illegible]	17·7	—	4	14	1·9	91½	2100	[illegible]	[illegible]	[illegible]
C	6	International Harvester	[illegible]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	6	Gas Traction Co.	—	—	—	[illegible]	2750	24120	11·0	26	[illegible]	[illegible]	—	4·6	—	6	14	1·27	44½	[illegible]	—	[illegible]	[illegible]
	8	Marshall Sons and Co.†	[illegible]	—	—	[illegible]	4580	21440	10·14	100½	[illegible]	27·3	[illegible]	26	—	9	14	[illegible]	71	[illegible]	—	[illegible]	[illegible]
	16	Kinnard Haines Co.*	[illegible]	—	—	[illegible]	[illegible]	26120	[illegible]	112½	[illegible]	19·7	[illegible]	10	—	8	14	2·4	26	[illegible]	—	[illegible]	[illegible]
	15	International Harvester‡	24	—	—	12000	[illegible]	21440	[illegible]	115	[illegible]	16.7	[illegible]	15	—	—	—	—	—	—	—	—	—
D	1	J. I. Case Co.*	[illegible]	8·8	28·2	27000	[illegible]	[illegible]	6·15	165	14000	15·7	[illegible]	[illegible]	175	[illegible]	14	2·6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	6	M. Rumely Co.	26	7·4	29·8	40000	[illegible]	24120	[illegible]	197	[illegible]	26	[illegible]	[illegible]	[illegible]	10	15	[illegible]	26	[illegible]	—	[illegible]	[illegible]
	11	Marshall Sons and Co.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	14	Russell and Co.†	—	8·2	28·6	34000	[illegible]	25400	[illegible]	119	13000	20·6	·241	[illegible]	[illegible]	[illegible]	14	[illegible]	26	[illegible]	[illegible]	[illegible]	[illegible]
	20	Avery Co.‡	14·6	6.4	26·6	34000	4700	19700	[illegible]	26	17750	26·1	·242	[illegible]	120	26	14	2·2	[illegible]	[illegible]	—	[illegible]	[illegible]

*1st. †2nd. ‡3rd. Length of ground ploughed [illegible] ft. Length of hauling course, [illegible] ft.

RECENT FRENCH MOTOR PLOW TRIALS

PARIS, Sept. 1—Agriculturalists will have an opportunity of seeing how plowing can be done without the aid of horses or oxen at an exhibition to he held at Amiens on September 24. The occasion is an international competition and motor congress intended to develop the use of the internal combustion motor in agricultural pursuits. In the motor plowing match each of the competitors will be given a piece of land on which to operate, the classification being established on the manner in which the plowing is done, the cost per acre, the time necessary to bring the machine to the field and put into operation, the number of men required, the facility with which work can be done on varied land, and the possibility of using the motor for other work on the farm.

This is the second occasion on which a plowing competition has been held in France, the first being last year at Bourges. In order to encourage the use of motors on farms it has been decided that a series of exhibitions, competitions and congresses shall be held, a different center of France being selected each year. Up to the present French constructors have not paid very close attention to the development of very simple motors for use on farms, or to motor-driven or steam plows. In the last competition America and England were well represented, and will figure again in the Amiens competition. French entries will doubtless be larger than last year. Too much credit cannot be given the French nation as a whole for the tests of this nature, which they hold every year and in every branch of the industry. These tests lay the foundations of good business.

DIRECT INJECTION OF FUEL FOR MOTORS

That direct injections of fuel have the advantage of weighing out an exact amount of the same is self evident, and since the weight of fuel injected may be varied at will, it is plain that there is a considerable advantage attending the method providing the time of injection can be altered at will. It is easy enough to measure out the required weight of fuel, if a plunger pump is used, especially provided the packing question is well cared for and there is no leakage of moment. The length of the stroke of the plunger may be changed at will by means of a sliding cam motion, and if the cam is also given the ability to lag, or lead, which is but a question of supplying the necessary mechanism, just as is done with ignition systems; it then becomes possible to measure out the fuel, with great accuracy, alter the quantity of the same, at will, and fix the time of injection to suit the conditions. Under the best conditions the amount of gasoline required is about two per cent, by weight, of the total volume; but to attain flexibility, it is necessary to vary this ratio over considerable ranges.

Not only is this subject being discussed very thoroughly, but many experiments are being made with engines fitted with a fuel injection system. As these are tried out one by one, their success spurs other manufacturers on to try the same thing, and so the list of engines using the direct injection gains in numbers daily. Thus far, however, it is in the field of two-cycle motors that the greatest advance has been made. But the success there will before long have its direct result upon the more reliable and much more general four-cycle form.

AUTOMOBILE WHEELS, RIMS, AND TIRES

By Thos. J. Fay

FROM A MUMMY PIT DATING BEFORE 2000 BC

FIG. 15 FRONT

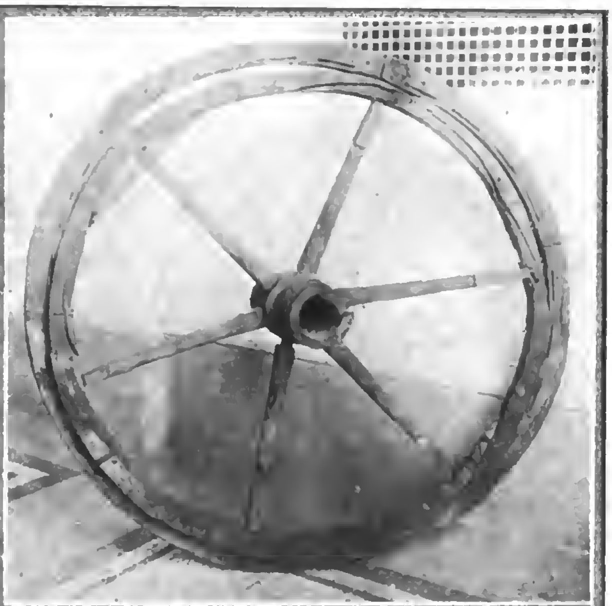


FIG. 16 BACK

THE NINEVEH WHEEL-EGYPTIAN

FIG 17

EGYPT, as a land of silence and mystery, indicates to the investigator with eyes to see the silence of consummate intelligence and the mystery which must ever remain in the maw of forgotten centuries. For over 30 years the New York Historical Society has had in its possession what is catalogued as the "Nineveh" wheel, which was taken from a mummy pit by Doctor Abbott, at a point near Dashour, in Egypt, which wheel upon examination proves to be the direct ancestor of all spoked wheels as they are now made.

The date of making of the Nineveh wheel cannot be exactly fixed, but Dr. Abbott estimated its age to be not less than 4,000 years, and the indications are that the date of interring of the once mortal, or mummy, was about 2000 B.C. The wheel is here shown in photographs taken especially for THE AUTOMOBILE by permission of the director of the New York Historical Society, and Fig. 15 represents a front view of the wheel; Fig. 16 depicts the wheel from the back, and Fig. 17 is with the wheel on edge, in order to depict the dish of the spokes, which is apparently very large.

The hub of this wheel was turned from a solid block of wood, is about 18 inches long in the axle plane, and the enlarged portion at the center is about six inches in diameter, dropping down to four inches at the approach of the two ends. The wheel is provided with six spokes, terminating in six felloe segments, and the tenons come at the joints of the felloe sections. The wheel is about 40 inches in diameter, and the tenons are nearly square, fitting into square sockets both at the hub and at the felloes.

Demountable Rims Invented by the Egyptians—This wheel is provided with an outer rim of bent wood, which serves as a tire, and since it is bound on by means of wrappings at six points around the periphery, with T-shaped slots provided in each spoke for the purpose, it has all the advantages of a demountable rim. This rim was evidently bent by artificial means, and that it could be removed and replaced at will is one of the evidences afforded by an inspection. In a word, then, the Egyptians used wooden tires and provided for their prompt replacement as the occasion required. This particular wheel was probably used on a chariot. The views given show the markings of great age, and that the wheel was much used before it was placed in the mummy pit by the ancients is scarcely to be believed.

What Went Before the Nineveh Wheel—What sort of

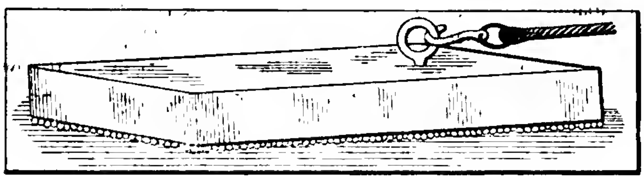


Fig. 18—Showing How Heavy Weights Were Once Moved

wheels, or equivalents, rolled over the causeway leading up to the Great Pyramid 4000 B. C. is not clear to us, but Fig. 18 represents a logical suggestion; brute force, so to speak, aided by crude ball bearings wrought out of the sands of the desert, probably did have something to do with it. Imagination, tuned up to the occasion, leads to the roller bearing system as depicted in Fig. 19, and from this point on to "Nature's own" wheel, as shown in Fig. 20, is but a step.

Modern Wheels Differ in Point of Detail—History, leading down through the halls of time, records the days of ornamental wheels, reaching their height during the seventeenth and eighteenth centuries, but these wheels were not dished, and they differed materially from the Warner or Sarven style of wheel of the present day in that the lion's face or other ornamentation is erased from the hub, but strength is substituted instead.

If the Egyptian invented the first wheel, it was the American who brought it out of its earlier stage, introducing all the features of strength, simplicity and utility, of which exact knowledge is now in the possession of wheelmakers. Take a wheel of the present, for illustration, and load it down, when, lo, it will be found that five tons will be safely borne by a wheel with spokes no more than three inches wide at the flange in the axle plane.

Wheel Diameter Represents an Important Point—The Egyptian wheel shown in Fig. 18 is 40 inches in diameter; wheels for extremely heavy trucks have been made even 100 inches in diameter, and in this respect the practice, depending upon the requirements, has varied over broad ranges. For automobiles, owing to the splendid service rendered by pneumatic tires, coupled with the cost thereof, diameter has fallen away to a low ebb, reaching the low limit of 26 inches in a few cases.

That small wheels, even below 32 inches, represent much economy is not readily proven by past performances. For a very light, relatively slow speed runabout, it may be that 28-inch wheels (measuring over the tires) will do very nicely, but the trend is back in the direction of the (former) large-diameter wheels, despite the finer qualities of modern tires, which rather goes to show that the cost of tires had more to do with reducing the diameter of wheels than any other one thing. This cost of tires is curing, and quality, which is also a point to be enlarged upon, is advancing about in the same ratio that cost is reducing. In this is seen a double advantage, which enables builders of cars to increase the diameter of the wheels, and in so doing augment the easy riding qualities of the cars, reduce spring troubles, and gain advantages in other ways, leading to longer life of the cars as a whole. This statement of the cost of tires does not contemplate any discussion of the moment, as the rise and fall of the rubber market and the relating incidents are too well known to require it.

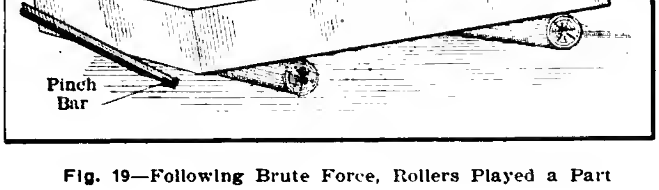


Fig. 19—Following Brute Force, Rollers Played a Part

In a general way the ability of a wheel is proportional to the square of the (section) diameter of the tire it will accommodate and to the circumference of the tire used. There must be a point beyond which this rule will fail to respond advantageously, since the centrifugal force, which will set up fiber strains in the tire, will increase with the diameter of the tire used, considering a given road speed of the car. That centrifugal force and its effect on the tire should be taken into account is quite as true as it would be of a flywheel for the motor or any other revolving mass. The right diameter of a wheel then involves all the conditions, as follows:

(A) Diameter of the tire in proportion to the height of road obstructions it will have to surmount.

(B) Section of the tire in proportion to the road debris it will be expected to "swallow."

(C) Section of the tire in proportion to the load it will economically sustain in actual service.

(D) Diameter of the tire as it relates to the load to be sustained.

(E) Diameter of the tire as it relates to centrifugal force.

(F) Weight of the wheel as a whole in view of flywheel effect on the car.

(G) Weight of the wheel as a whole from the point of view of gyroscopic action.

(H) Diameter of the wheel, taking into account the difficulty involved in removing and replacing tires.

(J) Diameter of the wheel, considering resilience, allowing that as the tires are reduced in this property, the wheels must make up for the deficiency.

(J) Diameter of the wheel as it affects cost, taking into account the cost of tires.

Obviously, in view of all these, and other conditions besides, there is justification in going slow, and time only will measure the ultimate diameter of tires such as will spell finality in automobile work. Progress in this work dates from the reign of a Pharaoh of the fourth dynasty, but the upward ascendancy of the curve of progress has taken most rapid strides toward the long-sought goal within a few years.

Diameter of Wheels Relates to Height of Road Obstructions—If a wheel encounters an obstruction equal to its own radius, there is no tendency to surmount, because the resolved forces must be summed up as a problem in impact calculations of the first magnitude, in relation to which it would be of small advantage to pursue a further investigation, since the car would have to go in any but the forward direction. But there is some angle of impact which may be encountered with impunity, which angle will be nearly the same for all wheels of whatever diameter, but the higher the obstruction the greater must be the diameter of the wheel, in order to come within the fixed (maximum) angle of impact.

It is possible to consider that the versed sine of the angle of impact of a road obstruction with a wheel, allowing for pneumatic tires, will be allowable when the versed sine is some proportion of, but less than, the section diameter of the tire, which proportion, in turn, will depend upon the area of the section of the tire and the speed of the car, considering a given blow struck. In thus reasoning, it is necessary to take into account the nature of the roadbed over which cars must roll, but, after all, this is one of the prime requisites, and the proof lies in every effort at road building, since if cars could be made to negotiate Naurres byways, road building would languish.

Tires Swallow Small Road Debris—There are two ways of annulling the ills of small road debris, and speed may be increased in proportion to the versed sine of the angle of contact of rigid tires with such debris, or if pneumatic tires swallow the debris, speed may be increased up to the point where the debris becomes too large for the tires to swallow. In the absence of pneumatic tires, increasing diameters of wheels allows of increasing speed from this point of view, simply because the angle is reduced. The mere employment of pneumatic tires will not eliminate the tendencies, and, in a general way, increasing the diameter of pneumatic tires will allow of increasing speed, independently of the ability of the tires to swallow the debris. With pneumatic tires the gain is a double one, however, primarily due to the natural advantage of large diameter wheels, and, again, in view of the ability of the large tires to swallow the small, road obstructions.

Centrifugal Force Limits Diameter of Wheels—In the list of conditions which affect wheels, C and D remain as tire problems, and will be reserved for discussion later. The condition E, however, is abstract, since it affects wheels, no matter of what material they are made. In a cast-iron flywheel, when the rim speed is one mile per minute, the stresses set up in the section of the iron are all that it is safe to engender, if a factor of safety of suitable magnitude is to be retained. It is not in wood that danger is to be encountered when reference is had to flywheel effect, since in wood the rim strains is materially reduced, owing to the specific weight of the same, in view of its ultimate strength. For a given rim speed the extreme fiber strain is in proportion to the specific weight of the material used. The weight of ash, for illustration, is 34 pounds per cubic foot,

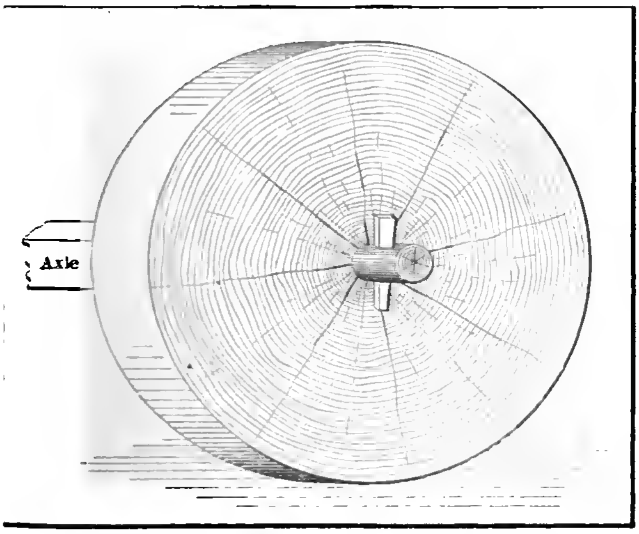


Fig. 20—From Rollers to Solid Wheele Was a Natural Step

whereas cast iron weighs about 450 pounds per cubic foot. In view of the relations, it has been determined that an ash rim will compare with cast iron for safety when the speed is increased to:

$\sqrt{10.58} = 3.25$ times the rim speed of cast iron.

The steel rims, as used with pneumatic tires, are not nearly so capable as the wooden felloes, so that the danger to be encountered, contrary to the usual expectation, is in connection with the steel rims rather than with the wood.

In flywheel work the rim is supported by the arms, which is not true when automobile wheels are considered, since the rims are not held by arms, unless account is taken of security bolting, which is frequently a negligible quantity. Considering steel, of which rims are made, centrifugal force (not counting the weight of tires) will tend to part the rim, one half from the other, and resistance is offered by the rim at each end of the diameter. The rim strain will be:

$S = 0.0000294\ V^2$

when

S = extreme fiber strain in pounds per square inch;

V^2 = square of the rim speed in feet per minute.

The above takes no notice of the weight of the tire, which loads the rim, since it is incapable of supporting its own weight, and an allowance must be made for this loading.

The extreme fiber strain is quite independent of the sectional area of the rim, so that the calculation assumes simple proportions, if only the speed of the wheel is known and its diameter is fixed, barring the error which is likely to follow if the weight of "loading," due to the weight of the tire, is not known exactly.

The limit of speed in revolutions per minute, considering different tire diameters, for a given maximum will be as follows:

MAXIMUM DIAMETER OF WHEELS FOR A GIVEN RIM SPEED

Revolutions per Minute	Diameter of Wheel	Speed in Miles per Hour	Rim Speed in Feet per Minute
672	30	60	5,280
612	33	60	5,280
560	36	60	5,280
480	42	60	5,280

It is not claimed that the rim speed above given will endanger the rims or the tires, but it may be well to consider that the strain is proportional to the square of the velocity, and double the above speed means that the strain will be multiplied by four. Just what will be a safe rim speed is yet to be determined, but the extreme fiber strain in the steel of the rim at a rim speed of 60 miles per hour will be:

$S = 5{,}280^2 \times 0.0000294 = 819.6$ pounds per square inch.

The above value, not counting the effect of "loading," seems to be well within the limits allowed for steel, and experience seems to prove that rims do hold out, even at double this speed, which is attained in racing. In the meantime, since speed imposes strains in a manner not usually considered, it may be well to ponder over this phase of the subject from the point of view of tire depreciation when cars are going fast on a hard, level road, and wheel depreciation when roads are not level, even if the speed is considerably reduced. Finally, with a method of reasoning sufficiently clear for the purpose, individual cases may be investigated with a view to ascertaining the factor of safety.

Weight of Wheels Must Be Considered—There are two ways of looking at the question of the weight of road wheels for cars—a, if flywheel effect is present to a noticeable effect it reduces the flywheel requirement, and, b, at high speeds of the car, if this same effect excess is in the road wheels, steering around curves will be attended by some approach to danger. Gyroscopic action, in so far as it is due to flywheel effect, will be present, no matter in which of all the members, the flywheel effect is induced, modified, to be sure, by the plane of the axis of rotation, so that each case would have to be investigated on individual merit. In the meantime, to whatever extent flywheel effect is necessary to the motor, it may best be supplied by a flywheel proper, because the speed of the motor crankshaft is higher than the speed of the road wheels, and greater flywheel effect may therefore be supplied with a lowering of the total weight of the car. Regarding the condition H, as before referred to, enough is to say it will be better to discuss sizes of tires and rims at the one time, a little later on. Resilience, as this property is tied up in diameter of wheels, is best represented in high-wheel cars using solid tires. That the high-wheel cars work very well is due to the resilience of the wheels, which property comes in through the use of long spokes, in which spring effect is most noticeable, and the amount of this action within limits is proportional to the cube of the length of the spokes.

That this resilience is destroyed when pneumatic tires are used is far from true, and this point alone augurs for wheels of considerable diameter, rather than the reverse. To whatever extent it may be possible to impart to wheels the property which makes it unnecessary to use pneumatic tires, also imparts longer life to the tires, since the amount of work they will have to do will be accordingly limited.

This point is one which might be well thought over by many otherwise promising inventors who are attempting to develop spring wheels. The one feature which all these wheels have in common is that they directly turn their backs upon this principle. No spring wheel has yet appeared on the market which was not heavier than the ordinary wheels, and of which the design was not such as to destroy every particle of natural resiliency which the wheel might have possessed in its original form. In this way the designers of these wheels were in reality adding to their task with each step they took. On the whole, it seems probable that the problem will work itself out gradually without making necessary any revolutionary changes.

(*To be Continued.*)

SOME CONVENIENCES IN THE OWNER'S GARAGE

PROFESSIONALS, if they deny themselves such facilities as would seem to be in keeping with progressive methods, make up for the deficiency by diluting their backwardness with skill. In the owner's garage an overcharge of skill is scarcely to be expected, and to trot to a repair shop every time some little thing happens is to run up a repair account which is likely to lend to autoing a reputation for cost, which is outside of the actual necessities.

If a nut is rusted in and fails to respond to a reasonable amount of pressure surely a can of kerosene oil may be ready to hand, and a little of the fluid, if it is spilled over the refractory nut, will loosen it in a little while; excess pressure, on the end of a long Stillson wrench, will, more likely than not, wrest the nut—with a part of the bolt clinging to it—from its home, and serve as the signal for a trip to a repair shop.

When a stud backs out during an attempt to take off the nut, to disregard the condition which underlies the incident is bound to lead to the loss of the stud and with, perhaps, the member the stud is placed to hold, and, rather than the resulting inconvenience, it is better to have in the garage a small quantity of hydrofluoric acid, a little of which, if daubed over the threads of the stud before screwing it back into place, will cement it into intimate relation and assure that it will remain where it belongs.

Rims, even if they are well coated with "japan" and baked will, in time, be attacked by rust, and, as the makers of tires are wont to say, rust is the bane of the fabric. In the owner's garage it is scarcely to be expected that facilities will be available for use in baking on japan, and there are no grades of unbaked japan that will stay on after rust forms on the rim. Fortunately, it is possible to cope with this problem, inasmuch as bees'-wax combines with rust and forms a new compound which prevents the further formation of the same. This same bees'-wax serves very well as a substitute for properly applied japan, and it may be easily put on, heating the rim, using a blow torch for the purpose. When this rim is heated sufficiently the bees'-wax may be spread over the rusted surfaces.

Strong Springs Render Valve Grinding Difficult—In some of the larger sizes of motors the valve springs are compressed to from 40 to 50 pounds, and in view of the cramped space in which they are nested many motorists prefer to have the valves ground in at a garage. A little experience of this kind generally leads to a period of leaky valves, rather than stand for delay which naturally results from placing a car in a busy garage, and the cost, which is frequently augmented by having other, and probably unnecessary, work done—a condition which is brought about by the mere delivery of the car into the hands of a repair man. True, every car should be kept in good repair, yet, even so, it is not good practice to make two bites of a cherry, and there is a class of repairs that can be deferred until the time when general overhauling is indicated by the condition of a car. Fig. 1 shows a spring puller of simple form, and by its use the spring may be compressed with but small effort, thus rendering valve grinding a relatively simple matter.

Keys Are Difficult to Remove—Unless keys are "driven home" they are likely to drift out at an unpropitious moment, and they will fail to do the work for which they are placed. When they are properly fitted, to remove them is more of a task than the average motorist is likely to admire, and Fig. 2 is offered as indicating how a key may be removed if in fashioning it the end is up-turned in order to allow of the placing of a "drift" piece and enable the mechanic to apply pressure in the manner as shown. Frequently, when keys are not properly fitted, they bear on the top and bottom, with the result that it is difficult to remove the wheel, drum or whatever it may be, but when the key is drawn the radial pressure is relieved and the drum may then be driven off with ease.

When a key has been taken out even two or three times, it is a question if it will then be valuable for future use, and while it may be peened to a new bearing thickness, and then refitted, even so it is better to have a little key stock on hand and fit a new key in place. In fitting a key, careful work will furnish its own reward; and, remembering that it is side pressure that is wanted, all that remains is to taper the key slightly, say 1-16 inch to the foot, and have a true bearing all along the faces. Blueing the pressure faces of the key will enable the mechanic to note, by trial, how tight it will fit by trial, and how well the face-bearings will be. When the key is ready to insert for the last time, it should drive nearly home with but relatively little effort, but the last part of the key, say for 1-2 inch, should resist with considerable tenacity. If the hub is of cast iron, and the shell is thin, it will be well to have a care in order not to split the hub, which will be a simple thing to do, in view of the slight taper of the key and the tremendous pressure it is capable of exerting. The lever advantage is in the ratio of 192:1 when the taper is 1-16 inch to the foot.

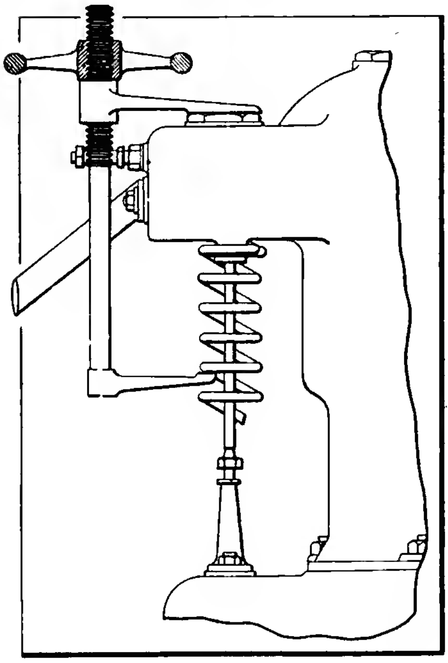


Fig. 1—Spring puller of simple form

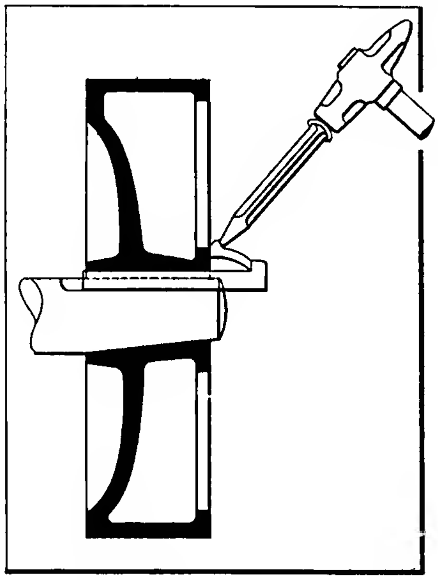


Fig. 2—Showing how key is removed

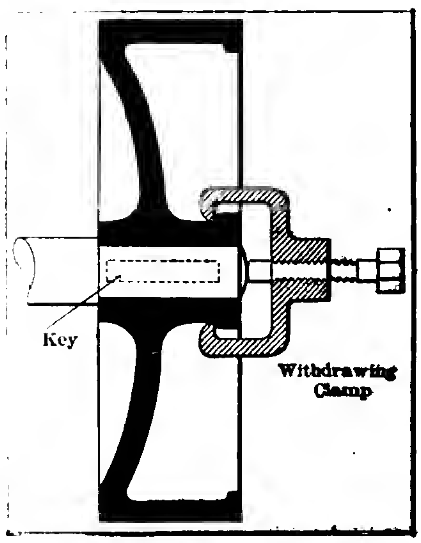


Fig. 3—Pull-jack of simple design

Meritorious Features of Wire Wheels

By Joseph A. Mackle

In the early days of the history of the automobile, solid-tired wire wheels were standard practice, and for the low powers and low speeds of those times the wheels gave satisfactory service. Less success was experienced when speeds increased, for owing both to too light construction and to undue imitation of the bicycle form of wheel—which, as shown below, is quite unsuited for automobile work—wire wheels gave considerable trouble and were soon replaced by artillery wooden wheels of the present day type.

One British car, however, had wire wheels of suitable design and shape even at that early date. This was the Lanchester, whose designers have seen so many of their distinctive ideas first ridiculed and afterwards generally adopted.. Such matters as three-point suspension, forced lubrication and worm drive of rear axle are all general developments of Lanchester practice, and, in passing, the opinion may be hazarded that further Lanchester features of tiller steering, wick carbureter, epicyclic gearing and uncanted front wheels are likely to find a good following in the near future. This reference to Lanchester practice is evoked by the fact that it was the excellence of the results given by those wire wheels that led the directors of the Rudge-Whitworth firm to study the advantages of this form. After lengthy experiment on the part of this great bicycle concern, the first Rudge-Whitworth wire wheels were fitted to the 90-horsepower Napier—the earliest six-cylinder racing car—which appeared in the British eliminating trial for the 1905 Gordon-Bennett race. The wheels showed their value by standing up when MacDonald skidded at high speed against the curbstone at Ramsey corner; but a still better proof was afforded later by Earp's 100-mile record ride at Ormond Beach, when he covered the last 63 miles on the rim, while in spite of this, the average speed was nearly 90 miles per hour.

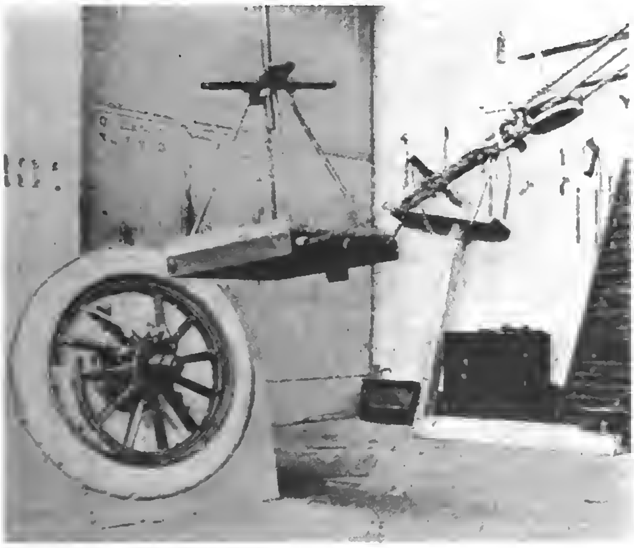


Fig. 1—Apparatus used in testing wire wheels

Such incidents showed the value of the wire wheel, and undoubtedly its popularity was assured, even if progress were slow. Meanwhile, however, the detachable rim had been extensively introduced for Continental races, and this suggested a detachable form of wire wheel. When the Rudge-Whitworth detachable wheel was at length placed on the market it immediately jumped into favor. Almost every make of car has been fitted with the wheels for special orders, while for this season the leading British firms—Daimler and Napier—fit Rudge-Whitworth wheels as standard on all their cars.

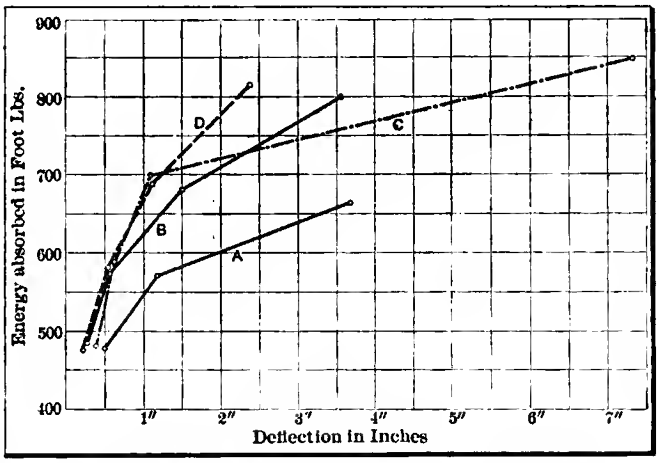


Fig. 2—Graphical showing of result of the first test

Edict Forbidding Their Use Proves Their Worth—Possibly the widest possible publicity obtainable was given to the wire wheels by the refusal of the Commission Sportive to allow the Napier cars to use these fittings in last year's Grand Prix race at Dieppe. Under these circumstances, S. F. Edge withdrew his cars, and his action was endorsed by the failure of several of the French cars through defective detachable rims. The embargo on the detachable wheel was withdrawn after the race, but as there has been no big European contest since then, the wheels have not had an opportunity to demonstrate their superior value in this very severe service.

The advantages of the wire wheel lie in its strength and lightness, while equally obvious are the special benefits accruing from the detachable form. A change of wheel can be made inside the space of ten seconds—this, of course, exclusive of the time occupied in jacking up the wheel axle. This ease of changing is not only of service in case of a puncture or blow-out, for by

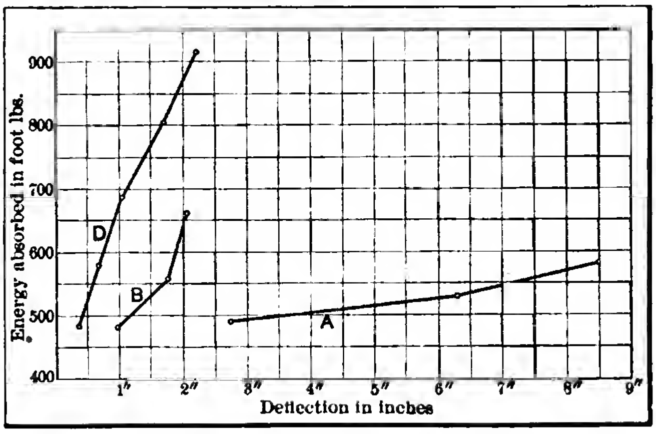


Fig. 3—Second test showed wire wheel superiority

Fig. 4—Wheel B as it appeared after the test

carrying a couple of, or even one, spare wheel with studded tire, the car becomes equally prepared for wet roads or dry.

A set of 888 x 120 mm. wire wheels weighs about 50 pounds less than the corresponding wooden artillery wheels, and the lessened weight of rim seems to have a saving effect on the tires. Particularly is this noticeable on rough roads through the absence of pounding. The greater ease of cooling through the rim serves in a notable degree to prevent the tires from becoming unduly heated at high speeds. Extremes of temperature and climate exercise an extremely deleterious effect on wooden wheels, however well the timber has been seasoned, and for this reason in particular wire wheels are now specified on all British cars required for export to the colonies. Wood is beginning to be reckoned an unreliable and unsuitable material for standing the abnormal stresses to which every automobile part is subjected, and following on its early abolition from the frame, wood has given place to steel, aluminum, and pressed steel for body work, and it is now being succeeded in most cases by steel wire for the material of spokes used in the road wheels.

In view of the fact that the strongest claim made for the wire wheel is its ability to withstand a side blow, such as would be occasioned by a sideslip against a curbstone, it is interesting to refer to certain tests made at the Rudge-Whitworth works under the observation of disinterested experts.

Disinterested Tests Prove Claims Beyond a Doubt—A heavy weight was suspended by a rod from the roof in the manner of a pendulum, in such a way that with the rod in a vertical position the weight rested against the rim of the wheel to be tested, while the wheel itself was supported on a dummy hub. The pendulum was then drawn up to a predetermined height and suddenly released, so that a heavy blow was given to the rim of the wheel. Successive blows increased in magnitude, and the results are shown graphically in Fig. 2. The wooden wheels indicated at A and C were greatly distorted after the first two blows, and at the fourth blow, wheel C collapsed altogether. The wire wheels B and D show only a slight advantage over the wooden wheels for the first blow, but subsequent heavy impacts have comparatively small effect, and even with the maximum deflection that was produced, the rims retained their circular shape to a considerable extent, so that they would still be capable of supporting the weight of the car. A further test of the three wheels was made by striking the rims at a point diametrically opposite to that of the first experiment. The wooden wheel, A, quickly collapsed, but both wire wheels gave substantially the same figures as in the previous test.

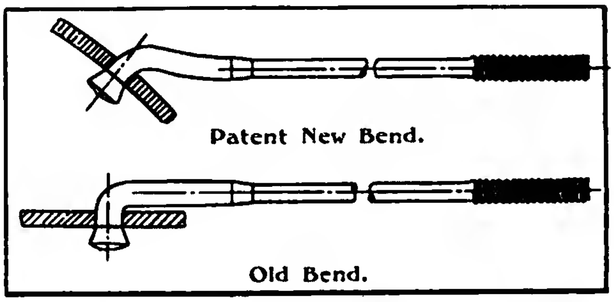


Fig. 5—New and stronger shape given to the spokes

Experiments of this kind have led makers to guarantee that a wheel of 888 x 120 mm. size (practically 4¾ x 35 inch), weighing 20¼ pounds, with rim, spokes and nipples, will sustain without damage a side pull of 6,000 pounds applied at the rim. The best artillery wheel yet tested, weighing 31½ pounds, would not sustain more than 4,500 pounds. This amounts to an advantage in strength (guaranteed) of 33 per cent. in favor of the wire wheels which are over 35.7 per cent. lighter in weight.

Regarding the construction of the Rudge-Whitworth wheels, the two rows of spokes are not yet symmetrical, as in the case of a bicycle. The stresses set up in a car wheel, particularly when rounding a corner, are very much greater from the outer than from the inner side of the wheel. For this reason the wheels are considerably dished, so that the outer spokes follow a much sharper cone than the inner. This displacement of the center line amounts to ⅞ inch in a wheel size 888 x 120 mm. Furthermore, in the case of driving wheels, the outer spokes are made tangential to a much smaller circle than the inner spokes, so that the latter take the major portion of the driving stresses, leaving the outer spokes free to resist the side stresses

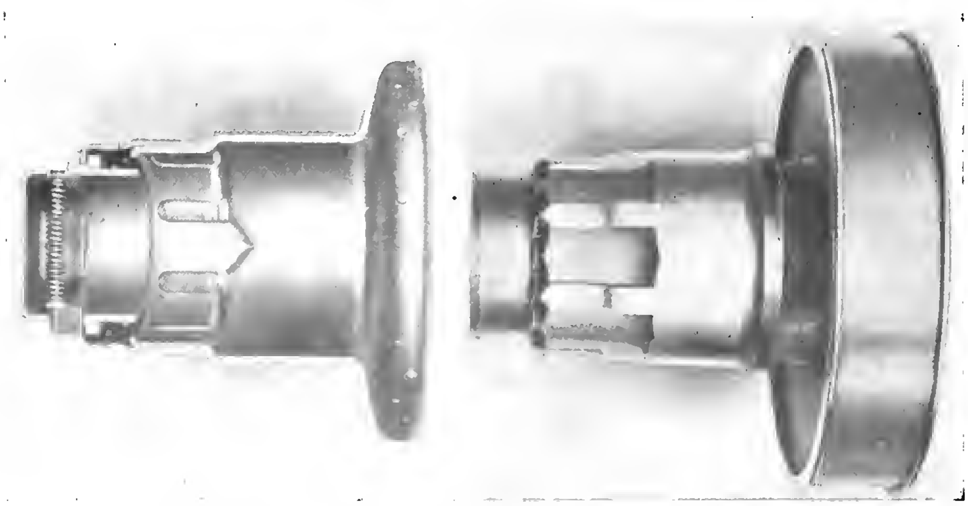


Fig. 6—Inner and outer hubs of detachable wheel showing driving keys

Improved Spoke Shape Increases Strength—In an 888 x 120 mm. wheel, which is the most popular size, there are 60 spokes, these being equally divided between the inner and outer rows. The spokes are made of 8 gauge (British) steel wire, swaged to 10 gauge at the centres. The heads are bent only through 45 degrees instead of 90 degrees, as usual. This simple alteration, shown in Fig. 5, has been found to decrease very greatly the liability of the spoke heads to break away owing to vibration, and, as a matter of fact, this construction leaves the metal with 90 per cent. of its ultimate strength in place of the 75 per cent. that the 90-degree spokes have.

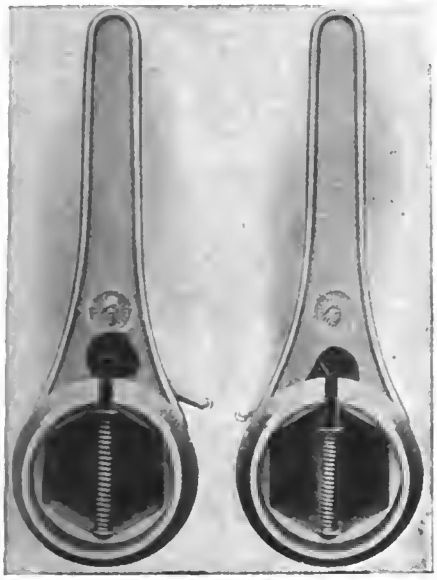


Fig. 7—Two views of spanner used on Rudge-Whitworth Wheels

The construction of the detaching mechanism will be evident at once from a glance at the illustration. The inner hub takes the drive in the usual way, it being immaterial whether this is by shaft or by side chains. This hub also carries the brake drums, speedometer rings, and other like fittings. Integral with the body of the hub are eight projecting keys, milled up out of the solid. The hub of the wheel itself consists of a shell which is internally grooved so as to make a sliding fit with the keys of the inner hub. A triangular pilot piece in the hub shell insures that the keys shall enter into the slots straightway, no matter in what position the wheel may be pushed on to the hub. When the wheel is in position the hub cap, which is permanently secured to the wheel, is screwed up by a special spanner until the wheel is felt to be securely home. The small lever visible in the illustration of the spanner is then thrown over, and a pawl, which has hitherto been held out of action, is now released and engages with a notch in the hub, securely locking the whole arrangement in place. Until this pawl has been released by the lever, the spanner cannot be removed from the cap, so that it is impossible for anyone to forget to make use of the locking device. Several other arrangements of locking pawls have been employed, but all work on similar lines to the above; for example, the latest wheels have a simple ratchet internally cut round the edge of the wheel hub and a spring pawl on the lock nut. When the wheel is in position no backward movement of the cap is possible till the spanner is used to depress the pawl.

Rudge-Whitworth detachable wheels are now only made in wire, although the detachable principle could as easily be applied to artillery wheels, and, this has been done in a few isolated cases.

Use Not Confined to One Firm, but Is General—Several other firms have recently introduced types of detachable wheels, usually both the wire and the wood forms being supplied. The Humber wheel is probably the best known, and is locked in place by a screwed cap with a spring locking device, shown in Fig. 8, and consisting of a spring actuated bolt which connects the hub cap to the wheel proper unless held out of position by the special withdrawing spanner. These had the test of racing experience in several Tourist Trophy races before being accepted.

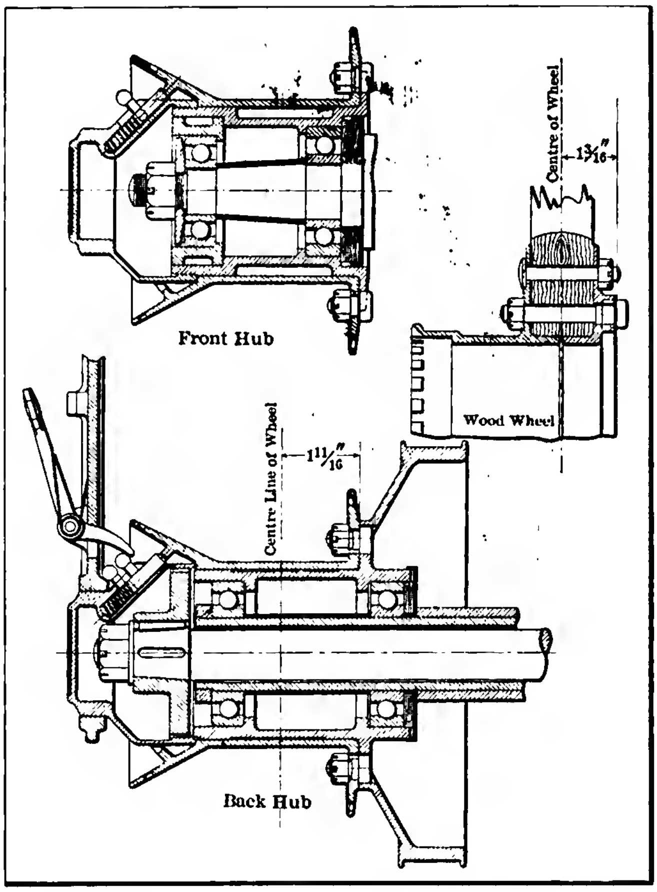


Fig. 8—Construction of the Humber wheel, which is new

Other British detachable wheels are the Riley and the Harper. Both these are similar in construction to the Humber, and are fitted respectively to the Riley cars and to the S. C. A. T.—an Italian make somewhat popular in this country (England).

22-Horsepower Daimler with Silent Knight Engine and Rudge-Whitworth Wire Wheels

LETTERS INTERESTING

VALVES AND CLUTCHES

Editor THE AUTOMOBILE:

[2,002]—Will you kindly inform me through "Letters Interesting, Answered and Discussed" as to the following matters:

1. How does the slide valve spoken of in Letter 1,982 differ from the ordinary?
2. How does a coil spring, Mercedes type of clutch, that was used on the Maja car in the Briarcliff Cup race, differ from the cone clutch as used on the Renault car?
3. Which do you consider the best—the three or four speed transmission?

W. I.

Santa Ana, Cal.

Your questions are rather broad, yet we will attempt to answer them as well as possible.

Question 1. The slide valve there spoken of differs from the ordinary valve (which is not a slide valve at all) in that it slides. That is, the usual form of valve sets into a seat and thus covers a hole, being lifted to uncover this when it is necessary to admit or discharge anything through it. The slide valve, on the contrary, consists of a circular, hollow sleeve, which slides up and down continuously. In this there are cut a series of slots or ports, which at the proper time in the stroke cover or uncover other ports in the walls of the cylinder, thus affording a passage through the sleeve and cylinder to the outside. In this particular engine we do not know any more than you do what form of valve is used, but presume that it is of the rotary type, the action of which is similar to the slide valve, except that it rotates continuously instead of reciprocating. There is this difference between the two, however: the slide valve, just like any other valve which is moved up and down, must be driven at half of the crankshaft speed, while on the rotary valve other speeds may be used, according to the desired action of the engine. Thus one engine which was built with rotary valves had them rotate at one-fourth of the crankshaft speed.

Question 2. Although there is apparently much difference between the coiled spring clutch and the ordinary cone clutch, it simmers down on close investigation to the same thing. There is this minor change, however, that one uses a steel spring for a contact surface, and an interior cone as well as the usual exterior cone. The Renault type, on the other hand, uses a leather lining, or leather and cork. It would appear as if the use of the coil spring interposed between two cone surfaces would give double the clutching surface, and therefore could be used with a spring of half the usual strength. This would make declutching easier and more gentle.

Question 3. This question is too broad to be answered directly, but we can say that the two seldom conflict, one being used for one purpose and another for another. Thus all of the very highest powered cars, which might reasonably be described as those of highest speed as well, are fitted with four speeds. This is due to the fact that with such a large moving mass both a much slower speed than usual and a much higher ratio of gearing on the high speed are necessary. This makes it advisable to add one to the number of speeds in the gear box. On the other hand, the medium priced and more moderately powered car has no need for either very high or extremely slow speeds, for the class of people who purchase this kind of car, in doubtful cases, are not afraid to stop the engine. This dispenses with the necessity for so many speeds, and as a consequence the transmission is smaller, more compact and lighter in weight.

In the very few cases where moderate powered cars may be had with four speeds or high powered cars with but three, it is a matter of individual preference on the part of the constructor.

WANTS TO BUY TRACTORS

Editor THE AUTOMOBILE:

[2,003]—We are interested in gasoline tractors for pulling gang plows and doing other similar agricultural work, and although from time to time have seen cuts of such machines, do not know the addresses of any successful ones. If you have such addresses, we would be pleased to have you publish this information. H. & COMPANY.

Sumter, S. C.

Although we cannot give you a complete list of such makers, nor guarantee that any list given would include only the successful ones, we are appending a list which includes nearly all of the competitors at the recent agricultural machinery competition at Winnipeg, mentioned in detail elsewhere in this issue. In this list they are arranged in about the order in which this contest and others would place them as to merit:

Kinnard - Haines Company, Minneapolis, Minn.
Hart-Parr Company, Charles City, Ia.
International Harvester Company, Chicago.
J. I. Case Company, Racine, Wis.
Russell & Co., Massillon, O.
The Avery Company, Peoria, Ill.

HIGH TENSION VOLTAGE

Editor THE AUTOMOBILE:

[2,004]—Will you please let me know through "Letters Interesting and Instructive" approximately the voltage of a high tension current as used in modern jump spark ignition systems, both from an induction coil and batteries and high tension magneto. R. G. McCREIGHT.

Camden, S. C.

The voltage at the moment when the spark jumps may attain any figure between 10,000 and 15,000 volts, inclining somewhat more toward the lower than the higher figure. Porcelain walls of spark plugs will not withstand more than the upper figure, so it is very reasonable to keep below it. These figures apply equally well to the self-contained magneto system, that is, the magneto which is a complete system in itself, and to the battery and coil system, in which the current from the battery is stepped up in voltage by the coil.

AIR OR WATER, WHICH?

Editor THE AUTOMOBILE:

[2,005]—I would like to ask you, entirely as a matter of information, why it is there are so many water-cooled gas engines in automobiles and so few of them air-cooled. As I understand it, the most efficient temperature for economic gas combustion is acknowledged to be 350 degrees. Water cooling will not permit of this high temperature, and the thought presents itself that the use of expensive radiators, pumps, plumbing etc., creates a hazard in freezing weather, and adds cost, weight and complications simply to defeat the fundamental economies of that type of engine.

Am looking for general facts and not commercial argument. I know of air-cooled cars that have been in use for many years with great economy and perfect satisfaction. I know it is possible to make an air-cooled engine that will not heat up excessively when running either high or low gear and when touring or standing still. I believe these engines require very little more lubrication than other cars, and will only smoke when too much oil is used. If these facts are so why do the majority of cars use the unnecessary water system of cooling?

D. C. N. C.

New York City.

Your first statement that "the most efficient temperature * * * is acknowledged to be 350 degrees" is susceptible to proof; that is, this is *not* acknowledged—in fact, just recently, page 273, August 12 issue, there was published the tabular results of one accurate test, made by S. F. Edge, in England. Consulting this, you will discover that he found the most economical temperature, both as to power and fuel consumption, to be 149 degrees, both 186 and 212 degrees showing less power developed and more fuel used. This result was somewhat astonishing to the writer when first published, for his own experiments had led him to believe the most economical temperature to be about 200 degrees, or as close to the boiling point as it was possible to run the engine. Laying all this aside, the popular, or, to put it otherwise, the most general idea seems to be that the water-cooled motor offers more in the way of reliability. As indirect proof of this, it may be said that the estimate of the cars which will be produced during 1910 is 200,000. Of these, not over 10,000 (which is, incidentally, a very high estimate) will be air-cooled. This amounts to one-twentieth, or 5 per cent. Worded otherwise, 5 per cent. of the people who buy and run automobiles prefer air cooling, while the other 95 per cent. seem to prefer water. If one can judge fairly from the number of firms concerned in making the two kinds, the air cooler is on the decrease, for several concerns wedded to this construction have gone out of business in recent years, and more have turned to the other type. They doubtless were unchanged in their faith in the ability of air, but failed or changed for the reason that public preference made the other kind easier to sell.

ANSWERED AND DISCUSSED

GAS TURBINE INVENTION

Editor THE AUTOMOBILE:

[2,006]—The following are a few queries which I will be greatly obliged if you will reply to in your column "Letters Interesting, Answered and Discussed:"

I have recently worked out improvements in the two-cycle engine and gas turbine combined, and though I have come across nothing of the same nature, I cannot but think that I have been anticipated. Before going to the expense of having searches made, I would like to be able to look up recent development in this line, and would be glad to have you advise me where I can obtain either a concise account of recent improvements (including those in practical operation) or various articles bearing on the subject. That is, either a complete book or a series of separate articles.

I presume an application to the Commissioner of Patents for all existing patents would cost as much as a special search. Can you recommend the patent department of any paper, or any firm or party who make such searches at a reasonable charge?

TURBINE.

Half Way Tree P. O., Jamaica, B. W. I.

There is a book published on patents (it now comprises several volumes), these being restricted to those applicable to the automobile, either directly or indirectly, which might be of some use to you. The title is United States Automobile Patent Supplement, and it is published by some book firm in New York City. You might apply to the Class Journal Publishing Company, 231 West 39th street.

This does not contain anything of a practical nature; in fact, no book on patents does. It seems to be impossible to treat the two sides of invention—that is, the patent and the practical sides—at one and the same time. The fact of the matter is that a man fitted to pass on the patent side seldom knows or cares anything about the practical or operating side, and vice versa. There are no separate articles of this sort that we know of, either.

We never recommend any firm or private party in these columns. As to getting the patent papers direct from Washington, this is more simple and less expensive than you seem to think. The charge is but ten cents per paper, and the Patent Department sells stamps of this value, which may be bought in quantity, and used at leisure, one at a time or otherwise. The thing for you to do is to buy, say, $2 worth of these and send in for a list of subjects, which we believe is furnished free. Then select the likely subjects and send in stamps enough to cover the number which you wish to obtain. The Patent Office will not make a search for you, nor would it fill such a broad order as "all existing patent papers" on any one subject.

In case you go to a patent attorney you may judge whether he is charging you much or little by the amount which his fee exceeds the Government fees. The latter amount to $35 and are invariable. The attorney to whom you go will either make you a lump price for the whole job, in which case he pays all fees, or he will tell you what his services will cost, in addition to the Government fees.

Doubtless preceding letters on the same subject will be of interest, so a list of those which touch on this matter is given. In the issue of THE AUTOMOBILE for Feb. 4, 1909, will be found a letter entitled "Wants to Know If the Idea Can Be Patented," about patents, and taking out one. Then, in the May 27, 1909 issue, there was a letter headed "Gas Turbines," in which a contributor was given some idea of the existing types, with sections through two of them. Also, a brief mention of the literature on the subject. Lastly, in the June 24, 1909 issue, a letter under the caption "Gas Turbine Prospects," dealt with the matter of cooling the blades.

WAY TO CLEAN CYLINDERS

Editor THE AUTOMOBILE:

[2,007]—Many instructive questions and answers appear in your "Letters Interesting," and I wish a word with you. I have recently been experimenting in cleaning spark plugs, when very much sooted, by making a solution of concentrate lye and water, and let the plugs remain in it over night; the next morning the soot and carbon can be wiped off with a rag, and the metal part is about as clean as new.

The question arises, can this solution be used in cylinders to remove a coating of carbon; is there anything in it that will injure the iron? It certainly cuts out the carbon and softens the deposits on plugs.

C. W. W.

Delaware, Ohio.

Yes, this same solution could be used, but since the interior walls of the cylinder have a very smooth finish, obtained at much expense by the manufacturer, it would not be advisable to let the solution remain in there over night, as you do in the case of the spark plugs. A concentrated solution would probably attack the iron itself, besides destroying the finish, but a very weak solution would do little in the way of eating into the metal. The worst thing that would happen is that the water would rust the interior of the cylinders badly, and this would have to be removed before running the engine again, else you would be likely to lose pistons and rings, as well as cylinders, as against cylinders only. You have not asked for our advice, but if you had we would say do not use the solution.

A recent suggestion in the way of cleaning carbon from the cylinder walls may be appropriate here. This was to place in the suspected cylinder one of the soft wire chains used around the kitchen. With this in the cylinder, run the engine for a short time and the carbon will be broken loose.

WHY FAVOR TWO-CYCLE?

Editor THE AUTOMOBILE:

[2,008]—I have been watching the columns of "The Automobile" for years, hoping that you would eventually, though tardily, acknowledge the superiority of the two-cycle motor, as exemplified by the product of the Elmore factory. I speak of the Elmore because of nearly two years' experience with a three-cylinder 24-horsepower car, and I am in a position to know of the great efficiency of this engine.

No motor, whether it be two or four-cycle, scavenges completely, possibly a six-cycle might do so. There is always a small amount of burnt gas remaining in the cylinder, but this residue of the burnt charge does not dilute the fresh charge as stated in your answer to letter 1,986. The fresh charge and the burnt gases do not mix readily, and the small portion remaining in a two-cycle is not important except that it goes to disprove your statement that the two-cycle motor is wasteful of fuel, allowing it to escape with the exhaust.

The deflector on the piston turns the fresh charge toward the top of the cylinder, pushing the residue of the burnt gases ahead of it to the exhaust port.

As these fresh and burnt gases do not mix, and as there is a small amount of burnt charge remaining in the cylinder when the piston closes the exhaust port, it follows that none of the fresh gas has been wasted, as it could not pass through the residue of the exhaust lying against the exhaust port, and effectually blocking the passage until the same is closed by the rising piston.

Another point that makes for efficiency in the Elmore two-cycle is that the compression space is small, compact and perfectly tight. An Elmore motor does not lose compression after a year's service, the perfect lubrication takes care of that most effectually. An Elmore motor does not smoke, and you can test the perfection of the oiling system by holding your handkerchief at the end of the exhaust pipe, remove it and it will remain as clean and white as before the experiment.

Try this test on some of the four-cycle smoke motors on cars selling as high as $5,000, and note the (greasy) results.

The Elmore four-cylinder motor furnishes four light, smooth, power impulses per turn of the flywheel in ordinary driving on good roads; strike a heavy grade and open the throttle; four powerful impulses per revolution follow, but are applied so smoothly and quietly that it is very easy on machinery and tires; therefore, minimum repair expense.

Contrast this with the two heavy explosions per revolution in a high-powered four-cycle motor, there being an interval between each two-power impulses. The results tell on the tires, the mechanism of the car, and on the passengers. There is no interval between explosions on any Elmore motor, the power impulses overlapping each other and resulting in a smooth application of power more like an electric motor than the ordinary explosion engine.

In conclusion, if it is a fact, as you state, that the two-cycle motor is wasteful of fuel; that it will not develop over one-fifth more power than the same sized four-cycle engine, and that the "doubling up, or doing two things at once" is a hindrance to its perfect working, then please explain why I can take six full-grown people up a stiff grade in my 24-horsepower car that has been in service twenty-one months, and do this on high gear at a good rate of speed, when it bothers some of the so-called "thirties" to get up with four passengers? Also please explain why, in a distance of over 8,000 miles, my repair expense runs less than one dollar a month and why my total expense is less than ten dollars a month, and why the original set of tires are on the car in running order, three punctures being the extent of the trouble? Last, but not least, why do you suppose I was able to drive this car from November 25, 1907, until December 22, 1908, without ever entering a shop or making a single machinery repair? Would advise that you make a thorough test of a 1910 Elmore and then give the two-cycle motor its just dues, regardless of the fact that it is now greatly in the minority.

W. H. THAYER.

Pueblo, Cal.

A single question will suffice in answer to Mr. Thayer's argument above, and it is suggested by his own last sentence. If all that he says or claims is true, why is it that the two-cycle is "now (as always) greatly in the minority?" In comparing different engines double as many four-cycle cylinders should be used as two-cycle.

FINAL SKIDDING SOLUTION

Editor THE AUTOMOBILE:

[2,009]—I have read your reply to the Letter (1,994) of "I. B. G." I have also gone over your diagram very carefully, and still think that you are wrong. Let us suppose that a car is skidding on a wet pavement. If the driver holds his front wheels straight, that is, in the direction in which the car was going, the rear wheels will skid let us say to the right until the steering angle is reached. By the steering angle I mean the extreme angle which the front wheels will make with the line "A B." Now, when this limit is reached, the still skidding car will then begin to drag the front wheels around and will, of course, have to work against the resistance of these wheels on the roadway. If the front wheels had been turned to the opposite side when the skidding started, the resistance which you have marked with arrows against the front wheels does not operate against the skidding rear wheels but increases the angle made by the line "B D" with a line drawn through the hubs of the front wheels and practically gets the front wheels out of the way. The result is that the limit of the angle which I have called above the "steering angle" cannot be reached, and therefore the car will keep on going around as long as there is momentum enough to carry it. On the other hand, if the front wheels are quickly turned in the same direction as the skidding rear wheels, the steering angle is quickly reached and the momentum has to work against the resistance of the front wheels through a greater distance. For this reason the skidding car will hardly, if ever, turn completely around if the wheels are turned in the same direction as the rear ones, while if turned in the opposite direction, with fair momentum, the car will surely face about. I trust that I have made myself clear in writing about this matter as, in practical use, I have saved myself from the gutters many times here in New Orleans where we have deep ditches on either side of the roadway. When driving through the city streets where the roads have a fairly high crown, and one has to keep to the gutter side, and where the street department's water cart drivers go to sleep and deluge the pavements, making them more than slippery, because they do not wet enough to wash off the dust but only convert it into mud, a driver is very apt to feel his rear wheels slipping toward the ditch. As sure as death and taxes, if he faces his front wheels in the opposite direction to his slipping rear ones, he will need a friend to get him out, whereas a quick turn in the same direction, and then when he feels the resistance of the rear wheels against the front ones, turn them as quickly to the straight line again, will keep him "a-going" along just as if nothing had happened. ALBERT J. MAYER.

New Orleans, La.

While not agreeing with the writer above, nothing will be offered to dispute him, since we do not wish to prolong the already lengthy discussion of this subject.

STOP THAT MISSING

Editor THE AUTOMOBILE:

[2,010]—I drive a six-cylinder car, with which I am having much trouble. As long as the motor runs rapidly, either on the high speed or any other speed, it pulls well, but it both misses and backfires when running slowly. The trouble is no doubt in the carbureter, because when running on either storage batteries or magneto, or both, it does the same thing. The valves are all right as to time, and all cylinders have good compression. Aside from the source of trouble, the carbureter is all right, too, as I have had the float out, dried it, and given it an extra coat of shellac. W. K. RODGERS.

Brilliant, Ohio.

Your trouble lies in the adjustment of the carbureter, rather than in the carbureter itself, and from the description of your trouble it looks as if you were feeding the engine too lean a mixture. This may be done by having too much air or too little gasoline. To adjust the carbureter properly it should be adjusted not for high speed alone, but for slow speed as well. This is done about as follows: Run the engine as slowly as possible, gradually reducing the gasoline until you have brought this down as low as the engine will stand and still continue to run. Then try this out on the road and find out if you have gone too low or not low enough, remembering that the lower you go at this end, the less will be your fuel consumption. Having satisfied yourself as to this slow speed adjustment, take up the high speed, which usually consists of the auxiliary air only, since the motor usually can suck enough gasoline for any speed. Run your engine as fast as possible, meanwhile slowly, very slowly, opening the auxiliary air valve adjustment, as long as the speed continues to increase. Try this several times, until you obtain the widest possible opening, or, rather, that opening which gives the highest possible speed. Then try it on the road, as was the case with the slow speed adjustment. This latter step is always advisable, since, after all, it is for road use that you want it adjusted, and the two vary greatly.

RULE OF THE ROAD

Editor THE AUTOMOBILE:

[2,011]—I have noted in your issue of May 27, 1909, an article headed "Aids in the Driving of a Car, Part 2." In this there is something about passing cars or other vehicles on the wrong side, illustrated by means of a figure, showing a car passing on the inside of a truck.

In your illustration you speak of car A taking the course A, which I suppose is the lower line, passing the truck on the wrong side. Our Michigan law in Section 17, Act 196, 1905, would give us exactly the opposite interpretation, if I understand it correctly.

Am I to understand from your article that the truck, or the first vehicle on the road, has the right of way over the second vehicle or automobile, and that the truck would naturally turn to the right in passing another vehicle and thereby leave little room for the second vehicle, or auto, to pass on the right side, therefore making it necessary, and the natural course for the vehicle No. 2, to receive little consideration and be compelled to pass on the left hand side?

Traverse City, Mich. LEON F. TITUS.

You are right about the law, which requires the second vehicle or automobile in this case to take the left hand or upper course, as indicated by the dotted line. This would make the truck turn in to the curb and give the automobile more room to pass, or if it did not do so, the machine would be obliged to slow down, and drop back behind the truck until the other approaching automobile had passed.

If you will reread the article which goes with this figure, however, you will find that the writer advocates that automobilists neglect to observe the letter of the law, since the average truck driver will do likewise and not turn out from its central position. It is there pointed out that the usual country road is highly crowned or cambered, and that for this reason the truck driver will not turn out, as that would mean much difficulty in getting back.

It is also there pointed out that to take the right or legal course presents more danger than the one advocated, since the truck driver will not turn away from his central position, and the automobilist passing at speed, will find himself running head on into the other approaching machine, with much danger to both.

FLYWHEEL WEIGHTS

Editor THE AUTOMOBILE:

[2,012]—Will you please give me a formula for proportioning the size and weight of flywheels on large stationary gas engines, one that could be used for any type or size of engine. HARRY DAY.

Buffalo, N. Y.

The very idea of a flywheel, to steady the running of the engine by storing up energy during the power stroke and giving it out again during the idle strokes, shows that the weight is the necessary item, the size usually being a matter of conveniently arranging that weight.

Mathot is responsible for the following formula:

$$P = K \frac{N}{D^2an^3}$$

from which the total weight equals 1.4 P. In this formula, P = the weight of the rim alone, without arms, spokes or bosses.

D = the diameter of the center of gravity of the rim in meters.

a = the coefficient of irregularity.

n = revolutions per minute.

N = brake horsepower at that speed.

K = a varying coefficient, this varying with the type of engine, cycle, and number of cylinders, as follows:

44,000 for four-cycle, single-cylinder single-acting.

28,000 for four-cycle, two opposed cylinders, single-acting, or one cylinder, double acting.

25,000 for two single-acting cylinders with cranks at 90 degrees.

7,000 for four twin opposed or two tandem double-acting cylinders.

In use, the service determines the co efficient a, as, for instance, electric lightin service would require a very low coefficier of irregularity, such as 2 per cent., or .o Then n and N would be assumed, the as sumption of the type and cycle fixes th varying coefficient K, from all of whic P and D would be found by the method c trial and error. That is, a diameter is a sumed and the figures carried through. the result is not correct nor satisfacto make another assumption, either higher lower, as the former result was too low too high, and carry through another seri of figures.

The only arbitrary part of this is the c efficient, which was determined by caref experiment from a number of Continent engines, most of them from Germany a Belgium. The coefficients as given are ve reliable.

None of the above applies to automob construction, and students of the latter, terested in the subject of flywheels but having the time to work these out from correct mechanical standpoint, may use following for which Güldner, the Germ scientist, is responsible:

$$R_{\varepsilon} = C\,(.75 + \xi)$$

Lucke on page 242 of his work on Engine Design, gives a table of values the two constants.

Appearance of Mora Light Four Touring Car, Upon Which Factory and Other Facilities Will Be Concentrated

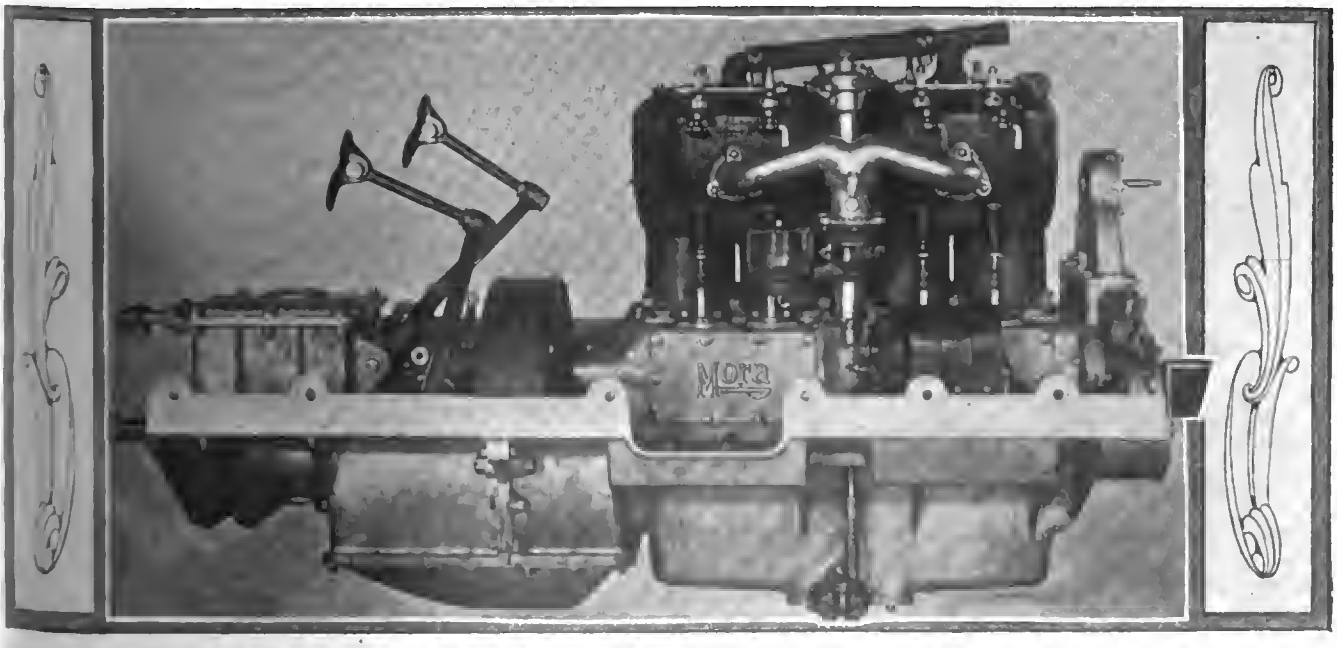
AT a time when everybody is talking of "sixes" and long stroke motors, the plans of the engineers for the Mora Motor Car Company, Newark, N. Y., relative to the season of 1910 may prove to be epochal in their character, since this company will abandon the "six," devoting its whole energy to a single type of four-cylinder chassis in which the length of the stroke of the motor relative to the size of the bore has been reduced. Moreover, added zest is lent to this announcement, by the statement that the price of the four, which is continued for 1910, will be slightly increased.

Some small but consequential changes have been made, including a longer wheelbase, larger wheels and tires, a new carbureter, gear pump for the oiling system, change in the water pump from gear to centrifugal, "tee" instead of "ell" head motor, placing the valves on opposite sides instead of all on the left side as before, gear drive for the fan, and many other little refinements.

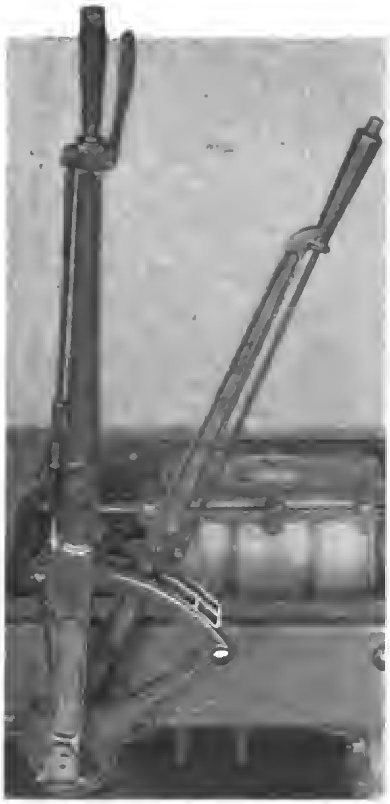
This model, which the Mora people do not call by a model number, although it is the fifth which the company has produced, will continue to be known as the Light Four. Of this title, the first word is descriptive of the light weight construction, which this concern advocates, and the second, of the number of cylinders of the engine. In the continuation of this model, five important points, which might even be called policies, have been kept constantly in the foreground. These are: first to refine continually a car of a given type, and thus obtain the advantage of previous use on the part of many users; second, to build every piece in the factory, so as to be able to supervise its construction; third, to build a car of intermediate weight so as to keep down tire and maintenance costs; fourth, to design and build for reliability at all times; fifth, to design and build as simply as possible, omitting all unnecessary parts.

Adherence to these points has resulted in the production of the Light Four. This is powered with a four-cylinder engine of 4 1-2-inch bore by 5 1-8-inch stroke, as compared with the previous motor, which was of 4-inch bore and the same, 5 1-8-inch stroke. Just as the old engine was conservatively rated at 25 horsepower, so the later one is also given a modest power rating of 38. The change in the bore alters the relation of bore to stroke, which in the light of the present foreign tendency is perhaps worthy of further mention.

The former bore and stroke gave a ratio of 1 to 1.28, one of the longest ratios to be found on an American car. The present



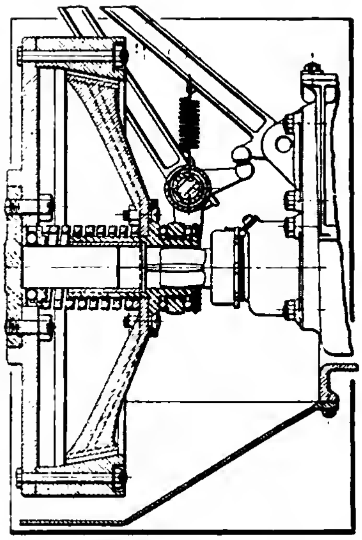
Clean-Looking Inlet Side of the Unit Power Plant, Showing New Cylinder Construction, Carbureter and Magneto



Mora Control Levers and Quadrant

sizes make this read 1 to 1.14. This latter figure, strange to relate, agrees exactly with the average of 78 different engines exhibited at the two New York automobile shows of last winter. Most noticeable among the many changes in the engine is the alteration in the cylinders, which are now cast in pairs with the valves on opposite sides. This construction makes the cylinder castings symmetrical, and, therefore, balanced in weight better. The exhaust is placed on the left, with the water pump, while the right side carries the inlet, carbureter, and magneto. This distribution of the accessories sizes the gears so that the gear cover, of aluminum, at the front of the engine case, becomes symmetrical about the center line. The upper part of this is now carried up to take in the new gear drive for the fan, this being effected through spur gears, which replace the former leather belt drive. The cover is so designed that it is possible to remove the fan drive for adjustment or other purposes, without disturbing anything else. The valves, which are of two metals, nickel steel heads welded to carbon steel stems, are of large diameter and liberally water-jacketed. Unusual care has been taken with the camshaft so as to preclude the possibility of acccident. Thus, the case hardened cams are both keyed and pinned to the shaft. Should the pins fail, the keys will still hold them in place, and are made of sufficient size to do the work.

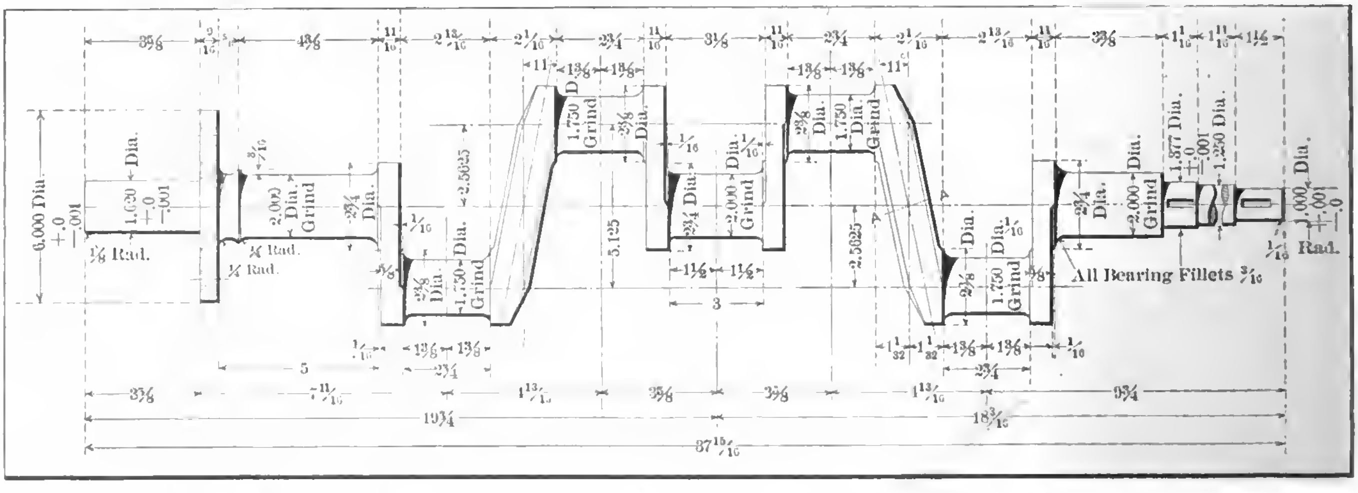
Combination Crankcase and Mud Pan—One of the principal features is the cast aluminum crankcase and mud pan combined. While this is an expensive construction, the builders consider it as superior to such an extent that it is made the feature of the car. This pan gives the power plant great rigidity, being bolted securely to the transmission case, and thereby eliminates the universal joint between engine, or rather, clutch, and transmission. This pan really makes the frame more stiff, while the close connection with the frame makes the crankcase a more rigid form than it would be otherwise. In other words, each one mutually stiffens and strengthens the other. This, too, with a liberal use of aluminum, which is famous for its light weight. This free use of aluminum is noticeable throughout the chassis, despite the high market price of the light-weight white metal.



Inverted Cone Clutch Is Self-Contained as to Thrust

Coincident with the increase in the size and power of the motor, the crankshaft has been increased both in diameter and length of bearings, as shown by the appended reproduction of the working drawing. The shaft is heavier and the bearings longer than general practice would make them, which is an excellent point in their favor. The makers say that a few extra pounds weight here is metal well placed, and have as proof that they are right the records to prove that no Mora owner has ever had a crankshaft break. The bearings are of parson's white bronze, a very superior bearing metal, which has a high heat resisting quality, combined with great hardness, yet will melt and save the crankpins from damage before it will seize. This feature is worthy of consideration, since the bearings are made interchangeable and it is but a moment's job to replace one or more of them, and the expense is also small. To buy and replace a crankshaft, on the other hand, is a very complicated, tedious, and expensive piece of work, and onc that a novice would tackle with fear and trembling. So it is better to have a bearing that will melt in the absence of lubricant.

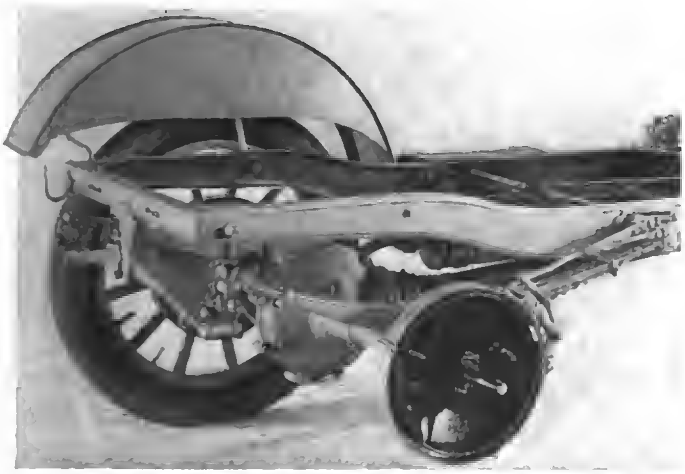
A leather-faced, inverted cone-clutch acts as the transmitter of the engine power, and is placed within the flywheel. The clutch spider is of aluminum and strongly ribbed. This is bolted to a steel sleeve, the inner end of which is bushed for the end of the crankshaft. The construction of the interior of the clutch is such as to leave it free from thrust when engaged. The square section clutch spring presses against a large ball thrust bearing. The clutch operating fork is in addition placed between a pair of ball thrusts. This fork is operated from the foot pedal, this having adjustable foot pads, by means of a short, hardened end, pivoted on a crossshaft. The flywheel clutch sur-



Crankshaft Drawing with Complete Dimensions Will Be of Much Interest to Other Designers as a Worthy Example face is bolted up to the forward disc by six bolts, the nuts being set into a series of counterbores, so that they are inside and do not project to catch in the clothing when making an adjustment.

Excellent Oiling System for Engine—Improvement being the order of the day, the engine oiling system has been improved. As it is at present, the oil is circulated by a small gear driven pump, located on the outside of the crankcase, inlet side, and on the lower part so as to be accessible at all times. This is supplied with oil from a false bottom in the crankcase, and cast integral with the lower part of it. From the reservoir, the oil is pumped to another smaller header attached to the inside of the hood. Thence it flows by gravity to the crankshaft bearings and cylinders through copper pipes, a sight feed indicating the amount of the flow and its regularity. The overflow from bearings and cylinders drops to the bottom of the case, where it is maintained at a constant level, and used as the source of oil for an interior splash system. The surplus oil, over and above that needed for the splash system, drains back into the crankcase reservoir, and is thus used over and over again.

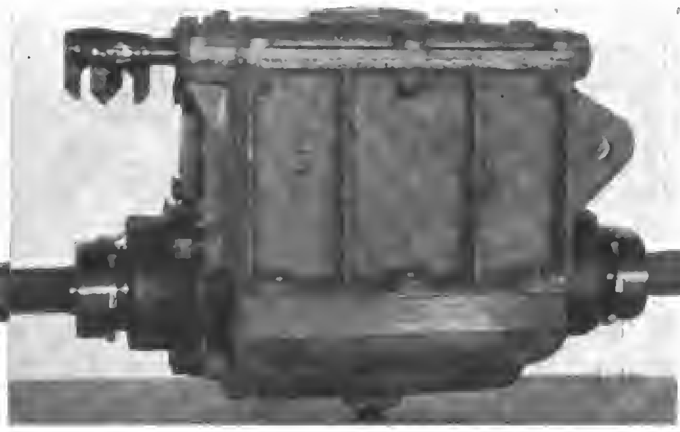
Successful Transmission of Last Year Continued—Like the clutch, the transmission is unchanged, that of last year, which was unusually successful, being continued. This affords three speeds and reverse, operated selectively. All shafts are mounted upon ball bearings. Large diameter shafts, large faced gears of large pitch, and other items making for an unusual factor of safety in the gear box just as in the engine, characterizes this speed reducing means, which already possesses the proud record of over 400 in steady use for a year, without a repair or replacement. As built, it is a complete and self-contained unit, which at the first sign of trouble may be removed bodily and another substituted for it, or at least, the trouble remedied outside of the car, with plenty of elbow room. Back of the transmission is placed the universal joint, this being of the company's own make and different. It is also famous for its simplicity, being but a squared shaft working in a squared hole.



Rear Spring Suspension and Brakes Show Ability

What the Axles Show—Flexible roller bearings of the Hyatt type carry the semi-floating bevel driven rear axle. The gears of the bevel drive are cut with unusual care, being of the now popular stub tooth form, which possesses more than ordinary strength. Front axles depend upon ball bearings to carry their load without friction. These are of very large diameters, 1 3-4 and 1 inch sizes being used. This axle is an I-beam section, drop forged in one piece with integral spring seats. As designed for a car of several hundreds of pounds more weight than the Mora, the same large factor of safety is always present.

To facilitate starting, the crank has been brought forward away from the radiator. It is now securely braced from each side. This radiator is just as it was last year, of the popular vertical tube type, of unchanged design.



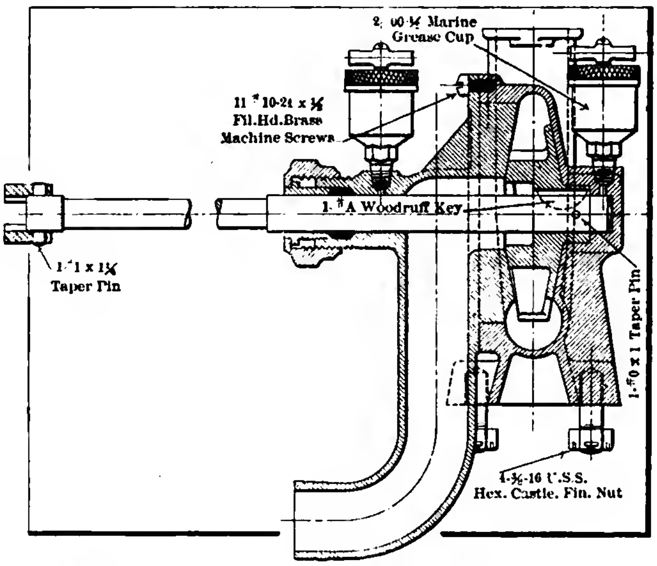
Complete Transmission Unit Removed from the Car

After some years of hard use, no flaws have developed in the spring suspension. The front springs are flat, semi-elliptic, and the rears, three-quarter, or as they are more commonly called, platform springs. The front springs are purposely made rather stiff, the good riding qualities being obtained from the rear spring suspension. To aid in this the body is placed rather far forward, and the space back of it allows plenty of room for a trunk rack, large enough to accommodate a real trunk.

The wheelbase has been increased to 112 inches, the additional 2 inches over last year affording more comfortable riding, also more leg room in the tonneau. Working toward the same end are the larger wheels and tires, the former now having a size of 34 inches, while the tires are 4 inch all around. The wheels are of the artillery type, with 10 spokes in front and 12 in the rear wheels.

Two complete sets of brakes are used, one internal and the other external. These operate on the rear wheel brake drums, which have been increased in size, so that they now measure 14 inch by 2 inch. Not only are they unusually efficient, but their ease and equality of operation is facilitated by the use of a compensating brake bar. This contributes equal pull on all brakes regardless of the amount of power applied or the adjustment, and insures against skidding, through having one wheel held more than another.

The bodies are another example of the great care used in the construction of these cars. They are built with sheet metal panels, the mouldings of which are rolled in the metal and not riveted on. This results in a dependable body, which can be relied upon not to crack open at the seams under the first hard usage.



Cross-Section Through Centrifugal Type of Water Pump

The Leader of the Holsman Line, a Serviceable Runabout for Rough Roads

DESERVEDLY popular in the West because of its ability on rough, sandy or hilly roads, the Holsman high-wheeler is now entering upon its ninth successful year. During this period it has undergone fewer important changes of design than perhaps any other car which has been before the public for an equal length of time. The Holsman Automobile Company, of Chicago, the maker, has always remained true to the principle of high wheels—for, as it says, "high wheels travel all roads, because all roads are made to be traveled by high wheels." The wisdom of this epigram has been demonstrated by the steadily increasing average size of automobile wheels, even when shod with pneumatic tires, which seems to indicate that other manufacturers are slowly coming around to the same point of view. The Holsman, however, does not rely on this single feature to distinguish it from the conventional type; its gear-changing, if such it can be called, its method of securing differential action of the driving wheels, and by no means the least, its four-cylinder design of motor, are any one of them sufficient to challenge the attention.

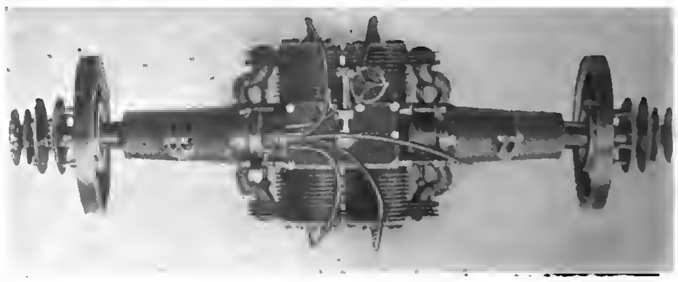
Belt, Chain and Friction Drives Combined—The Holsman method of driving the rear wheels will certainly be distasteful to the man who likes to classify every detail in its proper pigeon-hole. The Holsman drive refuses to be classified, at least according to any ordinary standards. It is a combination of belts, chains and friction rollers, each performing a definite purpose. The ingenuity of the construction will be perceived when it is explained that the gear-changing, which gives two speeds forward and one reverse, is all obtained through varying the method of drive. When the belts are in action, the car is on high gear; the chains give the low gear, and the friction rollers the reverse.

Complicated as this may seem at first glance, the construction is startlingly simple. In fact, at a casual glance there appears to be no change-speed mechanism at all. One sees the motor, placed under the body of the vehicle with its shaft extending from side to side, small pulleys on the ends of the shaft, and belts which pass around larger pulleys on the rear wheels. It takes a close examination to reveal the trick. The belts are really chains, although their action on the high gear is that of belts. When starting the car, or on an unusually steep hill, the two flanges of the grooved pulley spread apart, revealing a sprocket between them; the belt, now become a chain, drops in, its rollers engage with the teeth of the sprocket, and the car is chain-driven. The chains, however, still remain belts as far as the pulleys on the rear wheels are concerned. As the sprockets are considerably smaller than the pulleys they replace, this drive gives a greater gear reduction, and the car is then on low speed. It will be evident, however, that unless some special provision were made the chains would be very loose on the low gear, and would be apt to jump occasionally. The necessary provision is again obtained in the simplest, though most unexpected way; the whole motor, with its shaft, pulleys and sprockets, is hung from the frame by two knuckle joints, on which it may be swung backward and forward. A forward movement of the motor, therefore, obtained at the same time and by the same action of the controlling lever which spreads the pulleys apart to disclose the sprockets, tightens up the chains and forces them into firm engagement with the sprocket teeth.

This flexibly-supported and moveable motor once conceived, its second application became immediately apparent. The ends of the motor shaft were extended beyond the pulley-sprockets, and a second set of grooved pulleys applied. Swinging the motor backward then brings these pulleys into direct contact with the solid rubber tires on the rear wheels, and provides the reverse. The same action loosens the chain-belts so that they no longer exert any driving effort forward, although they remain in place. By an ingenious system of connections, these various movements are obtained by progressive movements of a single lever. This lever swings horizontally on the top of a shaft which is united with the steering column, making it extremely convenient to operate.

Two Speeds and Reverse without Gears—To summarise, then: the motor is started and runs idly hanging in its middle position, neither forward or back, and with the pulley-sockets spread apart. To start the car forward on the low gear, the motor is swung forward; this tightens the belt chains so that their rollers engage with the sprockets, giving a positive drive which will not slip no matter how great the load. To go into the high gear, the motor is swung back to its first, central, position, loosening the chains; then the halves of the pulleys are forced together, lifting the chains off the sprockets and converting them into belts. To obtain the reverse, the motor is brought to central position, the pulleys are spread apart to loosen the belts, and then the motor is swung backward till the small pulleys on the extreme ends of the motor shaft engage with the tires of the rear wheels. This drive of course rotates the wheels in the reverse direction to that obtained by the chain or belts.

The driving chains are specially constructed of hardened chrome-nickel steel. They run in deep sheaves, so that they can not be thrown out of engagement. On high gear the chains are as noiseless as an ordinary belt, and on the low gear make no more noise than the usual drive chain. The chains leave the rear sheaves at a point 15 inches above the ground, so that there is no danger of their becoming entangled with stones or brush. One of the particular advantages of this construction is that the power is applied as near as possible to the rims of the wheels; the spokes and hubs therefore do not transmit any power, but simply sustain the weight of the car, and can be made much lighter than usual. The wheels are 40-inch front and 42-inch



Unit Power Plant—the Motor and Change-Gear rear, and are shod with 1 1-4 inch solid rubber tires. Sweet patent wheels, with concealed metal band hubs and offset spokes, are used on the runabout, surrey and coupe, and Sarven patent wheels on the $550 light runabout and on the delivery wagons. All hubs are roller bearing except those of the light runabout.

How the Differential Is Abolished—So far, the reader will observe, no provision has been made for the introduction of a differential gear. The driving pulleys and sprockets are mounted directly on the ends of the solid, one-piece motor shaft. However, the same mechanism that is used to obtain the gear-changes provides a very acceptable substitute for a differential; in fact, the Holsman Company claims that in this case the substitute is better than the original. The trick lies in the movable suspension of the motor, which is interconnected with the steering gear in such a way that when the vehicle rounds a curve the inner end of the motor is swung back a little, loosening the belt on that side so that it can slip, while the belt on the other side is slightly tightened. The advantages claimed for this construction are not only its simplicity, but also a mechanical superiority, in that the amount of power applied to the wheels, as well as their speed, is varied. The ordinary differential gear, while allowing one wheel to run faster than the other, still gives the same power to each. On the Holsman, however, the inner wheel not only runs slower, but as its belt is slipping it receives less power, and the outer wheel, which is doing more work, receives proportionately more power. For this reason, it is said, the Holsman is little given to skidding.

Although the Holsman Company has experimented with wheel steering, it still retains the lever for use on its vehicles as being more reliable and easily operated. The lever connections do not wear or develop the lost motion which frequently becomes so noticeable in wheel-steering gears. There is no necessity for irreversibility or for great leverage; the nearness of the steering knuckles to the hubs, the narrowness of the tires, and the lightness of the front construction—hardly more than the weight of the front wheels themselves—are all conducive to easy steering. The steering post is placed in the middle, about eight inches forward of the seat, and carries also the other control levers. All are so arranged that they can be operated equally well from either the right or left side. In carrying out this same idea, the motor is so arranged that the starting crank can be applied to either side.

Four-Cylinder Motor Light and Compact—The four-cylinder motor, which is interchangeable with the two-cylinder motor on all the models except the light runabout, is, in its way, as radical a change from ordinary constructions as the change-gear. The cylinders are horizontal and are opposed in pairs. All piston pins and connecting rods have been abolished. The pistons of each opposite pair are rigidly connected by a steel frame straddling the crankshaft, following the design technically known as the "Scotch yoke." The yoke carries in its middle a large roller bearing, of which the inner radius is equal to the radius of the crank plus the radius of the crankpin. As the yoke, with its pistons one on each end, oscillates backward and forward, it rolls the crankpin around the inner surface of this bearing and so rotates the crankshaft. This design naturally limits the pistons to a very short stroke, but has compensating advantages in the way of eliminating numerous parts and bearings. Counting the three crankshaft ball-bearings, it will be seen that the entire motor has but five bearings, instead of the eleven which would ordinarily be used for the same work. The bearings are exceptionally large in proportion to the service which they perform.

The "unit power plant" idea is carried to its highest development in the Holsman. The motor crankshaft is extended at each end to carry the driving sprockets and pulleys. The crankcase is also extended in the shape of sleeves, carrying the lugs by which the motor is suspended from the frame, and supporting the shafts in large roller bearings. There are two flywheels, placed one at each end just inside of the pulleys.

Other features of the motor are so plentiful that they can

Holsman Surrey, a Car for the Whole Family

hardly be more than enumerated. The cylinders are air-cooled by flanges cast integral, and no fans are found necessary. The inlet valves are automatic and are located in the pistons; the mixture reaches them through the crankcase, much as in a two-cycle motor. The carbureter, a Holsman design with but one adjustment, bolts directly on to the top of the crankcase. The exhaust valves are actuated directly from the crankshaft, and the crankcase extensions carrying the outboard bearings of the shaft are used as mufflers. Lubricating oil is carried through the motor and into the cylinders with the gasoline mixture. No adjustments are necessary. Ignition is by batteries, with a single coil and high-tension distributor.

Holsmans Made in Many Types—Eight different styles of bodies may be had—three runabouts, a surrey, a coupe, and three delivery wagons. Three different chassis are built, with wheel bases of 65, 80 and 92 inches, respectively; on all of these except the smallest, the four-cylinder motor described above, which is rated at 26 horsepower, is interchangeable with a two-cylinder, 12-horsepower motor. This latter is of more orthodox design; its cylinders, 4 by 4 inches, are horizontal, opposed, and air cooled, but it has the usual connecting rods with plain bearings; its inlet valves are automatic and directly over the exhaust valves. It is adapted to the same unit construction as the four-cylinder motor. The $550 light runabout, with 65-inch wheel base and the 12-horsepower motor, is practically the same car that the Holsman Company has been building for five years, and a great number of them are in active service. All Holsman types can be had with a 61-inch tread.

Holsman Coupe, Especially Favored by Doctors

THE AUTOMOBILE

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WIRE WHEELS SHOW PROGRESS

Modern automobilists, who are deeply interested in the subject of weight, and its immediate effect upon such items as tire mileage, repairs and per-mile-cost, will doubtless peruse the timely article elsewhere in this issue on the subject of wire wheels with more than ordinary attention. Many experienced motorists favor light-weight construction, but when this is applied to the subject of wheels, they sidestep, with vague and noncommital remarks about side strength.

The old superstition relative to this subject was that the wire wheel had much strength other than that necessary to sustain sidewise application of force. This has persisted and persisted until it might be said with truth that it has been the only formidable barrier to the popular adoption of this type of wheel. In fact, so deeply is this grounded that it is to be found in many books, one widely circulated work commenting as follows:

"Now while it is widely conceded that a wire wheel will sustain a greater load than a wood wheel, the two being considered weight for weight, it certainly will not sustain as great a strain sideways, which represents the line of the wheel's greatest weakness. A wire wheel driven against a curb with sufficient force will have its rim dented, with the result of loosening all of its spokes and ruining it. A wooden wheel, on the other hand, may have a gap in it and still be serviceable. It may even run with several spokes broken off," etc.

As dispelling in an effective manner this twenty-year-old superstition, attention is again called to the article mentioned above. In this there is a brief but convincing description of tests made on such wheels in England, in the course of which tests, wood wheels of the usual artillery pattern were tested under parallel conditions. The results show plainly why these wheels are so extensively used in England, since the old idea of lack of side strength is not only dispelled but unbiased tests prove that the opposite of this is actually the case, the wire wheel possessing a superior strength to its artillery competitor.

Second to nothing else in showing this is the accompanying series of tests, in which, having already put one of the artillery wheels out of business, the wire wheels surpassed the remaining wooden competitor by a tremendous margin. This test was in the nature of a reverse stress. Now, it is well known in engineering that the most severe stresses, and those which are most destructive, are alternations of stresses: applications of force from two opposite directions. Yet, it was under that very kind that the wire wheels stood up best. So it may fairly be said that a slight revision of our ideas relative to wheels is very much in order.

Viewed from a purely utilitarian standpoint, it means that the devotees of long touring can carry a complete spare wheel with tire, at the same total weight for the five wheels and tires, in case wire wheels are used, as the ordinary motorist with but four wheels and tires (those on the four wheels) of the wooden artillery type. That is to say, the weight of one whole wheel and tire is saved by the use of wire-spoked wheels.

ELECTRIC AUTOMOBILE LIGHTS

Ever since automobiles were invented their owners have been accustomed to struggle with refractory lamps. They have had tail lamps that would not stay lit; side lamps that smoked; headlights with clogging burners and cracking or tarnishing reflectors; generators which would not generate, and gas-tanks which refused to surrender any part of their precious contents. These annoyances are decidedly less frequent now than a few years ago; but the automobilist, accustomed to bestowing considerable care on his lighting equipment, still patiently stops his car at nightfall, dismounts, and trudges from lamp to lamp, kindling each one with a match carefully sheltered from wandering breezes. When he reaches home, on the contrary, he snaps a convenient switch, and instantly the room is flooded with light. Strange that the most modern means of travel should hold to so antiquated a system of illumination!

Electricity was formerly in ill repute for automobile lighting, as the incandescent bulbs of some years ago consumed an excessive amount of current, and at the same time were very susceptible to vibration. The carbon filaments were provokingly brittle, and with the filament once broken the lamp was worthless. Both these old objections have been nullified by the introduction of the tungsten lamp, which is at once economical of current and, in its improved forms, exceedingly robust. The smaller consumption of these lamps makes it practical, in some cases, to use ignition storage batteries as a source of current; a storage battery specially designed for lighting purposes will give perfect service, with very low cost. In addition, there are a number of mechanical generators which can be used both for ignition and lighting; the first cost of these is but little more than the battery, and they consume but an inappreciable amount of the power.

INDIANAPOLIS SPEEDWAY WILL HAVE A NEW SURFACE

INDIANAPOLIS, Sept. 6—Either the finest road brick or a bitulithic cement will soon be placed on the Motor Speedway and will give it the greatest track for automobiles in the world. This has been decided upon by the management, and for the last few days experts have been submitting figures and samples of materials that would be best for the complete roadway. A sum of $150,000 has been set aside for the purpose of resurfacing the course, and it is probable that still more will be necessary before the work is completed. It has been found that a bitulithic surface, would cost $100,000 and make the track smooth and hard enough to permit a speed of two miles a minute with safety. A layer of the very finest road brick, at the rate of $15 per thousand, would perhaps make the track even faster and certainly as durable, but the cost would be proportionally increased. The requirements would take 4,000,000 brick, costing $150,000, with $20,000 for laying them, meaning that the expense would be nearer $200,000 than $150,000. Money, however, is a minor consideration and whatever promises to give the greatest satisfaction will be adopted.

The officials of the speedway are determined to make the circuit all that was expected of it in the fondest hopes, and the entire equipment is being considered thoroughly to see where it can be improved. Experimental surfaces of brick and cement will perhaps be tried, but it is the opinion that the former will be the one selected. The cost of the entire affair to date is $425,000, and the added appropriations will raise this to nearly $650,000. In addition to the new surface for the racing machines there will be marked improvements around the grandstands. New restaurants will be installed in both the 50-cent and dollar parking fields, in addition to the two already there, and four refreshment stands will be built. Two tunnels will go under the track so that automobiles can be driven to the infield during the running of the events, or leave before they are entirely finished, at the will of the owners. There is room for 20,000 machines in these big parking spaces, and accommodation for others outside.

For the information of those watching the races the Warner automatic timer will be improved and enlarged so that in addition to scoring the number of the first three cars, the laps, and the time total, it will give the number of the events, the number of each race, and the complete score of every contestant. Assistant announcers will be stationed at vantage points and will receive their instructions direct from the chief announcer at the main post. The military board is training the soldiers so that the course will be policed better than ever at succeeding meets. The spectators will be assured of ample protection.

According to present plans it is the intention to hold the next automobile contests after the big aeroplane carnival, which will come during the middle of October. In this way the public will be given a chance to inspect the track with its new surface and will be positively assured that the accidents of the opening days will not be repeated. That series of events taught many lessons which are being carried out now. The management is in close touch with the needs of the big motordrome and the suggestions of those who witnessed the speed carnival last month have been given close attention. It had been announced that the next race meet would be held about the middle of October, but this has been postponed until later in that month, or until early in November. This will give the new surface ample time to set and make it safer. Then, too, there were conflicting dates which required rearrangement. A 24-hour race will be the feature of the next series.

Entry blanks have already been sent out for the proposed aviation contests, which are scheduled for October 15, 16, and 17. Aeroplanes, dirigibles, and balloons are included separately, but the conditions for them have not been announced. Cash prizes amounting to $10,000 will be offered. In a cablegram received from Glenn Curtiss he finally agrees to the terms offered him to be present with his biplane, and to attempt to better his record-breaking achievement at Rheims. He also gives the interesting information that a pupil of Louis Bleriot, with a Bleriot monoplane, will accompany him to the United States. It is expected that Curtiss and the Wright brothers will represent this country. Two dirigibles are being constructed here for the contests in their classes, one to be piloted by Carl G. Fisher and the other by G. L. Brumbaugh. Thomas Baldwin has assured the management that he will enter.

MUNSEY TOUR WILL TEST 1910 RULES

WASHINGTON, D. C., Sept. 6—Considerable interest attaches to the fact that the Frank A. Munsey reliability contest, from Washington to Boston and return, September 21-29, will be run under the 1910 rules recently adopted by the American Automobile Association. They will have their first tryout in this contest. Under these rules a fixed penalization schedule will be used, a fact that has been strongly commended by all the factories that have entered cars in the Munsey tour. Another departure from the old order of things is the changing of the cars from classes to divisions, ranging from division 1, for cars costing $850 and under, to division 6, for cars listing at $4,001 and over. Division 1 cars will be started first, followed in rotation by the other divisions. Cars in divisions 4, 5, and 6 will average 20 miles an hour; those in divisions 2 and 3, 18 miles, and those in division 1, 16 miles. The new rules are very comprehensive and embrace 162 different paragraphs.

Handsome trophies will be awarded the winning car in each division, in addition to which there will be a grand sweepstakes prize to be awarded the car making the best mechanical and road score. In addition to these awards, the entrance money will be divided among the drivers of the winning cars in each division. Thirty-one cars, embracing 26 different makes, have been entered to date. The latest entries include a Renault, entered by L. H. Shaab, Baltimore representative of Renault Freres, and a Hupmobile, entered by the Hupp Motor Car Company, of Detroit.

MILWAUKEE PREPARES FOR ITS "24"

MILWAUKEE, WIS., Sept. 6—Under the auspices of the Milwaukee Automobile Club the third annual 24-hour race will be held this year on September 24 and 25, on the State fair grounds track. As usual it will be the leading event of a two-days' speed carnival, and the shorter contests will range from the one mile to that of 100. The programme is still being made up. The entire meet will be conducted with an A. A. A. sanction.

Extraordinary preparations are being made for the races, especially for the round-the-clock grind, and from September 23 to 26 the fair grounds will be under martial law, with the State troops in full charge. The mile course is one of the best in the West, and it will be made still better in the coming weeks, for immediately after the 1909 fair, lasting until September 17, the club will have men upon it to put it in splendid shape. The turns will be reconstructed, oiled, and rolled to a stone-like surface. An original unit lighting system will be installed, consisting of 200 lights of 300 candlepower each, 20 feet apart. Lee A. Dearholt is chairman of the club's racing board and will again have charge of the events. President Clarke S. Drake will again be the referee.

An innovation in track racing will be seen in the arrangement of the repair pits directly before the grand stand, as in road contests. The enclosure of former years will be used as a parking space, and other quarters will be given in which the reserve crews may rest and have their meals.

TWO ENDURANCE RUNS IN NORTHWEST

Minneapolis, Minn., Sept. 4—This city has been the center of two endurance contests within a few days, the first being that under the auspices of the Minneapolis Tribune, to Duluth and return, and the second being the "Little Glidden Tour" of the Minnesota State Automobile Association. The former was held on Tuesday and Wednesday of last week, and the latter between Friday of last week and Tuesday evening.

Jean Bemb, in the Chalmers-Detroit, with which he won the Detroit trophy in the Glidden tour, was the victor in the Tribune run to Duluth and return, with the Franklin, driven by Carris, second; another Chalmers-Detroit, third; Walter C. Winchester, in his Pierce-Arrow Glidden winner, fourth; and a Ford was fifth. The run was a combination of the regular endurance contest with note taken of gasoline and oil consumption, and technical examinations. The big Pierce had the best record in the gasoline efficiency contest, showing 26.43 ton-miles to the gallon, while its nearest competitor had a mark of 20.73 ton-miles. The scores at the finish were: Chalmers-Detroit, 957; Franklin, 936; Chalmers-Detroit, 932; Pierce-Arrow, 926; Ford, 839; Pullman, 816; Gaeth, 813; Ford, 760; Lozier, 641. The Franklin had the only perfect road score.

The annual tour of the association started with 16 cars in line. The first day was a run to Alexandria, the second to Fargo, N. D., where Sunday was spent, and the stop on Monday night was at Benson, reaching this city on Tuesday evening. At the finish there were but seven cars with perfect road scores, and two of these were penalized in the technical examination. The five perfects were: Packard, driven by H. J. Clark; Pierce-Arrow, Reuben Warner, president of the St. Paul Automobile Club; Chalmers-Detroit, Barclay Automobile Company; Chalmers-Detroit, H. S. Johnson; and Brush runabout, Will Kemp. The two others with clean road slates were: Apperson, Basselle Automobile Company, and Ford, George Doerr. The performance of the little Brush was considered phenomenal. The penalties inflicted were as follows: Lexington, Haynes Automobile Company, 6.3; Oldsmobile, H. S. Johnson, 6.5; Cadillac, R. Stanvard, 7; Ford, A. Hanson, 10; Franklin, Theodore Wetmore, 10; Hupmobile, 40; Apperson, Ford; Haynes, Burney Bird, withdrawn, 1,000; Glide, Col. F. M. Joyce, withdrawn, 1,000; Glide, F. E. Murphy, not reported.

FIVE-DAY TOUR FOR HOUSTON AUTOISTS

Houston, Tex., Sept. 4—In the interests of the automobile dealers and owners in this city, the Houston Post is preparing a five-day endurance contest. The trade has liberally supported it and from present indications the event will have at least 30 entries, many of which will be the 1910 models. The start has been scheduled for September 24 and advices from along the route promise a hearty reception everywhere. As laid out now, the following is the itinerary: Houston to Victoria, 125 miles; Victoria to San Antonio, 130 miles; San Antonio to Austin, 80 miles; Austin to Brenham, 80 miles; Brenham to Houston, 86 miles; total 501 miles. The contest will be held under the rules and sanction of the A. A. A., such as those used in the last and most interesting Glidden Tour.

The Post has offered the main trophy, and it is likely that others will also be added by other parties, in order to make the affair more interesting. It is felt here that while the daily runs are not long, and the roads are generally fair and good, there will be plenty of ways in which the contesting machines will be well tried. The event is in the hands of a committee of which O. J. Lorehn is chairman.

COLUMBUS, O., PLANS 24-HOUR RACE

Columbus, O., Sept. 6—It is probable that a 24-hour race will be the feature of the October meet under the auspices of the Columbus Automobile Club. The event will be held upon the local one-mile track, and the details are now being arranged.

DENVER OUTLINES WORK FOR 1910

Denver, Col., Sept. 4—That the activities of the Denver Motor Club for the coming year may be well known before time, and to avoid conflicts, the officials of the club have announced the following contests: Two road races, one on Decoration day and the other on Labor day; reliability contest in June; gasoline economy contest in October; hill climb in November. This list is as comprehensive as possible, including all the important forms of automobile trials, and should give to the people of this section a well-defined knowledge of the cars being sold here. In addition to the above competitions, there will be considerable interest in the annual automobile show, which will be held in January or February. The preparations for these various events are under way, and some have been led to advanced stages. The show has been arranged to take place at a time when it will be possible to secure some of the exhibits from the New York exhibitions.

In the meantime, however, the club members are very busy with road and sign work, and the development of the club as a power in the State. An information bureau has been established so that local or visiting autoists may obtain correct data regarding the routes to all parts of the State. Guide books giving the directions, the distances, grades, road conditions, and legal ordinances have been prepared, and are given upon request. The membership of the organization has now passed the 550 mark.

Special interest attaches to the work for improved roads, for the Legislature has begun to realize the necessity for better highways, or rather for highways themselves. Extensive campaigns have been outlined for the building of bridges where at present none exist, and for constructing roads in several directions. The experience of the Glidden tour and the immense amount of publicity given to the fact that in some places, Colorado roads are such only on maps, has influenced many of the legislators. The Motor Club has invited the Rocky Mountain Highway Association to join hands with it in the crusade. The former is engaged at present in erecting sign boards on through routes and by the first of the year this will have been completed. The nuisance of overflowing irrigation ditches has attracted attention, and the members of the club are supplied with postal cards on which to send notice of such trouble to the club headquarters. There is a law against allowing the water to flow over the banks when such injures the public highways, and the officials in many places have been lax about preventing recurrences.

NEW AUSTIN CLUB DESIRES SANER LAW

Austin, Tex., Sept. 4—With a primary object of securing more reasonable and liberal city speed ordinances, the Austin Automobile Club has been formed in this city, with about 50 charter members. A temporary organization was effected with A. C. Goeth as temporary chairman, and O. E. Millican as temporary secretary. The meeting was held in the council chamber at the City Hall, and immediately after forming, the autoists were invited to confer with Mayor Wooldridge and the City Commissioners in regard to the speed regulations.

A committee to draft a constitution and by-laws is composed of Dr. T. J. Bennett, Pierre Bremond, and H. A. Wroe. The committee which will have charge of the interests of the club along the speed legislation lines includes Frank M. Covert, E. B. Robinson, and R. M. Thompson.

CLUB FORMED IN HEREFORD, TEX.

Hereford, Tex., Sept. 3—The Hereford Automobile Association has been organized recently in this place with the following officers: President, W. H. Ray; vice-president, Dow Mercer; secretary, R. F. Rogers; treasurer, W. O'Brien. The purposes are declared to be to secure improved roads and sports. Efforts are being made to arrange for a fine track where automobile races might be held.

DETROIT MAKES GOOD ON 50,000 PRODUCTION FOR 1909

By LEN G. SHAW

DETROIT, MICH., Sept. 5—Nine months ago—to be exact, December 17 last—THE AUTOMOBILE published a comprehensive review of the local situation, based on a most thorough investigation, showing how Detroit, as the hub of the automobile industry, would produce 50,000 cars in 1909.

How well that prediction was fulfilled furnishes interesting reading at this time, when several of the local factories are practically cleaned up on their 1909 output, and in at least one instance, 1910 models have been on the market for two months, or, strictly speaking, have been delivered to customers for that length of time.

The statement that Detroit would produce 50,000 cars was greeted by many with derision; and not without a show of reason from their point of view. It was argued that such a feat would be a mechanical impossibility. Time was when it would, but that day is past, never to return. Many, who had been content to regard with wonderment an annual output of from 500 to 1,000 cars per factory, insisted that such increases as talked of came only with an aggravated attack of automobilis, or was the emanation of a publicity man's fancy run wild. Others, some of them experienced men, looked askance at such figures, and said that if factory managers lived up to predictions, storage space would be in great demand, with a sufficient number of cars left on hand to meet all requirements for years to come.

They were wrong. Detroit not only fulfilled the predictions made by THE AUTOMOBILE but will exceed the aggregate given by a considerable amount, and local manufacturers are preparing to perform even greater wonders next season. Furthermore, the entire output is disposed of, and in a majority of cases every energy has been directed toward keeping up with a demand that taxed every facility to the utmost.

In reviewing the situation and showing what has been accomplished, it is well to take the figures appearing in THE AUTOMOBILE last December and supplement them with the actual output.

Taking the factories in the order enumerated, the first column of figures showing the makers' plans, the second the estimated production by THE AUTOMOBILE, and the third what has actually been accomplished, or will be by January 1, gives these results:

	Makers' Plans	Estimated Production	Actual Production
Ford	25,000	20,000	20,000
E.-M.-F.	12,000	8,000	10,000
Cadillac	10,000	9,000	9,000
*Blomstrom (Gyroscope)	5,000	2,500	500
Chalmers-Detroit	3,000	3,050	3,100
Brush	3,000	3,750	3,000
Packard	1,500	2,000	2,303
Regal	2,000	1,000	1,500
Herreshoff	500	350	500
-Hudson			
-Hupmobile			

*Estimated.
-Not in existence when December computation was made.

In the foregoing table it will be seen that there are several variations alike from the manufacturers' plans and the estimated production, although in the aggregate the latter is remarkably accurate. It will also be observed that, with two exceptions, the actual production is equal to or in excess of the estimate.

The Blomstrom Gyroscope, a new proposition, was handicapped in several ways. Just how many machines will be produced during 1910 cannot be determined at this time, owing to impending changes in management and the probable removal of the business to another city.

The other concern which fell below the estimate made by THE AUTOMOBILE was the Brush Runabout Company. That was due to the liberality of the investigator, who added 750 cars, rather than to any failure of President Frank Briscoe's plans or lack of popularity on the part of the car.

"We planned to produce 3,000 runabouts, and that is the number we will actually turn out," said Mr. Briscoe. "We couldn't have made any more, no matter how urgent the demand. We have worked to the limit of our present capacity. Next year we will more than double this ouput. We are contracting for materials for 6,000 runabouts, hope to make 10,000, and will probably turn out at least 8,000. Our 1909 business is practically all cleaned up, and the 1910 models, involving no marked changes, will be coming through early in November."

In support of Mr. Briscoe's statement regarding next year's output is the fact that work has been begun on a new plant that will when completed treble the present facilities.

The Ford plant at the end of 1909 will have turned out 20,000 of the popular-priced cars, a record that will probably stand for some time as remarkable in automobile production. The factory that was supposed would be ready for occupancy February 1 is not yet fully in commission. An addition is being erected, and other buildings are under consideration. The new factory will be in commission late this fall.

At the present factory 450 cars are coming through each week. This is an average of seventy-five a day, all the plant can handle. Out at the new factory it is claimed that it will be possible to put 1,350 cars through in a week if desired. These are astounding figures. Two hundred and twenty-five cars in a working day of ten hours means that a completed automobile will be turned out every two and one-half minutes.

Next door to the Ford factory, the E. M. F. Company, in point of age still in its swaddling clothes, but in reality the liveliest infant of them all, is doing things that have caused the trade at large to sit up and take notice. General Manager Walter E. Flanders denies any knowledge of the existence of a dull season in the automobile business.

"There will always be an abnormal demand for cars in the spring," said Mr. Flanders, 'but to the live manufacturer the rest of the year is going to be good. The trouble with some concerns in the past was that as soon as the weather began to warm up, the sales department got lazy and decided to suspend operations for the rest of the summer. The manufacturer was to blame, too, for just about the time the factory should have been straining every energy to keep up with the demand he began shouting so loud about 'next year's model' that prospective purchasers decided they would wait and see what the new wonder was like, instead of investing in a car that, according to the manufacturer's own admission, would be a back number the following season. Now they're bringing out a good model and sticking to it. What's the result? Last month we shipped 1,100 cars, and we're going to keep right on doing the same thing month after month, except that next year—not next season, mind you, for it's an all-the-year-'round season with us—we will be making more cars than ever before."

By the end of the present year 10,000 E. M. F. "Thirties" will have been turned out and disposed of. Next year, according to Mr. Flanders, 30,000 to 32,000 cars will be turned out. Of this number 15,000 will be "Thirties." The rest, somewhere between 15,000 and 20,000, will be the Studebaker-Flanders "Twenty," a new Flanders creation, a four-cylinder car selling at $750, that will make its appearance the latter part of the present year. In anticipation of increasing demands, the E. M. F. plant is being increased in size nearly one-half. The new car will be made in a separate plant, located in another part of the city, where the present equipment is being increased to a point that will render possible the production of the estimated number of cars.

The Cadillac "Thirty," picked as one of the year's winners, more than fulfilled expectations. By the end of 1909 fully 9,000 of these cars will have been placed on the market, representing all that could be done and Cadillac quality be maintained. Henry M. Leland, who is in direct charge of the mechanical department, receiving his schooling in the old days when the apprentice, who finally became a journeyman, knew his trade from beginning to end and backward. It is not enough to be up with the times. Mr. Leland and his associates believe in keeping a little ahead, and as a result every device that counts for accuracy or a saving of time without impairing results is to be found here. Since last fall the Cadillac has been running a night shift, and the plant's capacity in the matter of output has just about been reached. While not caring to venture a prediction as to next year, the Cadillac people are planning to duplicate this year's performance, and a little more, if possible.

If the Packard people have any weakness, it is a leaning toward conservatism in the matter of predictions. A year ago in answer to an inquiry the anouncement was made that in the neighborhood of 1,500 cars would be produced for 1909. As a matter of fact, that figure was exceeded by exactly 803, the last of the 1909 Packards to leave the factory being 2,303. There was just one reason that could be assigned for this increase—the ability of the factory to turn out that number and maintain the Packard standard. The thorough-going methods that have made the Packard famous wherever automobiles are known have a tendency to limit production. This is not without its advantaages, for with a car of such recognized excellence and a limited production, it follows that the person desirous of securing one places his order in good season. However, General Manager Waldon would in any event have no difficulty in disposing of the entire output, and it is a knowledge of this fact, together with a desire to meet the constantly increasing demands without sacrificing a single iota in quality, that is causing the company to prosecute building operations on a hitherto unheard-of scale. This increase in facilities played an important part in enabling the Packard company to turn out 1,502 "Thirties" and 801 "Eighteens" during the year. Further additions now under way or contemplated will make it possible to produce approximately 3,000 machines during 1910. As a matter of fact, deliveries on next year's cars began early in July, and between 700 and 800 have already been sent out.

The Chalmers-Detroit is another concern that more than lived up to expectations, exceeding the mark set a year ago by 100 cars. It took that many more "Forties" than originally planned to meet the most pressing demands, bringing the year's total up to 3,100. Of this number 2,500 were "Thirties" and 600 "Forties." The original building of the present plant contained some 72,000 square feet of floor space. Machinery is just being installed in a new four-story building having 96,000 feet of floor space, and work is in progress on a third of like size that will be ready for occupancy by winter—November 15, the contractors say. This will give the Chalmers-Detroit company the room it has long needed, and accordingly 5,250 cars have been contracted for for 1910.

The Regal split the difference between the makers' plans and estimated production, the fifteen hundredth car winding up the season, being shipped September 1. This is a highly creditable showing when the handicap in the way of factory room under which the Regal people labored is taken into consideration, and the popularity of the car is demonstrated by the early cleanup. For 1910 the company plans to build 5,000 cars. There is no apparent reason why it should not succeed. Three times the present floor space will be available because of new buildings that are going up, and at all events this year's output will be greatly increased.

By the end of January, which closes the factory year at that plant, 500 of the Herreshoff cars will have been placed on the market, according to Charles F. Herreshoff, president of the company, and who is in direct charge of affairs. For a time considerable delay was experienced in getting motors, of Mr. Herreshoff's own design, but that difficulty has been obviated and everything is running smoothly. For 1910 a like number of cars will be produced, according to present plans. In this connection comes the interesting announcement by President Herreshoff that next year's sales will be handled direct from the factory, instead of through a middleman, as was the case this season. Harry Houpt, who controlled the entire output this year, may continue to handle the car in New York, but the rest of the country will be cared for by the company direct.

Two concerns that did not figure in last December's computation, not being in existence at that time, are looming strong above the horizon, and have already succeeded in materially swelling the total output of Detroit's factories. These are the Hudson Motor Car Company and the Hupp Motor Car Company. The former is located in the old Northern plant, which is well adapted to its purposes, and where cars are being turned out at a lively rate. The fact that operations were begun only a few months ago means little in this case, as with such experienced men as Hugh Chalmers, R. B. Jackson, F. O. Bezner, Howard E. Coffin and others identified with it, the company is in reality as well off as the average veteran. The advent of the Hudson "Twenty," which is listed at $900, was the signal for a rush on the part of dealers, and it is asserted that the entire year's output was contracted for three weeks after the first announcement. By January 1 next, according to present calculations, 2,500 "Twenties" will have been turned out. What next year may bring forth is not disclosed, those in charge preferring to await developments. However, in anticipation of an increased demand plans have been made for enlarging the factory's capacity.

Although the Hupp Motor Car Company did not get under way until last March, the end of 1909 will, according to Vice-President R. C. Hupp, find 2,500 of the little cars on the market. The chief difficulty experienced by the company has been in filling orders. Trouble from this source will from now on be eliminated, the concern having just moved into a new factory on Jefferson avenue that will prove adequate for a long time.

"We will build 5,000 cars next year," is the prediction of Vice-President Hupp. "In general lines the 1910 model will differ little from our this year's car. It will contain numerous refinements, however, and be even better than the original model."

Taking the foregoing figures, and in each instance applying the minimum selling price, it will be found that Detroit's contribution in the way of automobiles for 1909 possesses an aggregate sale price well in excess of $52,000,000. When it is further stated that the coming year will probably see the addition of a half dozen large automobile plants, one begins to understand what the automobile industry means to Detroit, or what Detroit means to the automobile industry.

Some Recent Projected Factory Plans

Detroit, Sept. 5—Detailed plans for the immense plant of the Brush Runabout Company have just been completed. There will be four structures, including a two-story office building, 63 x 71 feet; an experimental building, 276 x 150 feet; finishing building, 208 x 150 feet, and a foundry 75 x 50 feet. The buildings will be of brick and steel, and will have all modern accessories of finish.

The Packard Motor Car Company has just let contracts for an additional office building, 508 x 60 feet, to be erected in connection with its plant at Grand boulevard and the Belt Line.

The Michigan Auto Parts Company will build a factory addition one story in height and 168 x 71 feet on the ground adjoining its present plant at Jefferson and Campbell avenues.

This showing for a single week, coupled with the fact that nearly every other automobile factory in the city is engaged in increasing its capacity, indicates that manufacturers are not only satisfied with present conditions but have confidence in the future.

Another Newcomer to Hail from Detroit

Detroit, Sept. 7—The Krit Motor Car Company is the latest addition to the local automobile colony, articles of incorporation having just been filed. The company is capitalized at $100,000, of which $50,000 is subscribed and $23,000 paid in in models, specifications, machinery and completed cars. A four-cylinder car designed by Kenneth Crittenden will be manufactured and marketed. It is announced that a factory capable of turning out 2,500 cars a year will be erected.

NOVEL DECORATIONS FOR PALACE SHOW

Something entirely new in decorative effect will be witnessed at the opening of the Tenth International Automobile Show in the Grand Central Palace, New York City, on New Year's Eve. A trellis garden scheme, with lattice work intertwined by myriads of electric lights and huge fire balls, landscape effects, pictorial scenes, and floral designs, will be included in the materials which will absolutely transform the big building. At the recent meeting of the show committee, of which R. E. Olds is chairman, representing the American Motor Car Manufacturers' Association, the Importers' Automobile Salon, and the Motor and Accessory Manufacturers, it was decided to award the contract to Unitt and Wickes, of New York. It was this firm which presented plans for the trellis garden.

From the front door to the rear will be in the hands of this firm of decorators, beginning with a handsome porte-cochere outside of the building, of a different design from the one used last year. At the back of the main hall will be erected gigantic French glass mirrors, in front of which will be an electric fountain, and between these two will be the bower. The garden influence will permeate everything, even to the furniture in the exhibition spaces. The concern which has this in charge is a leader in this kind of work in this country, its latest success being in the construction of the mammoth roof garden on the Hotel Astor. It promises that the plans and models, which indicate schemes entirely different for the Palace from anything before attempted in connection with automobile shows, will be definitely carried out. As formerly the active management of the show will be under the personal supervision of Alfred Reeves, the general manager of the association.

BRUSH SUCCESSFUL IN RURAL MAIL WORK

Ottawa, Kan., Sept. 4—With the growth of the rural mail service has come the usurpation of the horse delivery by that of the automobile. W. A. Johnson, of this place, recently purchased a Brush runabout with which to cover his 25-mile route. He has to make daily trips through the rough and hilly country west of here, and with his horse and carriage it was the work of an entire day, with 84 mail boxes to be visited. He has had the Brush some time now, and does the entire circuit in three hours with ease. The outlay for the Brush was $610, only a little more than was necessary for three horses and wagon, which was the equipment needed before. Mr. Johnson keeps a close account of his expenses, and finds that it is costing him at a rate of $61.80 a year for the maintenance of the car, and his entire repairs have amounted to less than $10, even when he was engaged in learning to operate it.

PACKARD CAPITAL NOW $10,000,000

Detroit, Sept. 7—The Packard Motor Car Company, organized eleven years ago under the laws of West Virginia, is now a Michigan corporation, articles of association having been filed at Lansing September 1. At the same time the capitalization was increased to $10,000,000, of which $5,000,000 is preferred and $5,000,000 common stock. Increasing business made it necessary to enlarge the capital stock. Extensive additions are being made to the plant to enable the company to avoid night work, it being the desire of President Henry B. Joy and his associates to make it a strictly daylight factory.

ELKHART CARRIAGE MAKERS ENTER TRADE

Elkhart, Ind., Sept. 6—The Elkhart Carriage & Harness Manufacturing Company has decided to enter the automobile field and has drawn up plans for its product. The car will have a motor of from 30 to 35-horsepower, with the engine, clutch, and transmission in a unit. The rear axle will be full floating, with the housing of pressed steel, the wheel base 117 inches, and the wheels 24 inches in diameter. Three styles of bodies will constitute the line, the standard five-passenger touring car, the baby tonneau, and the roadster. The first lot of machines will be ready for exhibition purposes during the early part of October.

SMITHS RETIRE FROM OLDS MOTOR WORKS

Detroit, Sept. 6—Bentley J. Mead, general sales manager of the General Motors Company, is the new secretary and general manager of the Olds Motor Works, Lansing. Frederick L. Smith, vice-president and general manager, and his brother, Angus, secretary-treasurer of the Olds company, have resigned, and the duties of secretary and general manager have been assumed by Mr. Mead, who is regarded as direct representative of the General Motors Company, which recently acquired the Olds plant.

Announcement of the change came as something of a surprise, but directors of the company decline to discuss the matter, while both the Smiths, who are well known in the automobile world, refrained from commenting on the situation further than to state they had other plans in view that would occupy their time fully.

It is understood that the Smiths are interested in the organization of a new automobile company, to be promoted by Ralph R. Owen, who has resigned as factory manager for the Olds company, although he will have no active part in the management. There is a strong likelihood, in case the deal goes through, that the plant will be located in Detroit.

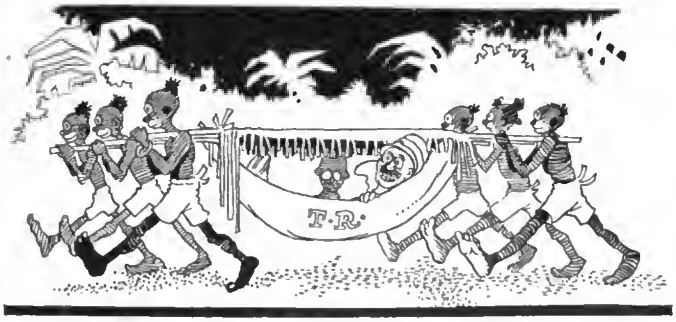
What Mr. Selby's Winton Found in Town of Casey, Ill.

Near Ellensburg, Wash., Roads at Least Had Foundation

Where the Roads in Town Were Somewhat Inferior to Traveling in the Open Country

Mr. and Mrs. W. G. Selby, of Marietta, Ohio, have arrived at Seattle in their Winton Six, having taken 29 days for their overland journey from Pittsburg to the exposition city. On the trip Mr. Selby states that he cleaned one spark plug; otherwise the motor never gave him a moment's thought. From Seattle, Mr. and Mrs. Selby will tour to Los Angeles and thence home via Salt Lake City

"T. R." UTILIZES AFRICAN "SIX"



From the "Auto Era," Published by Winton Motor Carriage Co.

NEW YORK Y. M. C. A. OPENS AERO SCHOOL

To meet the prospective demand for men trained in the various branches of aeronautics the New York West Side Y. M. C. A. is to conduct an evening course in that science, under the direction of Wilbur R. Kimball, of the Aeronautic Society. This school owes its existence to an experimental course of lectures given last winter by Cortlandt Bishop, Augustus Post, W. E. Scarritt, and others. The course will be principally devoted to aeroplanes, as these are believed to be susceptible of the most development in the future. Much of the equipment of the automobile school already conducted by this organization will be used in the new school. No actual practice in aviation is at present contemplated, but this feature may be added.

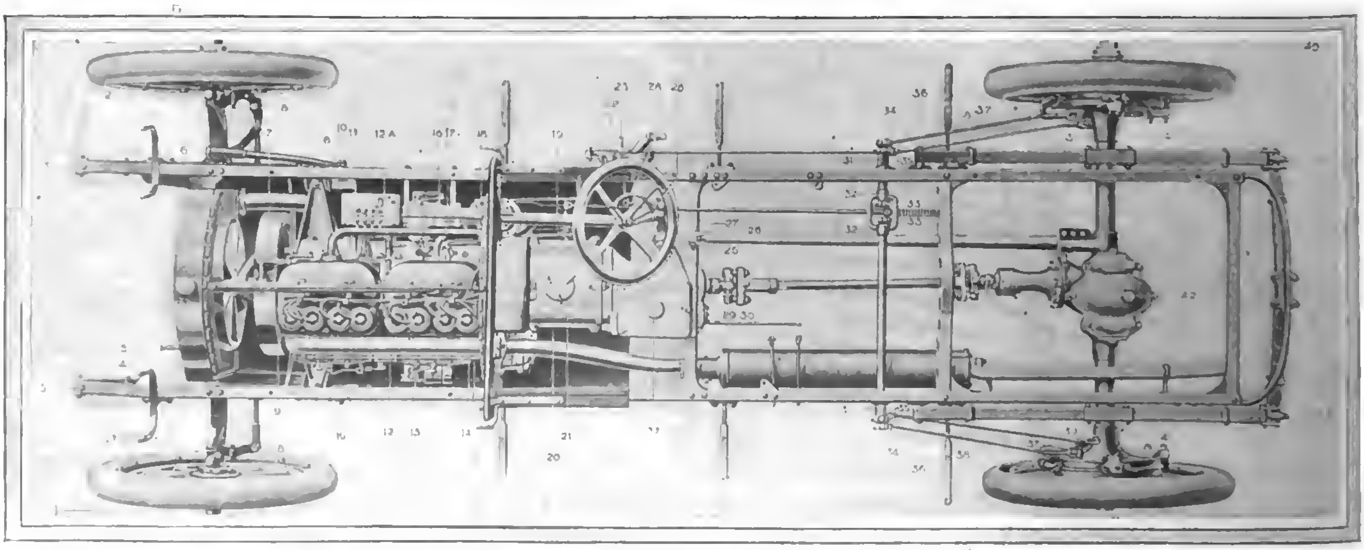
WARNER ORGANIZES NEW GEAR COMPANY

TOLEDO, O., Sept. 4—T. W. Warner, formerly of the Warner Gear Company, of Muncie, Ind., has organized the Warner Mfg. Co. in this city to make change-gears, differential and steering gears. At present the company is located in the old Pope-Toledo plant, in buildings rented from the Overland Automobile Company, which is one of its largest customers, and is employing 200 men. This arrangement is only temporary, however. Mr. Warner says that he will build a new plant either in Muncie, Ind., Toledo, or Detroit, to be finished within three months.

INSTRUCTING OWNERS IN CARE OF CARS

Admittedly the greatest obstacle to securing possibilities of efficiency and long life, which are latent in almost every automobile, is the indifference and neglect of the operator; and, further, that neglect has its most immediate and far-reaching influence when it affects the lubrication. Few drivers are so criminally careless as to forget to replenish the mechanical oiler and crankcase supply, and most of them refill the gear-box and the rear-axle casing occasionally; but the many small oil holes and grease cups, which of necessity must be scattered over the chassis, are too frequently neglected. As a reminder to owners and chauffeurs of their duty in this respect, the Stevens-Duryea Company has included in its instruction book a double-page plan view of the chassis, with all oil holes and grease cups indicated by arrows and reference numbers, and a table to correspond showing the intervals at which each should be given attention. The illustration is so clear that the veriest novice could not go wrong.

No.	Parts	Lubrication	Give Attention	Miles	No. of Places on Chassis
1	Front Hubs	Grease		1,000	2
2	Steering Knuckles	Grease		200	2
3	Springs	Oil	Every day	....	2
4	Carburetor Primer	Oil	Every day	....	1
5	Starting Handle	Oil	Every day	....	1
6	Steering Rod	Oil	Every day	....	2
7	Fan Support	Oil		300	1
8	Tie Rod	Grease		200	2
9	Fan Bearings	Grease	Every day	....	1
10	Springs	Oil	Every day	....	2
11	Springs	Oil	Every day	....	2
12	Valve Tappets	Oil	Every day	....	8
12A	Rocker Shaft	Oil		300	4
13	Magneto	Oil (light)		500	2
14	Magneto Connection	Oil	Every day	....	1
15	Magneto Bearings	Grease		200	1
16	Steering Post	Grease		750	1
17	Timer	Oil	Every day	....	1
18	Steering Post	Oil		200	1
19	Clutch Bearing and Brake Pedal	Oil		200	2
20	Clutch Bearing	Oil		200	1
21	Clutch Ring	Oil		500	1
22	Gear Shift Lever	Oil	Every day	....	1
23	Emergency Brake Lever	Oil	Every day	....	[illegible]
24	Transmission	Oil (heavy-1" deep in case)		....	
25	Torsion Rod Spring	Oil		300	1
26	Torsion Rod Bearings	Grease		300	1
27	Torsion Rod Bearings	Grease		300	1
28	Ball Joints	Oil		200	2
29	Universal Joints	Grease		250	2
30	Sliding Joint (Universal)	Grease		250	1
31	Brake Bearings	Oil		200	2
32	Brake Rods	Grease		300	2
33	Brake Equalizer	Oil		300	2
34	Brake Rod Ends	Oil		200	2
35	Brake Rod Ends	Oil		200	2
36	Springs	Oil		200	2
37	Brake Arm Bearings	Grease		200	2
38	Brake Rod Arm Ends (upper and lower)	Oil		200	4
39	Brake Rod Ends	Oil		200	2
40	Rear Hubs	Grease		1,000	2
41	Spring Seats	Grease		200	2
42	Rear Axle	Oil (heavy) to overflow		750	1
43	Springs	Oil	Every day	....	2



Chassis of Stevens-Duryea "Four" with Parts Numbered, to Be Used with Lubricating Table Printed Above

Told in the Progress of the Industry

Timken Company Host of Factory Organization—To show its appreciation of the manner in which its factory organization has responded during the formative period of the new plant, the Timken-Detroit Axle Company last Saturday acted as host. The factory employees were given a yachting party to Wolf's Point, Can., and a dinner there, after athletic sports. In the evening the commercial department and the heads of the several branches of the big industry were tendered a banquet at the Hotel Tuller. The celebration was over the remarkable showing that has been made by the officers and men of the concern in building up the present axle business since July 6. On that date the Timken Roller Bearing Company, of Canton, moved its axle plant to the City of the Straits, a new factory was started, an organization perfected, and deliveries made on contract time.

What it Costs to Guarantee Studebaker Cars—A question which has agitated the minds of many manufacturers of automobiles is that of the cost of guaranteeing the products. The standard warranty of both national organizations covers only 60 days, for defective workmanship or material. One of the concerns which has guaranteed its output for a year is the Studebaker Automobile Company, and a recent appraisal was made of the cost of this service. It has marketed 1571 Studebaker-Garford chasses, and the company has been extremely liberal in carrying out its promises. It came as a surprise, therefore, when it was learned that from March, 1905, to October, 1908, there had been expended a sum of $16,620.18 for the guarantee. This is an average of but $10.51 a car.

Fisk Tires Tested in Transcontinental—The worth of Fisk tires was recently shown in a double transcontinental tour, according to the information given by the Fisk factory. The tour was one made by Everitt Mead and A. Newton Mead, of Greenwich, Conn., in a Packard car, and 10,185 miles were covered. Leaving the East on May 19 they traveled overland with several makes of tires on the machine during the journey. At Los Angeles, they put a new Fisk on a rear wheel, and reached New York with the Pacific air still in it, not a puncture nor blowout having been experienced upon that wheel. The return trip included a long stretch of 1,600 miles to Seattle, over the Mount Shasta route, and the Siskiyou Mountains, before turning eastward over the Rockies and the great plains.

What Color for Municipal Automobiles?—This important question was a ponderous and facetious one in Boston recently, for an ordinance to prevent joy rides in the city's cars was passed. It required that the machines be painted a standard color, and that they bear the name of the city and the department on the side. The Mayor's cabinet first attempted to decide upon the color, but agreed to leave that matter to the art department. One man wanted Harvard crimson, another voted for pale lavender, another for crushed strawberry, and still another for lemon. The Mayor, however, decreed that the fire department might retain red on its autos, but suggested that the others be colored a standard black like his own.

Ajax Tires Score at Lowell—In the Merrimac Valley trophy contest of the light cars at Lowell, Mass., on Monday, the Ajax tires again made a splendid showing. They were used by the three Maxwell cars which finished second, third, and fifth, driven respectively by See, Costello, and Sickinger. These men drove the machines for 127 miles at high speed without a puncture and, according to the Ajax officials, were not handicapped with tire trouble of any sort. This showing is a repetition of the Ajax success at Savannah last year.

Will Exhibit Firestone Cars—The Columbus Buggy Co., of Columbus, O., is arranging to have large exhibits of its new gasoline cars at the approaching automobile shows. The firm is manufacturing the Firestone cars and the 1910 models are expected to be out in about 30 days. The machines at Atlanta will be in charge of L. E. Key. New York and Chicago are also on the list.

Another Carriage Maker in Line—The United States Carriage Co., of Columbus, O., has announced its intention of joining the manufacturers of automobiles and will have a four-cylinder gasoline car for sale next season. The line will consist of touring cars, runabouts, hearses, cabs and ambulances. It is expected that the first of the production will appear early in January.

Minneapolis Gets First Taxicabs—Minneapolis recently received its first taxicabs, and they are now upon the streets giving excellent service to a growing patronage. The McAllister & Newgord Co. introduced this method of transportation with 15 Fords, and it is understood that the Pence Automobile Co. will soon have 25 cars on the streets also. At present there is room for all comers.

Credit for Knox Photograph—The picture of the Knox car which won the 50-mile free-for-all on the Galveston Beach, as shown in last week's AUTOMOBILE, on page 413, should have been credited to C. C. Burns, who took it.

IN AND ABOUT THE AGENCIES

Pence Auto Company, Minneapolis, Minn.—One of the largest and handsomest buildings in this country devoted to the automobile trade has been opened by the Pence Auto Co. in Minneapolis. It is an eight-story structure of fireproof construction and with all the conveniences for garage, repair and selling work. The location at Hennepin and Eighth streets is almost in the center of the business section. The company was started in 1903 by H. E. Pence with a capital of $2,200, and its rapid rise can be imagined from the fact that the cars sold last year were valued at nearly $2,000,000. For the 1910 season, 3,750 machines have been ordered for the firm's territory, which includes this State, the Dakotas, and Montana.

Palmer & Singer, Philadelphia—The agency for the Palmer & Singer cars has been placed under the management of George P. Parker. Options have been secured on several Row locations and one will be selected shortly.

Morgan & Wright, Minneapolis, Minn.—The Minneapolis branch of Morgan & Wright, makers of the famous "Good Tires," was moved on September 1 to new and more commodious quarters at 911 First avenue, South.

RECENT BUSINESS CHANGES

Fort Worth Agencies Consolidate—Three automobile agencies in Fort Worth, Tex., were consolidated recently when W. J. Tackaberry and S. R. Wells, of the Runnells Automobile Company, sold their interests to E. P. Reynolds. The firm will hereafter be known as the Runnells & Reynolds Auto Company. E. F. Simmons is also connected with the concern, thereby bringing in the agency for the Stevens-Duryea. Five makes of cars will be handled, as follows: Chalmers-Detroit, Hudson, Stevens-Duryea, Ricketts Six and Regal. It is very probable that a couple of other lines will be added, in order to give a complete list of lines selling from $650 to $6,000.

Minneapolis Knox Agent Incorporates—The Mich Automobile Company, which has had the agency for the Knox cars in Minneapolis, has filed articles of incorporation, with a change of name. It will hereafter be known as the Mich-Stair Auto Company, with a capital stock of $50,000, W. A. Stair having joined as a partner. A new building will shortly be erected at First avenue and Eighth street, and other lines of cars added to the present one.

Morgan & Wright, Los Angeles, Cal.—The Los Angeles branch of Morgan & Wright, the manufacturers of M. & W. tires and rubber goods, was moved on September 1 from 118-122 East Tenth street to more commodious quarters at 1108 Main street. It now has greatly improved facilities for handling the trade, which is showing a healthy growth.

Tray Plate Battery Company Moves—The Tray Plate Battery Company, Binghamton, N. Y., has recently moved into its new large plant on Wall street. It is preparing for an increased campaign with the well-known "High Efficiency" non-sulphating batteries.

PERSONAL TRADE MENTION

E. LeRoy Pelletier has been appointed general advertising manager of the Studebaker Automobile Company and the Studebaker Bros. Manufacturing Company. He will have his headquarters at South Bend, Ind., instead of with the Studebaker E-M-F factory in Detroit. In his new capacity Mr. Pelletier will have full control of the advertising of the Studebaker horse-drawn vehicles as well as of the entire automobile business, which formerly was his special province.

S. W. Rushmore, of the Rushmore Dynamo Works, and Mrs. Rushmore, have recently sailed for Europe on the Mauretania. They will make a tour of six weeks' duration, during which time Mr. Rushmore will establish a branch in Berlin, where the Rushmore lights and generators have had a greatly increasing sale. The existing branches in London, Paris, and Milan will also be visited.

Len Zengle, the crack Chadwick driver who has been so successful recently in hill climbs and at Indianapolis, will shortly return to the Pennsylvania Motor Works factory at Bryn Mawr, Pa. He will, however, fill all of his driving engagements with the Chadwick Company until the close of the season.

Leon M. Bradley has been selected as manager of publicity for the Atlanta automobile show, which will be held in that city from November 6 to 13. Mr. Bradley retains his connection with the A. M. C. M. A. at the same time.

George S. Atwater, formerly with the Atwood Manufacturing Company, is now associated with the Tray Plate Battery Company, of Binghamton, N. Y. He will represent them in their sales department.

OBITUARY NOTICE

Edward M. Murphy, pioneer vehicle and automobile manufacturer, died suddenly of apoplexy at his home in Pontiac, Mich., on September 4. In 1887 Mr. Murphy settled in Pontiac, and the following year, with C. V. Taylor, organized the Pontiac Buggy Company. He was one of the organizers of the Oakland Motor Car Company and a stockholder in several other carriage and automobile concerns.

NEW AGENCIES ESTABLISHED

Marmon and Parry: Minneapolis, Minn.—Fawkes Auto Company, in addition to the American, Overland, Reo and Holsman.

Continental Tires: Milwaukee, Wis.—Welch Bros. Motor Car Company, Grand avenue and Seventh street. For eastern Wisconsin.

Haynes: Houston, Tex.—Mosehart & Keller Automobile Company, for Texas, Southern and Western Louisiana.

Velie and Hupmobile: Cincinnati—Evanston Automobile & Garage Company, 3705 Main avenue.

Stevens-Duryea: Pittsburgh—E. O. Vestal, The Rittenhouse, North Highland avenue.

Winton and Regal: San Antonio, Tex.—C. H. Dean, 234-238 South Flores street.

Haynes: Greenville, S. C.—B. W. Martin, for Greenville and adjoining counties.

Regal: Greenville, S. C.—W. H. Irvine, Jr., for Northwestern South Carolina.

Studebaker: Roanoke, Va.—Valley Motor Vehicle Company, Limited.

Detroit Electric: Minneapolis, Minn.—Hathaway-Stimson Company.

Stevens-Duryea: Minneapolis, Minn.—M. R. Waters & Sons.

White: Sioux City, Ia.—Bennett Auto Company.

Empire: Minneapolis, Minn.—Maxfield Auto Company.

Overland: Tampa, Fla.—Hobbs & Knight Company.

Croxton-Keeton: Pittsburgh—Fred W. Fischer.

Franklin: Baltimore—Mar-Del Mobile Company.

RECENT INCORPORATIONS

Harper Livery & Sale Company, Salisbury, N. C.—Capital $50,000. To operate livery and sale stable with privilege of operating automobile lines in the State. Officers: President, J. P. Harper; vice-president, J. D. Heilig; secretary and treasurer, M. J. Ragland.

E. R. Thomas Motor-Branch Company, Boston—Capital $100,000. To deal in automobiles. Officers: President, E. L. Thomas; secretary and treasurer, J. M. Edsall; manager, C. S. Henshaw. Temporary offices at 288 Columbus avenue, Boston.

Citizens' Automobile Company, Birmingham, Ala.—Capital $25,000. To manufacture, sell, and lease automobiles, taxicabs, and auto accessories. Incorporators: J. C. Turner, M. F. Hinckman, H. G. Robinson, G. W. Yancey.

Trackless Trolley Company of America, New York—Capital $150,000. To manufacture automobiles, motor vehicles, bicycles and other vehicles. Incorporators: C. E. Barrett, A. L. Newman, Sadie Wiener.

Victor Windshield Manufacturing Company, Chicago—Capital $2,500. To manufacture windshields and automobile accessories. Incorporators: J. McGaffey, A. L. Haake, S. S. Gorham.

Hazard Engineering Company, Gates, N. Y.—Capital $100,000. To manufacture automobile and marine gasoline engines. Incorporators: E. C. Hazard, G. E. Hazard, W. J. Robinson, J. Bennett.

Automobile Service Company, Camden, N. J.—Capital $50,000. To operate taxicabs and automobiles for public use. Incorporators. F. R. Hansell, W. F. Eidell, John A. MacPeak.

Rainier Motor Truck Company, New York—Capital $50,000. To manufacture motor trucks for freight only. Incorporators: P. N. Lineberger, G. C. Comstock, J. T. Rainier.

Fox-Stiefel Company, New York—Capital $130,000. To manufacture and deal in goods for automobilists. Incorporators: T. F. A. Gibney, H. A. Herold, Simon Wickes.

Kemezite Company of America, New York—Capital $10,000. To manufacture and sell kemezite. Incorporators: L. W. Lisberger, Joel Jacobs, Edward B. Levy.

American Automobile Company, St. Joseph, Mo.—Capital $25,000. To deal in automobiles. Incorporators: W. G. Campbell, John F. Garber, C. R. Vaughn.

Elizabeth Taxicab Company, Elizabeth, N. J.—Capital $100,000. To manufacture automobiles. Incorporators: F. N. Voorhees, W. H. Cole, F. V. Price, Jr.

Franklin Square Garage Company, Worcester, Mass.—Capital $35,000. To do a general automobile business. President and treasurer, A. R. Davis.

Ranger Automobile Company, Chicago—Capital $25,000. To manufacture automobiles. Incorporators: G. A. Schmitt, E. A. Sanders.

Ewing Automobile Company, Cleveland—Capital increased from $150,000 to $175,000.

RECENT PUBLICATIONS

Stewart & Clark Manufacturing Company—Stewart speedometers for 1910, with all the improvements considered in detail, and the entire construction of the instruments explained, are well taken up in the new catalogue, just issued. This book of imposing size, beautifully printed, with exceptionally clear photographs, is the foreword of the Chicago concern, and the news it contains is of special interest to owners and dealers alike. In regular order the type of instrument is explained, and the principles of the operation of the multipolar action shown, as compared with other types, before introducing the new models themselves. Twenty-one different styles of speed recording instruments will be manufactured, and the new factory has a capacity which would supply a speedometer for every automobile built within the next 365 days. The long list includes those for automobiles, motorcycles, and motorboat engines. Of course, the majority are for the autos and are constructed to read mileages from zero to 90, with some stopping at intermediate points, such as 50, 60, and 75. A great deal of attention has been given during the preparation of the 1910 product to the fittings which go with them, such as dash brackets, electric lights, swivel joints, and wheel clamps, and improvements made in them all. The book is printed in two colors, orange and black, so that the subjects being discussed are well set out. It is bound in heavy stock.

Winton Motor Carriage Company, Cleveland—The Winton Six Upkeep Book, the second annual edition, has been issued to show the records of the Winton cars winning prizes for low cost of maintenance. The booklet is very artistically compiled, and the statements of the judges and of those who won are very interesting. That a car can be driven for 17,003 miles without a cent being paid for repairs is wonderful. Other sets of figures are of equal importance. In each case of the ten, the details of the records kept for eight months are given, sworn to by both the chauffeurs and owners. It is especially noteworthy that the first three prize winners this year were not new machines, and these facts are well brought out in the edition. Announcement is also made in it of a continuance of this novel competition.

The Autolight & Motor Supply Company, Philadelphia—This large, thick catalog will be a delight to every automobilist, as it is one of that welcome sort that is practically an encyclopedia of every accessory pertaining to the sport. The 155 pages contain descriptions and price-lists of everything from a spark-coil primary binding post washer at five cents to a 42x5 1-2 inch tire.

How an Automobile Truck Is Utilized to Transport the Ever Popular Moving-Picture Show

The truck, manufactured by John H. Blacker & Co., of Chillicothe, O., was fitted up by Albert Taylor, of Mt. Sterling, O., to carry his moving-picture show. The dynamo which furnishes the light and power for the show is driven from the flywheel of the motor. The car itself carries the tent, seats, and all other paraphernalia. After the show is over, Mr. Taylor gives his customers a ride in the sight-seeing car, which is also shown in the picture.

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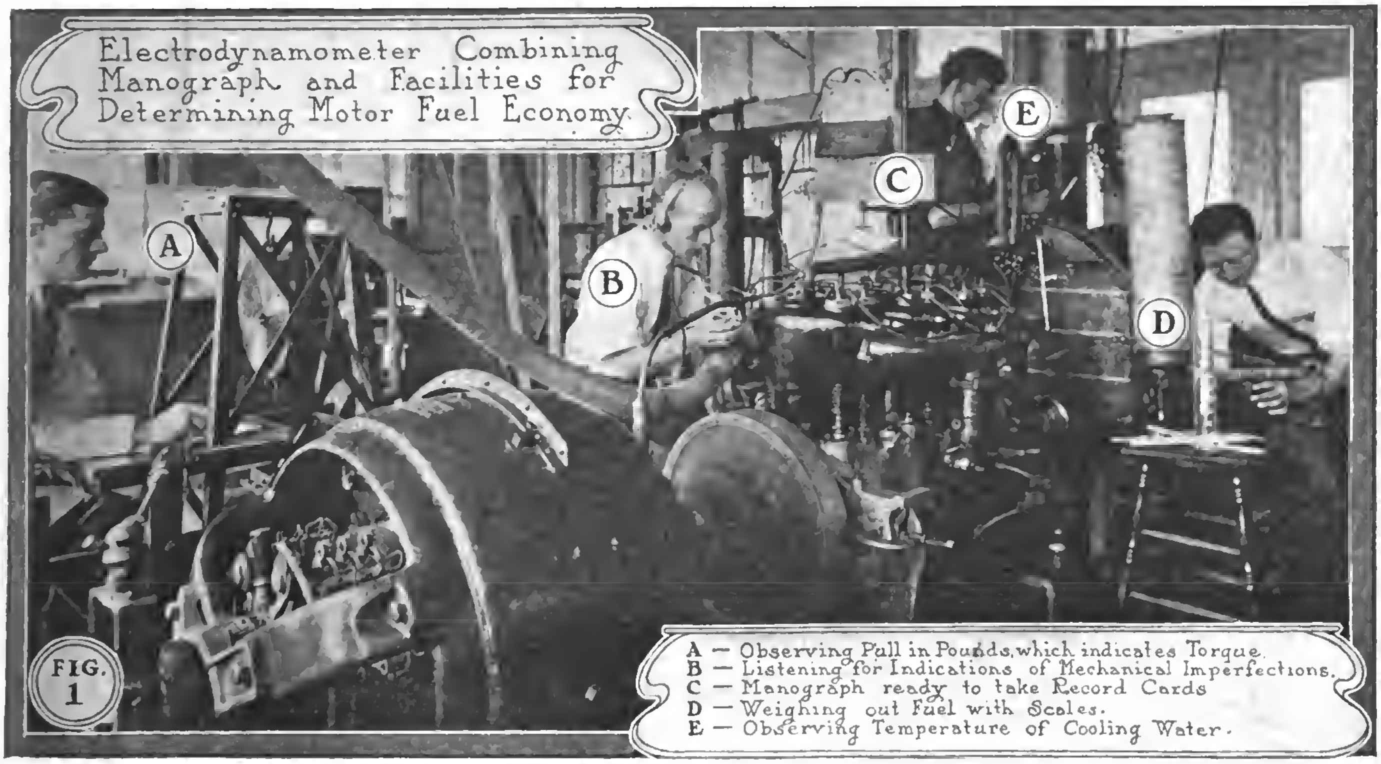
THE AUTOMOBILE

LABORATORY IN AUTOMOBILE MAKING

By Thomas J. Fay



BUFFALO, Sept. 13—In the making of the automobile of to-day the laboratory supplies definite methods and eliminates chances inseparable from unfit elements and other equally wasteful channels. What was once done in the making of automobiles is no longer possible or advisable. In the first cars, considerable guesswork as to material and its enduring qualities caused breakages and discouragements, both to the man who made and the man who bought.

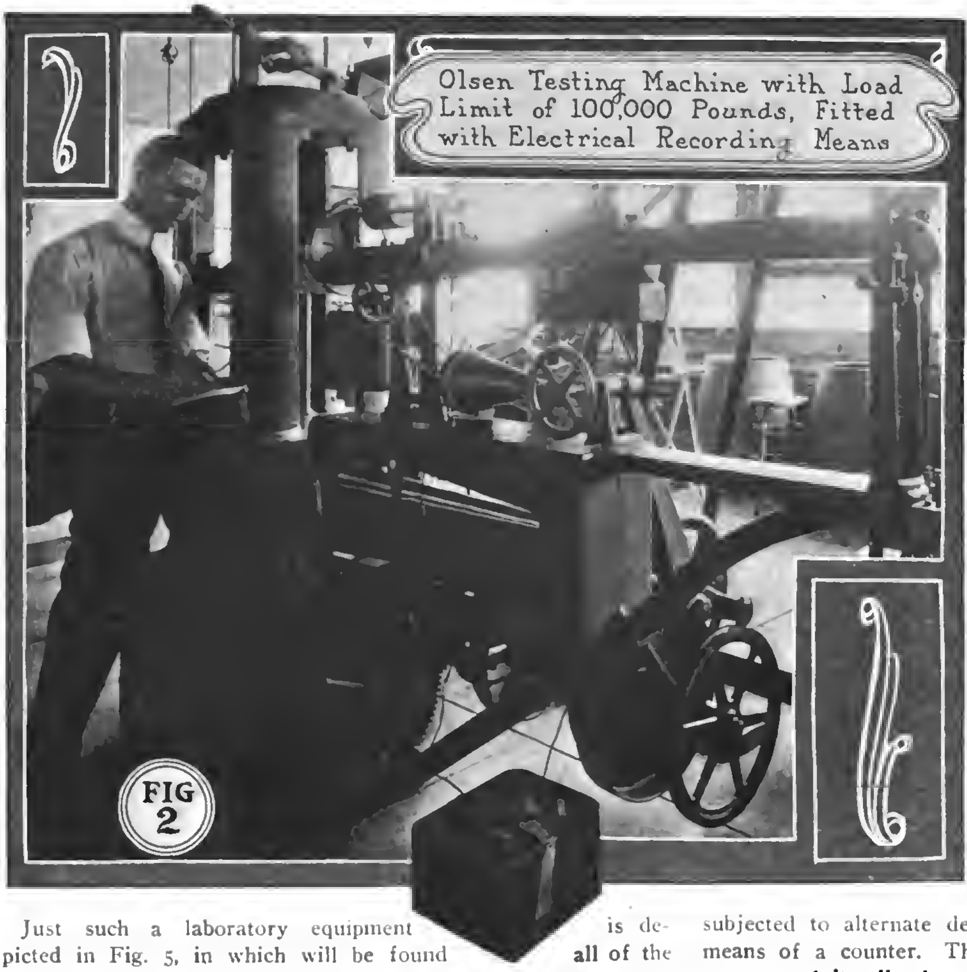
To learn that the 1910 cars have a laboratory foundation, it is only necessary to go into the establishment of a representative maker and study the up-to-date methods now employed. One there learns of laboriously-obtained engineering records calling for definite investigation of the qualities embodied before they are included in the final work of construction.

Nothing can be left to chance, no vendor's word can be safely taken for the quality of the material, and a corps of competent engineers must wait upon the men who do the work.

There is a widespread impression that the several makers of quality cars depend, for engineering information, upon one common laboratory, and that some one man is responsible for the qualities of the several grades of materials used in many makes of cars. This view of the situation merely indicates a vast lack of knowledge of the facts. Moreover, a moment's reflection is but enough to lead to the conclusion that the task is beyond a centralized laboratory, and to realize results as they must obtain in the cars about to be placed before discriminating buyers it is necessary for every big concern to have skilled men ready for instant action.

There are a vast number of reasons why each shop should have its own facilities, and the only way this phase of automobile building can be adequately explained is to investigate the situation in sufficient detail to bring out the points to be made.

Some of the Requirements in a Laboratory—The materials should be purchased on a basis of chemical composition—if they are to be heat treated, at any rate—for the reason that, in the absence of knowledge of composition, the heat-treating process will be attended with dangers, and, as is recognized, normal steel is better than heat-treated product if there is any question as to the composition. Heat treatment is necessary if the parts are to be up to the highest attainable standard. The first requirement in a laboratory is a suitable chemical equipment, by means of which every "heat" of steel or other metal, when it arrives, may be sampled at random, and the chemical composition ascertained.



Olsen Testing Machine with Load Limit of 100,000 Pounds, Fitted with Electrical Recording Means

FIG 2

Just such a laboratory equipment is depicted in Fig. 5, in which will be found all of the equipment necessary for determining alloy contents, carbon, silicon, sulphur, phosphorus, manganese, copper, arsenic, etc. In addition to these determinations, which must be made quickly, the chemist is engaged in the investigation of new products, and in trying schemes of heat treatment to bring out the qualities of the steel.

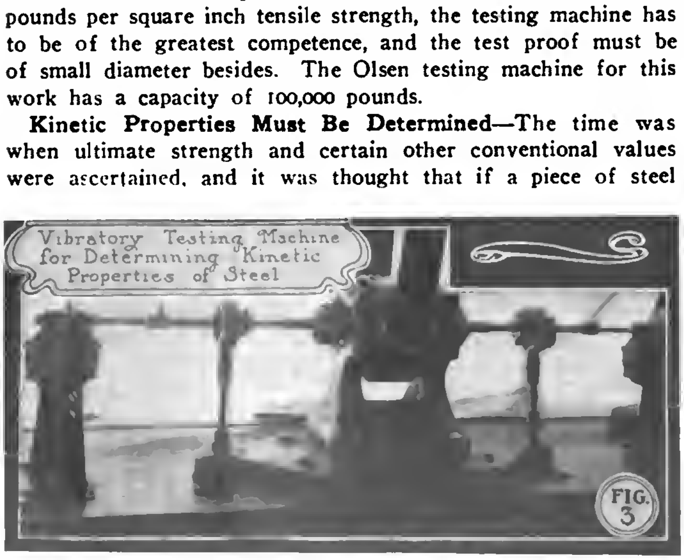
The chemist could not know, with any degree of certainty, whether or not a new mode of heat treatment would show positive advantages over a method in vogue were he not in touch with a physical laboratory in which to make and ascertain physical tests. Fig. 2 shows an Olsen testing machine used to determine the physical properties of materials, as ultimate strength, elastic limit, elongation between given limits, and reduction of area at the point of fracture. In these days, when steel for automobile parts frequently measures above 150,000 pounds per square inch tensile strength, the testing machine has to be of the greatest competence, and the test proof must be of small diameter besides. The Olsen testing machine for this work has a capacity of 100,000 pounds.

Kinetic Properties Must Be Determined—The time was when ultimate strength and certain other conventional values were ascertained, and it was thought that if a piece of steel were possessed of high attending elastic limit, elongation, and a good extension, that it would be suitable for any purpose. When automobiles came into vogue and the nature of the work was found to be of a character requiring more than static ability, kinetic life of steel was investigated at great length, and, among other facilities, the vibratory testing machine was devised. Fig. 3 shows just such a machine, built by the E. R. Thomas Motor Company for the purpose of testing all steel used, and it was naturally found that physical properties, even though they were very good, afford no guarantee of long life. After going into this phase of the material question at great length the Thomas company was enabled to eliminate all mysterious failures and reduce the factor of safety to definite values.

This testing machine rotates at a very high speed, and the materials to be tested are prepared, and, when adjusted into place in the machine, rotate under stress. The amount of stress is varied by altering the load, which is applied by means of weights, and the method of testing is such that the material may be stressed to any proportion of its elastic limit and subjected to alternate deflections, which are kept track of by means of a counter. The machine is very simple, free from errors, and it tells the vibratory value of the steel relative to a standard or in the abstract. The higher the stress in the steel undergoing test, the quicker it will fail, and the limits seem to stand between 400,000 and 1,600,000 vibrations when the steel is stressed to 65 per cent. of its elastic limit. Certainly, this is information well worth having, when account is taken of the performance of crankshafts, for illustration, in which it is impossible to assume with accuracy that a deflection is avoidable.

Bearings Demand Special Testing Equipment—When account is taken of the severe service rendered by bearings in automobiles, particularly since they are not always free from foreign substances, it is no wonder that the mind runs to ball and roller bearings, and if they are to be faithful to their work, some discrimination must be used besides relying upon catalogued information, which, in itself, may be quite accurate, but it may not properly apply. In every special case, in order to be sure of the results, it is necessary to test the ball bearings and find out if they will stand the class of service demanded of them. Fig. 4 is of a special ball-bearing testing machine built at the plant of the Thomas company to enable its engineers to cope properly with this problem, and with this machine the largest ball bearing used in any Thomas car may be tested under normal load to the end of its natural life; or it may be tested to destruction under predetermined conditions. Any type of bearing may be tested in this machine, and the loading, as well as the number of revolutions, may all be noted, either from time to time or at the end of the run.

Selections of Material for the Work—Different makers do not of necessity follow along the same lines, but there are certain market considerations which will be common to all, and in the selection of material, these influences must be taken into account. It is the function of the laboratory to tabulate the conditions, fix upon physical properties desired in view of chemical contents, and to so limit the specifications that the purchasing department will be able to procure what is wanted.



Vibratory Testing Machine for Determining Kinetic Properties of Steel

FIG. 3

promptly, and at a price consistent with the aims. In the Thomas plant the chemist has prepared specifications for the guidance of the several departments as follows:

PHYSICAL PROPERTIES OF STEELS

STEEL (Annealed State)	Elastic Limit	Ultimate Strength	Elongation	Reduction Area
N S No. 1	60,000	80,000 90,000	30%	65%
C S " 2	27,000	50,000	25%	60%
C S " 3	33,000	60,000 66,000	23%	50%
1550° F—Quenched in oil and drawn at 600°.				
N S No. 1	135,000	200,000	15%	50%
1500° F—Quenched in brine.				
N S No. 1	170,000 180,000	230,000 240,000	11-12%	40–45%
1450° F—Quenched in oil or water.				
C S No. 2	27,000 32,000	65,000	15%	40%
C S " 3	33,000 37,000	72,000	12%	35%

Note.—For shear or torsion use values 20% less than above; for compression use values given.

STANDARD HEAT TREATMENT

This is used by them for crank shafts, connecting rods and all nickel steel that is to be machined before use. After forging—anneal at 1450° F., cool in air, heat to 1500° F. and plunge in oil, draw at lowest point at which they will machine 950° F—1050°.

Gear Treatment—For parts where it is necessary to increase strength without increasing size, the following treatment can be used for 3½% nickel steel; it is, however, rather expensive.

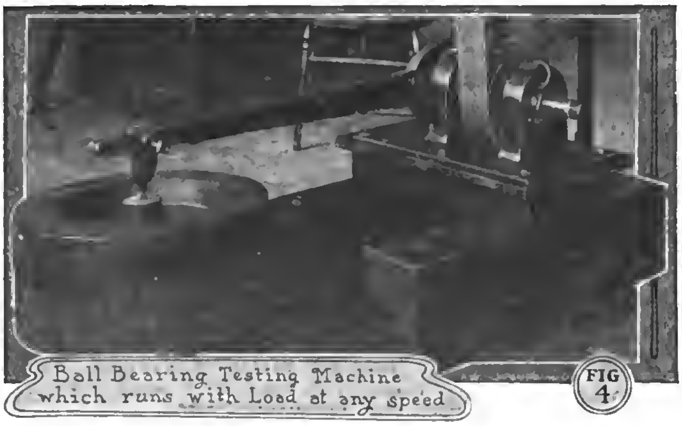
Pack harden at 1650° F., until carbon has penetrated a trifle over 1-64". Cool in pot until cold, reheat to 1500° F. very slowly. Plunge in Ca C/2 or Na Cl solution, 17° B., at 125° F. Reheat rapidly with very hot fire to lowest point at which steel will be hardened, which is 1325—1350° F.

In pack hardening use 40% new and 60% old bone. Bring up to heat for three hours and soak for three hours. As a rule the interior temperature of pots is about 50% below that of furnace even after prolonged soaking. It is a good idea to add charred scrap leather to bone bin from time to time. Take scrap leather and char in furnace.

Carbon penetrates 3½% nickel steel about 1-64" in two hours.

HEAT TREATMENT NOTES

T- 1 Transmission gears.
T- 2 Parts to be glass hard and no great strain.
T- 3 Bevel drive gears and pinions. Differential pinions.
T- 4 Small thin parts that are to be case-hardened.
T- 5 Any large work or local hardening.
T- 6 Propeller shafts and semi-floating type axle drive shaft or when bending and torsion is to be resisted.
T- 7 Same as T-8, is used only when carbon gets very high (0.28—0.32). When carbon is above these limits use T-6.
T- 8 Drive shaft of floating type axles and all places where pure torsion is to be resisted.


Ball Bearing Testing Machine which runs with Load at any speed — FIG 4

T- 9 Steering knuckles, steering arms, front and rear axles, spring chairs.
T-10 Same as T-9.
T-13 Cap screws, truss rods, Z bars. Don't use this treatment if composition of metal is not known, as it is dangerous.
T-14 Clutch drivers, steel clutch plates, etc.

Note.—Never quench semi-floating type axle drive shafts in brine.

NOTES ON MATERIAL

H. R.—Hot rolled. Steel as it comes from the rolls in the unannealed condition, runs —.005 and generally is oversized.

A.—Annealed. Hot rolled steel annealed.

C. D.—Cold drawn. Steel either cold rolled or cold drawn into bars, from 1" to 3". Round is correct to —.00025 less than 1" round comes with .00025.

Drill Rod.—Comes polished or unpolished (Lime finished); the unpolished is more accurate. If it is wished to harden the outside of drill rod, manufacturer should have specifications to that effect.

Drop Forgings.—Billets for drop forgings must be clean, free from seams, pickled and cleaned in order to avoid cracks and seams. Should be annealed thoroughly before machining is begun.

Keys.—Stock for keys should be oil or water-harden 0.80 carbon. Steel of a high grade. Harden in oil or water at 125° F.

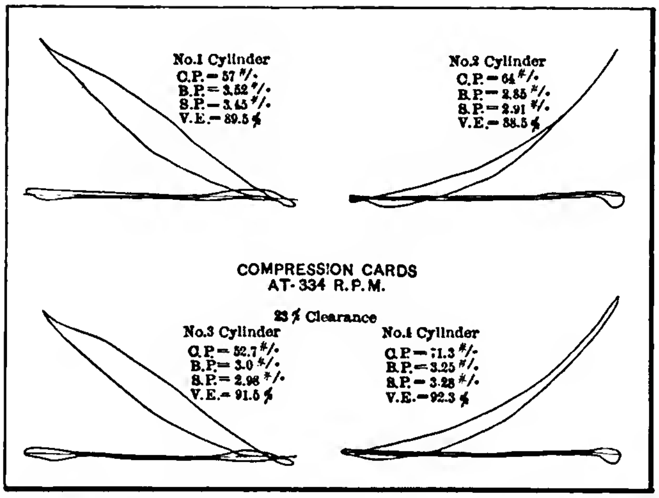
Aluminum No. 3.—Zinc over 14% in this makes it very brittle. Heat of pouring also affects the brittleness. High zinc gives metal with very good casting qualities.

Aluminum Alloy.—Should be specified not by number but by percentage of each metal required. Then buy each metal pure and mix.

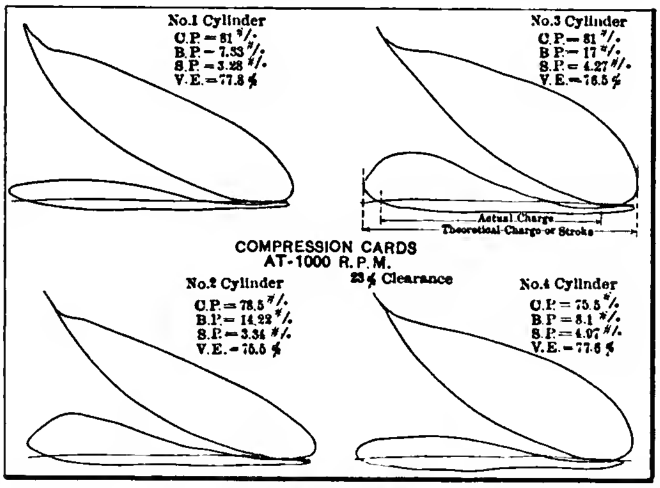
STANDARD SPECIFICATIONS—HEAT TREATMENTS

Treatments	Applies to Material	Symbols
Pack harden, allow to cool in pot, reheat to 1375° —2425° F. and quench in oil....	N S No. 1 C S No. 2....	T- 1
Pack harden, allow to cool in pot, reheat to 1375°–1425° F. and quench in water...	N S " 1 C S " 2....	T- 2

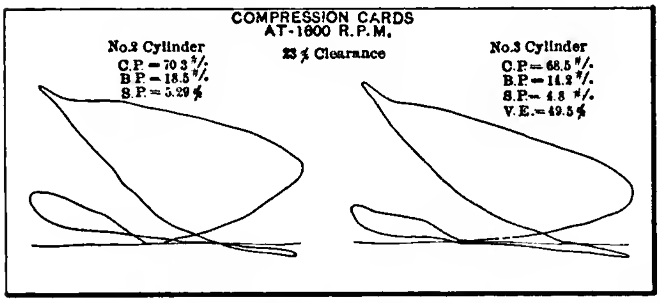

Thomas Chemical Laboratory fitted out to Determine Contents of Metals Used in Automobiles — FIG 5



Figs. 6, 7, 8 and 9—Compression cards taken at the very slow speed of 334 revolutions indicate clearly the performances of the four cylinders at that speed, this varying quite a little



Figs. 10, 11, 12 and 13—At the more nearly normal speed of 1,000 revolutions the increased back pressure is equally as noticeable as is the increased power, indicated by the large end of card



Figs. 14 and 15—With the speed increased to 1,600 revolutions per minute and slight changes in the carburetion, the ratio of useful work to back pressure is changed very materially

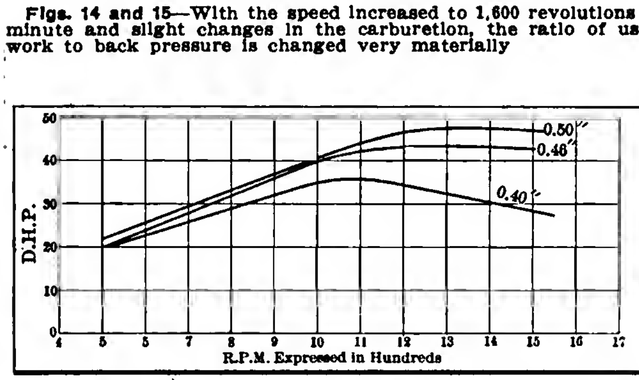


Fig. 16—Showing the wide differences in the power obtained with a proper and improper nozzle sizes in the carbureter. The shape of the upper curve shows elimination of "starvation" effects

Pack harden, allow to cool in pot, reheat to 1375°–1425° F. and quench in oil, draw at 375°–425° F.	N S No. 1	C S No. 2	T- 3
Cyanide, quench in oil	N S " 1	C S " 2 & 3	T- 4
Cyanide, quench in water	N S " 1	C S " 2 " 3	T- 5
Heat to 1575°–1625° F., quench in oil	N S " 1		T- 6
Heat to 1575°–1625° F., quench in water	N S " 1		T- 7
Heat to 1575°–1625° F., quench in brine	N S " 1		T- 8
Heat to 1475°–1525° F., quench in oil, draw at 475°–525° F.	N S " 1	C S No. 3	T- 9
Heat to 1475°–1575° F., quench in oil	N S " 1	C S " 3	T-10
All N S cap screws are to be heated to 1400°–1500° F., plunged in oil and drawn at 700°–800° F.	N S " 1	Cap screws	T-13
Pack harden, allow to cool in pot, reheat to 1375°–1425° F., quench in brine	N S " 1	C S No. 2	T-14
Heat to 1375°–1425° F., quench in oil at 60°–100° F., draw at 600°–650° F.	N S " 1	Tubing after brazing	T-15
Heat to 1400°–1450° F. for 1 hour, cool in ashes or lime	N S " 1	Electric welding	T-16
Heat to 1350°–1400° F. for 1 hour, cool in ashes or lime	C S " 3	Electric welding	T-17

STANDARD SPECIFICATIONS—MATERIALS

N S No. 1—3½% Nickel steel.

Carbon	.18% to .28%
Sulphur	.04% or less
Phosphorus	.04% " "
Manganese	.60% to 1.00%
Nickel	3.00% " 3.75%

Copper must be less than .25%

C S No. 2—Open hearth steel for case hardening and general use.

Carbon	.14% to .24%
Sulphur	.05% or less
Phosphorus	.05% " "
Manganese	.50% to 1.00%

C S No. 3—Open hearth steel that is not case hardened and required to be tough and stiff.

Carbon	.24% to .35%
Sulphur	.05% or less
Phosphorus	.05% " "
Manganese	.50% to 1.00%

M B No. 5—Manganese Bronze—"Parsons."

Copper	56.36%
Zinc	39.79%
Tin	.99%
Iron	.24%
Aluminum	.52%
Manganese	.40%

P B No. 7—Phosphor Bronze for bearings and general use.

Copper	88.60%
Tin	10.00%
Lead	1.00%
Phosphorus	.40%

G B No. 8—Gear Bronze.

Copper	88.00%
Tin	10.00%
Zinc	2.00%

R B No. 9—Red Brass.

Copper	80.00%
Zinc	15.00%
Tin	4.00%
Lead	1.00%

Al No. 12—Aluminum alloy for general use.

Aluminum	92.00%
Copper	7.00%
Zinc	1.00%

STANDARD SPECIFICATIONS—DIMENSIONS, ETC.

Materials in General—Thickness x Width x Length	3-16" x 1" x 2¼"
Bar Stock—Hex.-Sq. Rd., etc., x Length	5-8" Hex. x 1½"
Bearing—No. Bearing—Type	No. 204—Annular Silent
Bolt—**Cap Screw**—**Set Screw**—Diameter; Threads x Length—Head	⅜"—16 x 2"
Cotter Pin—Diameter x Length	⅛" x 1¼"
Gasket—Inside Diameter x Outside Diameter x Thickness	½" ID x ¾" OD x 1-16"
Gear—Pitch—Teeth—Stock or Drop Forging	10 P., 30 T., 1¼" Rd. x 3"
Grease Cup—Name and Number—Pipe Threads	No. 700 Empress—¼" pipe thread
Hose—Inside Diameter x Length	1½" ID x 3¼"
Nut—Diameter—Threads x Thickness	⅜"—16 x 17-64"
Oiler—Name and Number—Size—Threads	No. 20, Jewel—¼"—20
Rivet—Size x Length—Head	⅜" x 1½"—Rd. Hd.
Screw: Machine—Gauge—Threads x Length—Head	14—24 x ¾"—F. Hd.
Wood—Gauge x Length—Head	14 G x ¾"—F. Hd.
Spring: Elliptical—Width x Length, Center to Center of Eye	2" x 56"
Spiral—Inside Diameter or Outside Diameter x Length under given pressure	¾" OD x 1½" under 10"
Stud—Diameter—Threads x Length	5-16"—18 x 2"
Tubing—Outside Diameter x Wall x Length	1" OD x .065 wall x 3"
Washer: Lock—Size x Thickness	⅜" x .065
Plain—Size x Thickness	⅜" x .065
Special—Inside Diameter x Outside Diameter x Thickness	5/32" ID x 3/4" OD x 1-16"
Wire—Diameter x Length	.065 Diam. x 26"

STANDARD SPECIFICATIONS—GENERAL NOTES

Cap Screws, Studs and Nuts—These are to be of C S No. 3 or A. L. A. M. standard screw stock, preferably the latter, except where N S No. 1 is specified.

Crank Shafts—In general the material specified will be N S No. 1, but the final choice of material and also its treatment is to be left to the Drop Forge people.

Tubing—Unless otherwise specified all tubing is to be cold drawn and is to be medium anneal or temper.

Gauges—Unless otherwise specified, where material is commercially gauged decimal equivalent only will be given, gauge and name of gauge being omitted.

Bar Steel—This material comes from the mills in one of three different conditions, which conditions will be specified as follows;
H R—Hot Rolled—Bar steel as it comes from the rolls in the unannealed condition. Runs +.005 and is usually oversize.
A—Annealed—Hot rolled bar steel annealed
C D—Cold Drawn—Hot rolled bar steel annealed and cold rolled or drawn to size. 1" to 3" round, runs +.0005, less than 1" runs +.00025.
Drill Rod—Comes from mills either polished or unpolished, the latter being the more accurate.
Drop Forgings—Billets for drop forgings must be free from seams, pickled, cleaned and inspected before use. Forgings must be thoroughly annealed before machining.
Key Stock—Stock for special keys should be high grade .80% carbon steel. Hardening to be done in oil or water at 125° F.

After Material Comes the Finished Product—When the material is being worked up in the shop, it is necessary to do more than place reliance upon the supervising influence of the laboratory over the purchasing department. In the working up of the material into parts, each operation is inspected, and, if the workman makes no mistake in dimensioning, the material is given a critical examination to assure that no flaws were uncovered. This may look like too much of a good thing, but it reduces the size of the repair shop to insignificance, and enables the company is build more cars.

Upon the completion of the respective units, they have to be tested to ascertain how nearly they come to the mark set for them in the designing department, or to be able to determine what the remedy will be if the units have to be adjusted. For motor testing the electrodynamometer, as depicted in the first page illustration, is used, and, as the test progresses, the experts dispose themselves around the machine as follows:

(A) Observing the pull in pounds on the scales, which indicates the torque of the motor.
(B) With a phenendoscope strapped on the head listening for indications of mechanical imperfections, as noise or any undue interference.
(C) Manograph placed, and ready to take cards as soon as the motor is tuned up.
(D) Weighing out fuel with a set of scales on which the tank rests; taking specific gravity, as the occasion requires.
(E) Observing temperature of the water used in cooling. The amount of cooling water being measured, this enables the expert to determine the efficiency of the radiator and to tell if the motor is delivering an undue amount of heat units to the cooling water, which would be an indication of bad timing or mixture, assuming that the surface swept by flame is not in excess.
(F) The expert "B" has under observation a thermometer showing the temperature of the exhaust, and in this way a further check is held on the mixture and the timing.

The electric motor is cradled in such way that the "field" (frame) would rotate were the scales to be disconnected, and the torque of the motor is represented by the amount of the tendency of the field to rotate. The whole system is so calibrated that the horsepower can be determined for any motor tested, within the limits of the dynamometer, and the error is probably less than one percent.

The manograph cards herewith shown are offered as specimens of the work, and attention is called to the clearness with which they indicate:

(A) Compression pressure (C.P.)
(B) Back pressure (B.P.)
(C) Suction pressure (S.P.)
(D) Volumetric efficiency (V.E.)

With this class of information at hand, it is possible to investigate every cause of a loss, and, insofar as it is possible to do so, eliminate the same. The old way was to ignore back pressure, since it could be charged up to the muffler, whereas, with an equipment such as this, it is a relatively simple task to investigate the muffler and remove much of the back pressure. This is equal to adding power to the motor and reducing the weight of the power plant per horsepower; in other words, increase the weight efficiency of the power plant. The curve, Fig.

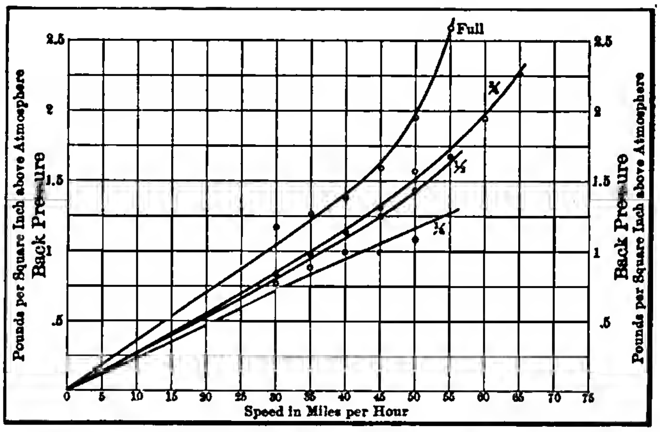


Fig. 17—Evils of back pressure are readily detected and when plotted in one specific case were seen to increase more rapidly than did the speed of the car, even when that was as high as 65 miles

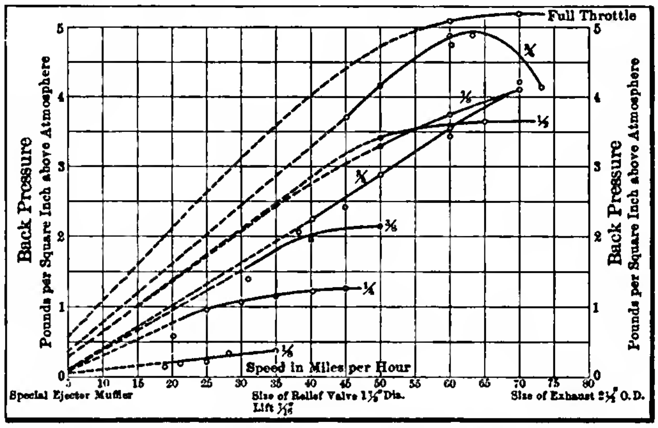


Fig. 18—Substitution of a muffler of improved and more scientific form soon eliminated the back pressure evil, at least in so far as its increase relative to the speed was concerned

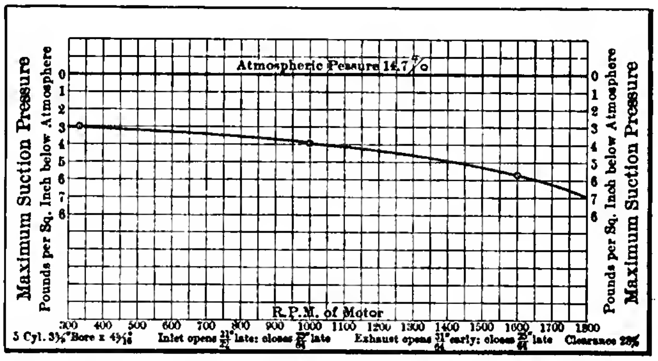


Fig. 19—Within the carbureter, back pressure or at least wire drawing made its appearance as is evidenced by the drop in the suction pressure with increased engine speed, up to 1,800 revs.

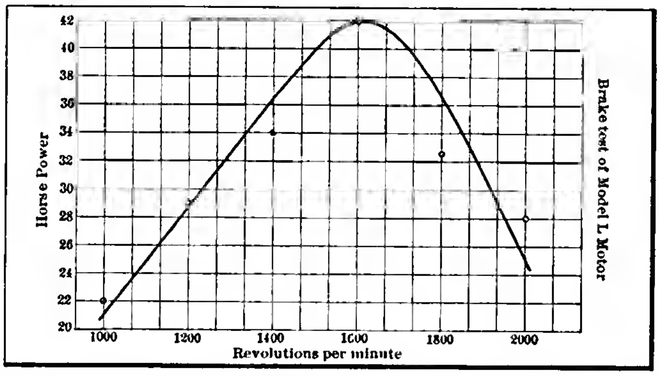


Fig. 20—Power curve of motor for which the previous indicator curves have predicted just this result, maximum power at 1,600 revolutions with a sharp rise to that point and a sharp drop beyond

20, for illustration, tells of a motor that is deficient, since the power falls off as the speed increases, after 1,600 revolutions per minute. The question is, what is the cause?

Back Pressure Due to a Defective Muffler—With a testing equipment of the character under discussion, in the hands of experts, it is possible to ascertain the cause, since the back pressure from the muffler may be determined; and Fig. 17 depicts just such a case. By inspecting the curve it will be found that the back pressure, under "full' conditions, increases more rapidly than the speed. By substituting a special form of "ejector muffler" the curve Fig. 18 resulted, in which the performance is quite different, and the power of the motor, under such conditions, would not fall off as the speed increases as a result of "piling up" of muffler pressure. The back pressure curve slopes downward at the higher range of speed, which is usually the point of greatest trouble and the one which is most difficult to cure.

Other Sources of Back Pressure Cured—It is not alone in the muffler that counter pressures will be generated; if the manifold and the piping are not ample in area, or if there are too many bends, or other eddy creating conditions, it is only by the use of proper testing equipment that there is any chance of eliminating the trouble. As an illustration of good in a rather unexpected direction, reference will be made to lowered suction pressure due to carbureter restriction, indicating excess depression. Fig. 19 shows the results of a carbureter test. In this, the suction pressure gradually increases from a minimum of three to a maximum of seven pounds per square inch, during speed changes from 300 to 1,800 revolutions per minute, thus showing a very large loss of power due solely to this cause.

Beyond back pressure, the set of curves covering practically the whole useful speed range, show as clearly as does the power curve itself the ratio of power to speed. Thus at the slowest speed of 334 revolutions, the back pressure is practically negligible; but so, too, is the power developed. With the increase in speed to 1,000, the useful end of the curve has increased, but so has the useless end, the apparent size of the two being ground for the prediction that at short speed interval further will find the turning point or peak of the power curve. This the power curve, Fig. 20, shows to be the exact state of affairs. Moreover, it shows that these cards mark to high point of the power, further increments of speed not resulting in equal increases in power. This is a condition for expert examination and preparatory to that a study of the back pressure curves, Fig. 17, will give the intelligent tester some sort of a cue to the source of trouble. The following figures show how this was remedied in one case and the immediately apparent benefits from the change.

This does not indicate that the carbureter is inferior so much as it shows that the motor demands a somewhat different set of proportions of the carbureter, and the point to be made is, that the laboratory affords a means for determining just this condition. By continuing the experiments the power obtained in the model M Thomas motor increased by gradual increment from the lowest point, which was fitted with a carburetter nozzle .040 inches in diameter, up through very noticeable increments, until the power obtained considerably exceeds the A.L.A.M. rating for a motor of this size. Fig. 16 shows the effect of changing the diameter of the nozzle alone, in a given carbureter, and the difference between the curve realized with a .040 and a .050-inch nozzle is very great indeed. The droop, which, in this instance, denoted fuel starvation, was eliminated. With the droop thus disposed of, all that remained was to correct the remaining tendencies, as excess depression, etc., and the power which ought to be available from a motor of this size was at once obtained.

In conclusion, it may not be out of place to state that the illustrations of the utility of a laboratory are but a few of the many available, and that the product of a shop can only be brought to a high state of perfection under the guidance of men who look to instruments of precision for results.

AUTOMOBILES GROW MORE LUXURIOUS

The automobile industry is a lusty infant which is nearing the strength and the buoyancy of the growing boy. Never has the present of the great industry looked as bright as now, and never has the future looked brighter.

Edwin L. Thomas

The day of the ideal automobile is here. Detail improvements will always be made, but the motor car of the present realizes the inventor's dream of the years gone by. It is dependable, and it is strong, and it is always obedient to the driver's will.

The latest efforts have been to make the motor do its work noiselessly, and to make the car as a whole smooth and quiet in operation.

Reserve power still appeals to the man with red blood in his veins, and the ability to climb hills without labor is appreciated by everyone.

Automobiles grow slightly more luxurious year by year. Cushions are made more comfortable, and the little details of design are worked out to greater perfection.

And, then, in the near future, is the vast field of business vehicle service, in which, as yet, only the taxicab has been really developed.

Regarding the entire automobile business, present and future, we are optimists.

Vice-President and General Manager
E. R. Thomas Motor Co.

THE ENGINEERING LABORATORY

Engineering departments have for their aim the production of an automobile that will stand above all others in popular esteem.

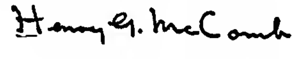
In a car of quality the American public demands grace of design and beauty of finish, silence of mechanism, and abundant power. It goes without saying that the car must be durable and sturdy, and that, in detail construction, it must represent, unit by unit, the most advanced automobile design.

Henry G. McComb

To safeguard the purchaser in every possible way an engineering laboratory was established a year ago. In this laboratory possibly the most valuable work done is the dynamometer testing of engines. This testing shows, for example, which one of a number of carbureters will give the most power, the best regulation, and the highest gasoline economy. It shows, with figures that cannot lie, the difference between a correct valve-setting and an incorrect one, and a dozen other differences between right and wrong.

In a recent test it was shown that the maximum horsepower of the motor could be increased 7.7 per cent. by a change of magneto setting, and that cutting out the muffler resulted in a 16.2 per cent. increase in power.

The aim, then, of the engineering laboratory is to test dispassionately and to decide logically. The "personal element" is more nearly eliminated. The result counts.



Chief Engineer E. R. Thomas Motor Company.

Aftermath of the Lowell Cup Race

Robertson (Simplex) Finishing a Winner in the National Stock Chassis 318-Mile Race for the Lowell Trophy

LOWELL, MASS., Sept. 11—The show is over; the tent is down; and the performers have shaken Lowell's dust from their feet. The affair was extraordinarily successful, with the automobile, of course, occuying the center of the stage.

From the all-around hustling abilities of one John O. Heinze came results gratifying to Lowell's pride and remunerative to some of its citizens, for plenteous visitors attended the diversified week of sport.

The absence of President Taft was a keen disappointment, though there was some reason in his failure to occupy the special box provided for his portly frame. Recently there has been much in print not exactly favorable to automobile competition, whereupon the President of these United States may have considered the Lowell meet one which he could afford to miss.

But the sport concluded without any real serious accident, though the unfortunate fatality that inaugurated the practice trials left a feeling of apprehension which was not entirely dissipated until the big car race had come to its conclusion.

As was prophesied by those who are supposed to know, the average speed of the winner in the big car race was lower than that made Monday by the smaller cars in Class 2. Robertson in the Simplex, who took the premier position in Wednesday's race, averaged 54.2 m. p. h., while Burman's Buick averaged 55.5 m. p. h. This, however, was not all, for Lorimer's Chalmers-Detroit, driven by Lorimer, made the first seventeen laps, 180.2 miles, Monday, in 182:24, as against Robertson's 187:55 for the same distance. This was a remarkable run, considering that the faster time was made by a 40-horsepower car, while the latter was accomplished by a 60-horsepower.

Only the first two cars averaged over fifty miles an hour. The winner covered the distance of 312 miles in 352:01 2-5, while Poole and the Isotta gained second place in 373:37 1-5 minutes, 21:35 3-5 behind, at a rate of 51.1 miles per hour.

Only five cars finished, these being, besides the above two, the Fiat, driven by Parker; Buick, guided by Burman, and the Renault, handled by Basle. Two of the Knoxes, driven by Shaw and Downey, as well as the Lozier and American, driven by Cobe and Drach, respectively, were still running when the race was called off, but were three or four laps behind the leaders.

Harry Grant, driving the Alco, certainly deserved the highest praise for the wonderful performance which he put up driving the major portion of the race. From the sixth lap to the ninth he was in third place; from the tenth to the twenty-sixth in the second, scarcely five minutes behind the Simplex. In the twenty-seventh he took first place with a lead of 3:34 over the Simplex. As he had already taken on gasoline and oil, apparently he had every chance to win. However, fate was against him, for while on the backstretch he broke one of his chains. Not being permitted to carry an extra one, he was out of the race, as a new one could not be procured soon enough to insure his getting even a position. Universal regret was expressed by those who had watched his plucky and successful fight for first place.

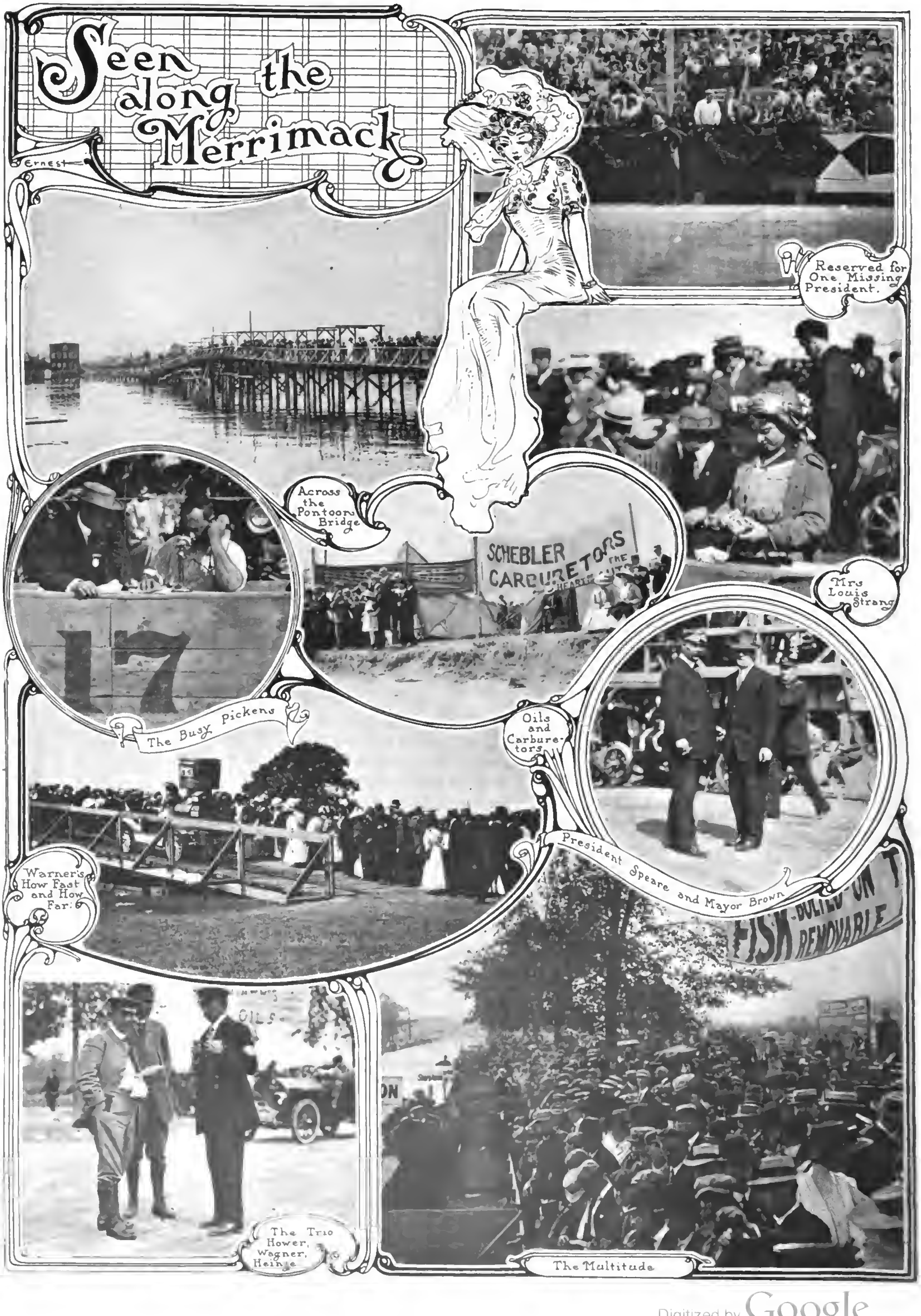
The winning Simplex was protested, Mr. Hollander of the Fiat company basing his objection to the fact that the car carried a couple of oil pipes to the back driving chains, and used two gasoline feed-pipes from the tank to the carbureter. The Simplex company, previous to the race, made affidavit that it had twenty-five cars of this model, fitted in like manner.

The protest meant that the technical trio, Beecroft, Edwards, and McMurtry, had to pay a visit to the Simplex factory in New York City. Its report is now in the hands of the contest board of the A. A. A.

Stock chassis racing, in order to make it positively such, is replete with difficulties requiring the exercise of some discretion by those entrusted with the carrying out of the rules—especially such rules as were experimentally drafted for the present season, but which will suffer considerable revision for next year.

It seems to be the general opinion that, instead of the old rule, which required only twenty-five cars of a particular model, in order to designate them as "stock," there must be a regulation which refers to a per cent. of the entire output of the factory. Otherwise a big concern without much difficulty can easily construct twenty-five cars of a semi-racing type, in order to obtain

Seen along the Merrimack



SUMMARY TOTAL AND ELAPSED TIMES OF CONTESTANTS IN NATIONAL STOCK CHASSIS RACE FOR LOWELL CUP, LOWELL, MASS., SEPT., 8, 1909

No.	Car and Driver	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
12	Simplex	10:53	21:32	32:14	42:58	53:34	64 30	75 33	86 35	97 35	108:36	119:38	130:56	142:10	153:26	164:51
	Robertson	10:53	10:29	10:42	10:44	10:36	10:56	10:50	11:02	11:00	11:01	11:02	11:18	11:14	11:16	11:25
6	Isotta	11:47	23:20	34:44	45:56	56:50	67:44	78:55	90:99	101:26	113:11	124:19	136:02	149:14	171:57	184:56
	Poole	11:47	11:33	11:24	11:12	10:54	10:54	11:11	11:14	11:17	11:45	11:08	11:43	13:12	22:43	12:59
7	Fiat	11:33	23:04	34:25	45:38	56:52	68:03	79:18	90:29	101:42	112:58	124:22	135:46	175:56	187:47	199:39
	Parker	11:33	11:26	11:21	11:13	11:14	12 11	11:15	11:11	11:13	11:16	11:24	11:24	40:10	11:51	11:52
4	Buick	11:05	21:55	32:38	43:38	54:34	72:38	85:38	99:58	119:46	137:10	148:11	159:24	170:34	181:44	192:49
	Burman	11:05	10:50	10:43	11:00	10:56	18:04	13:00	14:20	19:48	17:23	11:01	11:13	11:10	11:10	11:05
20	Renault	12:03	23:57	35:57	47:55	59:52	71:52	83:46	100:02	113:38	125:33	141:31	155:22	170:08	182:20	194:33
	Basle	12:03	11:54	12:00	11:58	11:57	12:00	11:22	16:16	13:31	12:00	15:58	13:51	14:46	12:12	12:13
11	Fiat	11:01	22:16	33:18	48:29	61:39	72:51	83:50	94:42	107:23	118:48	131:15	142:18	153:00	164:28	175:45
	De Palma	11:01	11:15	11:02	15:11	13:10	11:12	10:59	10:28	12:41	11:25	12:37	11:03	10:42	11:28	11:17
10	Knox	12:34	24:18	36:15	47:01	58:47	80:23	92:02	103:46	115:17	139:12	158:09	171:51	184:23	196:51	209:10
	Shaw	12:34	11:34	11:57	10:46	11:46	21:36	11:39	11:44	11:31	23:55	18:57	13:42	12:32	12:28	12:19
5	Alco	10:53	22:06	32:56	43:49	54:47	65:46	76:42	87:38	98:40	109:48	122:45	133:49	144:59	158:01	171:24
	Grant	10:53	11:13	10:50	10:43	10:58	11:59	10:56	10:56	11:02	11:08	11:57	11:04	11:10	13:02	13:23
14	Knox	12:23	24:36	37:13	53:50	76:52	94:51	109:04	127:41	139:33	156:20	190:01	202:06	214:43	227:05	239:38
	Downey	12:23	12:13	12:37	14:37	23:02	17:59	14:13	18:37	11:52	16:47	33:41	12:05	12:37	12:22	12:33
18	Lozier	11:36	23:13	35:04	46:47	58:40	70:42	110:27	125:42	149:10	174:48	187:41	200:56	213:53	227:47	247:38
	Cobe	11:36	12:23	11:51	11:43	11:53	11:52	39:45	14:15	23:28	25:38	12:53	13:15	12:57	13:54	19:51
2	American	10:47	56:44	68:57	81:21	93:29	105:38	118:03	130:25	142:42	154:45	168:33	180:43	193:52	215:09	227:38
	Drach	10:47	45:57	12:13	12:24	12:08	12:09	12:25	12:22	12:17	12:03	12:48	12:10	13:09	11:17	12:29
3	A-K	11:39	23:10	35:13	49:44	61:46	74:04	85:46	97:42	143:35	172:37	185:09	197:25	209:50	222:10	234:22
	Hughes	11:39	11:31	12:03	14:31	12:02	12:18	11:42	11:56	45:53	29:02	12:22	12:16	12:25	12:20	12:12
1	Buick	56:23	69:33	80:51	92:01	103:17	114:36	127:50	139:02	150:20	162:17	196:16	207:35	247:03	Radiator troubles caused by colliding before race.	
	Strang	56:23	13:10	11:10	11:16	11:16	11:19	13:14	11:12	11:18	11:57	33:54	11:19	31:28		
16	Apperson	10:57	21:50	32:31	43:12	53:56	64:44	75:41	86:26	97:06	110:26	Broke Camshaft				
	Lytle	10:57	10:33	10:41	10:41	10:44	10:22	10:57	10:45	10:39	13:21					
15	Stoddard	12:15	24:22	36:00	47:29	58:57	70:32	81:55	93:20	104:52	116:30	Broke Steering Knuckle				
	Shaw	12:15	12:09	11:38	11:29	11:28	11:35	11:23	11:45	11:32	11:38					
8	Knox	11:30	22:41	33:58	45:16	56:49	75:45	Broke Steering Knuckle.								
	Belcher	11:30	11:11	11:17	11:08	11:33	18:56									
17	Buick	10:41	21:14	35:17	Broken Frame.											
	Chevrolet	10:41	10:33	14:04												

No.	Car and Driver	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
12	Simplex	176:19	187:55	199:36	211:15	223:05	241:18	252:33	264:02	275:25	286:37	297:58	313:22	324:48	340:09	352:01
	Robertson	11:28	11:36	11:41	11:39	11:44	18:09	11:15	11:29	11:22	11:12	11:21	15:24	11:26	15:21	11:52
6	Isotta	197:00	209:13	221:13	233:09	244:40	256:32	268:12	284:05	296:03	308:07	325:08	337:25	349:34	361:44	373:37
	Poole	12:04	12:13	12:00	11:56	11:31	11:52	11:40	13:53	11:58	12:05	17:01	12:17	12:09	12:10	11:53
7	Fiat	211:41	223:45	235:50	249:51	262:05	274:13	286:18	298:85	310:31	322:32	334:33	346:30	358:09	368:29	382:21
	Parker	12:02	12:04	12:05	14:01	12:14	12:08	11:05	12:07	12:06	12:01	12:01	11:57	11:39	10:20	13:52
4	Buick	203:55	215:16	227:38	238:58	250:32	262:02	273:25	284:39	305:50	317:21	330:22	351:08	362:44	374:12	385:44
	Burman	11:06	12:05	12:22	11:20	11:34	11:30	11:23	11:14	21:11	11:31	13:01	20:46	11:36	11:28	11:32
20	Renault	210:16	224:03	236:14	248:26	260:38	279:01	292:52	305:26	322:08	335:42	348:00	360:17	372:32	384:43	396:47
	Basle	15:43	13:47	12:11	12:12	12:12	18:23	13:51	12:34	16:44	13:34	12:18	12:17	12:13	12:11	12:04
11	Fiat	186:40	197:35	208:46	219:51	231:11	244:27	255:43	266:59	283:27	296:18	307:28	318:45	332:13	354:26	Engine trouble
	De Palma	10:55	10:35	11:11	11:05	11:20	13:16	11:16	11:16	16:28	12:51	11:10	11:17	13:28	22:13	
10	Knox	227:50	240:33	253:09	265:30	277:59	290:45	308:54	317:02	342:47	355:10	368:12	381:17	395:50	Running at finish	
	Shaw	18:40	12:43	12:26	12:21	12:29	12:56	17:09	13:08	25:45	12:33	12:52	13:05	14:33		
5	Alco	182:47	194:01	205:20	219:48	231:01	242:19	253:28	264:54	276:12	287:32	298:45	309:58	Broke Driving Chain		
	Grant	11:23	11:14	11:19	14:28	11:13	11:18	11:09	11:26	11:18	11:20	11:13	11:13			
14	Knox	252:22	265:01	277:37	290:09	303:18	326:21	338:00	349:53	361:55	374:24	387:05	400:02	Running at finish		
	Downey	12:44	12:39	12:36	12:32	13:09	23:03	11:39	11:53	12:02	12:29	12:41	12:59			
18	Lozier	260:37	273:25	286:04	298:43	311:21	324:16	338:45	351:01	367:35	379:52	392:16	Running at finisn			
	Cobe	12:59	12:48	12:39	12:39	12:38	12:38	14:29	12:16	16:34	12:17	12:24				
2	American	241:09	253:48	267:50	291:44	316:21	332:34	345:42	356:06	373:42	387:25	407:56	Running at finish			
	Drach	13:21	12:39	14:02	13:54	24:38	16:13	13:08	10:24	17:36	13:43	20:31				
3	A-K	246:34	265:13	Injured rear axle												
	Hughes	12:12	12:39													

AVERAGE SPEEDS OF CARS AT LOWELL

CLASS 1—LOWELL TROPHY

12	Simplex	Robertson	54.2 m.p.h.
6	Isotta	Poole	51.1 m.p.h.
7	Fiat	Parker	49.8 m.p.h.
4	Buick	Burman	19.5 m.p.h.
20	Renault	Basle	48.1 m.p.h.

CLASS 2—VESPER TROPHY

J.	Buick	Burman	55.5 m.p.h.
E.	Benz	Stoecker	52.5 m.p.h.
H.	Chalmers	Dingley	52.2 m.p.h.
A.	Chalmers (for 180 miles)		59.5 m.p.h.

CLASS 3—YORICK TROPHY

31	Buick	Chevrolet	54.2 m.p.h.
33	Buick	Harroun	48.8 m.p.h.

CLASS 4—MERRIMACK TROPHY

42	Chalmers	Knipper	51.5 m.p.h.
44	Maxwell	See	47.7 m.p.h.
45	Maxwell	Costello	46.5 m.p.h.

POSITIONS OF CARS ON EACH LAP OF LOWELL RACE

No.	Car	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
12	Simplex	4	2	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
6	Isotta	12	11	8	7	6	4	4	4	4	5	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	2
7	Fiat	9	8	7	6	7	5	5	5	5	4	4	3	7	7	7	6	6	7	7	7	6	6	6	6	6	6	5	4	4	3
4	Buick	7	4	3	3	3	9	9	9	10	9	7	7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	5	5	4
20	Renault	13	12	12	11	11	8	7	10	8	8	6	6	6	6	6	7	7	6	6	6	7	7	7	7	7	7	7	6	6	5
10	Knox	16	13	14	9	9	13	11	11	9	10	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	Running	
14	Knox	15	15	15	14	14	14	12	13	11	12	12	12	12	11	11	10	10	9	9	9	9	9	9	9	9	9	9	Running		
18	Lozier	10	10	10	8	8	7	13	12	14	14	11	11	11	12	12	12	12	11	11	10	10	10	10	10	10	10	Running			
2	American	2	16	16	15	15	15	14	14	12	11	9	9	9	9	9	9	9	10	10	11	11	11	11	11	11	11	Running			
11	Fiat	6	6	5	12	12	10	8	7	7	7	5	5	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	Out
5	Alco	3	5	4	4	4	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	Out		
3	Allen-Kingston	11	9	9	13	13	11	10	8	13	13	10	10	10	10	10	11	11	Out												
1	Buick	17	17	17	16	16	16	15	15	15	15	13	13	13	Out																
16	Apperson	5	3	2	2	2	2	2	1	1	3	Out																			
15	‘toddard-Dayton	14	14	12	10	10	6	6	6	6	6	Out																			
	‒‒x	8	7	6	5	12	Out																								
	ılck	1	1	11	Out																										

Poole (Isotta) Negotiating "Dip" Which Was Considered Difficult

cars, which, in all fairness, do not belong in the stock category, and which would not be sold to the general public as such.

In the matter of drivers it is a fact that those manufacturers who entrust their racing craft to somewhat inexperienced men from the testing department do not figure very often in the list of winners. A man may be a most capable tester and still lack the essentials which go to make up a skilful racing driver. And skill only comes with practice; but the human material in the first instance must be of the sort which takes to competition as naturally as a duck does to water. Drivers are more frequently born than made, and many makers are discovering such to be the case.

Then, again, there is the driver who, having won a victory or two under most favorable conditions, begins to think himself the peer of all others. It does not take long to burst his bubble reputation, and he soon falls back among the "also rans."

Lowell is quite well satisfied with its automobile racing, and even now it hankers for something of the big sort again next year. The Lowell Automobile Club intends to seek something of a national character in 1910, and with Heinze at the helm the chances are not rated below par. This man obtained a special legislative act to permit automobile racing in Massachusetts.

Grant (Alco) in Full Flight Over a Perfect Stretch of Roadway

RANGERS' PROGRESS

Ogden, Utah, Sept. 13—This city was reached last Sunday night by the military trio carrying dispatches from Major-General Leonard Wood, of New York, to Major-General John F. Weston, of San Francisco, in the Mitchell Ranger. The party experienced road conditions which would be considered impossible in any civilized country, and they were frequently forced to obtain the permission of the Union Pacific authorities to use the railroad bridges, as all others had been swept away by washouts and swollen rivers.

Private M. E. Parrott, Tenth Regiment New York National Guard, who is in charge of the dispatches, Lieut. R. D. Rosenthal, a veteran of the Spanish War, and driver Frank X. Zirbes have condensed more novel experiences in that part of their run between Iowa and Ogden than even the New York-Paris racers encountered. All are in good health, and after rounding the corner of the Great Salt Lake look for a speedy and uneventful dash across the desert land of Nevada to Reno. From the latter place the route lies through Truckee and Colfax, and thence by a speedy schedule through Sacramento to Oakland. The goal of the first across-the-country automobile war dispatch expedition will be the Presidio, San Francisco.

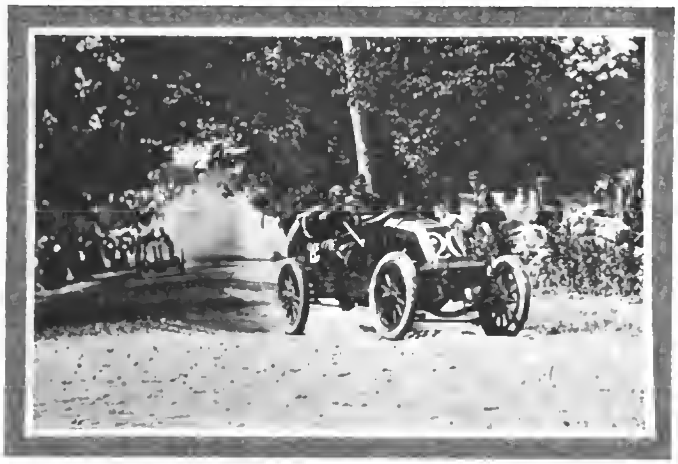
Knox Passing Over Disintegrated Backstretch

When asked after the race what he thought of the course, Robertson's reply was surprising, for the Merrimack Valley course was supposed to be ideal. "The Varnum avenue side was in good shape," said the driver, "but the backstretch was the hardest, roughest race course that I have ever driven on. Prior to the light car race it was fairly smooth, but the big cars tore up the road frightfully, and it was rough going."

GOOD ROADS TALKFEST

Herb Lytle's Apperson Which Made a Meteoric Run in the Race

Cleveland, Sept. 15—The vanguard of delegates and officers of tbe American Automobile Association are reaching Cleveland to complete arrangements for the Second Annual National Good Roads Convention which will open in this city next Tuesday afternoon. Chairman George C. Diehl of the National Convention committee and Secretary Frederick H. Elliott are already here. The official headquarters of the committee, representing the A. A. A., the National Grange, U. S. Office of Public Roads, the American Road Makers' Association, and the different automobile associations and other bodies assisting in the convention, will be at the Cleveland Automobile Club, where tbe guests, highway officials, and delegates may be assured of a hearty welcome upon tbeir arrival. As a pleasant change from the practical and more serious



Basle (Renault) Took the Turns Very Comfortably

elements of the Good Roads Convention the entertainment committee, whose members are chiefly drawn from the Cleveland Automobile Club, has made ample preparations for the social enjoyment of the delegates and guests who will be in the city during the convention days, Sept. 21 to 23. The steamer *City of Detroit* has been chartered for the use of tbe delegates and a special trip will be announced for one of the afternoons. Thursday evening a theatrical performance has been arranged which will be conducted by the members of the Hermit Club.

While the Governors of practically every State in the Union have made favorable replies to the requests that delegates be named to represent their States at the convention, no letter has exceeded in its expressions of appreciation of the good roads movement that of Governor Joseph M. Brown of Georgia. No less than fifty-four delegates have been named by Governor Brown to represent his State. Governor Brown in his letter to the officers of the A. A. A. naming the delegates says: "The improvement of the public highways being the demand of progress and necessary to that commercial and civic intercourse which makes for a quickening of patriotic endeavor, conventions that are called for the purpose of such advancement should receive executive approval."

Among the delegates, many of whom will be recognized as acknowledged good roads advocates, are: Congressman Clark Howell; Frank C. Battey, president of the Savannah Automobile Club; Asa G. Candler, president of the Atlanta Automobile Association; Prof. C. Strahan, Hon. W. F. Holdman, Hon. F. L. Seely, Hon. Wiley Williams, Gen. Clifford L. Anderson, and E. H. Inman.

OHIO FARMERS SEE HOW TO MAKE ROADS

Columbus, O., Sept. 13—The cause of good roads in tbis section of the State was given a lasting impetus by the practical demonstrations and discussions at the good roads day, held in conjunction with the State fair lately. Hundreds of automobilists and farmers participated in the exercises. One of the features was the construction of two stretches of road to illustrate the proper methods of up-to-date highway building.

American (Drach) Which Was Up and Doing When Race Concluded

JUDGE HOUGH HOLDS SELDEN PATENT IS VALID

IN the United States Circuit Court of the Southern District of New York, Justice Charles M. Hough presiding, decision was rendered on Wednesday, Sept. 15, sustaining the plaintiffs, the Electric Vehicle Company and George B. Selden, in their suit for infringement of patent claims against the Ford Motor Company, C. A. Duerr & Company, the O. J. Gude Company, John Wanamaker, et al, the Société Anonyme des Anciens Etablissements Panhard & Levassor, Andre Massenet, and Henry and A. C. Neubauer. In its decision the Court holds that the Ford machine infringes the Selden patent claims one, two, and five of the plaintiffs, and that the Panhard infringes claims one and five. The concluding paragraphs of Judge Hough's decision are as follows:

"No litigation closely resembling these cases has been shown to the Court and no instance is known to me of an idea being buried in the Patent Office until the world caught up to and passed it, and then embodied in a patent only useful for tribute. But patents are granted for inventions. The inventor may use his discovery, or he may not, but no one else can use it for 17 years. That 17 years begins whenever the United States so decrees by its patent grant. That the applicant for patent rights acquiesces in delay, or even desires delay, is immaterial to the courts so long as the statute law is not violated. On these principles complainants are entitled to a decree."

Claim No. 1, regarded as the most important, on which the court holds both the Ford and Panhard machines have infringed, is as follows: "The combination with a road-locomotive, provided with suitable running gear including a propelling wheel and steering mechanism, of a liquid hydrocarbon gas engine of the compression type, comprising one or more power cylinders, a suitable liquid fuel receptacle, a power shaft connected with and arranged to run faster than the propelling wheel, an intermediate clutch or disconnecting device and a suitable carriage body adapted to the conveyance of persons or goods, substantially as described."

Claim No. 2, of which it is held that the Ford machine only is an infringement, varies from No. 1 only in requiring the "suitable carriage body" to be "located above the engine." The fifth claim which is held to be infringed by both the Ford and Panhard sets forth substantially the same combination, but describes specifically the engine as comprising a plurality of cylinders with pistons arranged to act in succession during the rotation of the power shaft."

The complainant alleged that all three of the claims enumerated were infringed by all the defendants. "This statement of complainants' position," says Judge Hough, "seems sufficient to show that the subject matter of these suits is the modern gasolene automobile. The defendants are severally the manufacturers, seller and user of the Ford machine (a well-known American make) and the maker and importer of the Panhard, a celebrated and typical French product. If these defendants infringe, it is because complainants own a patent so fundamental and far-reaching as to cover every modern car driven by any form of petroleum vapor, and as yet commercially successful."

After entering into a detailed discussion relative to the mechanical issues at stake, Judge Hough says: "If I have correctly apprehended it, there was clearly room for a pioneer patent, and it must now be held that on its face and in view of the art Selden's is such a patent. This means that Selden is entitled to a broad range of equivalents, and this rule as applied here results in this crucial inquiry: was Selden (or anyone else) entitled in 1879 to appropriate as one of the elements of any patentable combination a 'liquid hydrocarbon gas engine of the compression type'?"

The cases in which the present decision was rendered were argued before Judge Hough for six days at the end of May and the beginning of June. In submitting the cases the record, which has been accumulating for the past five years, amounted to over 8,000 printed pages of testimony. The decison was rendered with unusual promptness. The arguments were made by William A. Redding, Samuel R. Betts and Franklin P. Fish, for the plaintiffs, and the defendants were represented by R. A. Parker, Frederick Coudert, John P. Murray and C. Benton Crisp.

R. A. Parker, of Parker & Burton, of counsel for the defendants, in a statement issued last June bearing upon the possibility of a decision, said: "As to the probable developments after the decison, it may be stated positively that if the patent is upheld we will appeal and if the patent is not upheld the plaintiffs are compelled to appeal by the contract between the A. L. A. M. and the other Selden interests. The only way this could be avoided by them would be to make a new contract and let the matter drop. At any rate, if an appeal is taken it would not get into the next court until probably a year from next October, and it would take perhaps six months in the Court of Appeals, so that perhaps it would be two years from the present before another argument would be held, and it can be seen that the patent will nearly have expired, in 1912, before the case would be settled. Should it become necessary it might even be carried to the Supreme Court."

DATE OF VANDERBILT CUP RACE IS OCTOBER 30

OCTOBER 30 is the date set by the Motor Cups Holding Company for a 1909 race for the famous Vanderbilt cup. Practically the same Nassau county course, though considerably shortened, will again be the scene of the Vanderbilt contest, which this time will be for stock car chassis racing craft.

The circuit may be less than 15 miles in length, of course utilizing the Long Island Motor Parkway to its fullest extent, and the necessary connecting State roads to complete a course.

The proper application for a sanction for the race has been forwarded to the office of the A. A. A. Contest board at Buffalo.

The race this year will be similar to last year's Motor Parkway Sweepstakes, which proved spectacular and decidedly interesting. Four classes of cars will compete simultaneously, according to classifications recommended by the general rules committee of the Manufacturers' Contest Association; the smaller cars being stopped at different shorter distances, leaving the larger ones, competing for the Vanderbilt trophy, to hold the stage for the final rounds of the competition.

The Vanderbilt Cup will be open to stock chassis in class 1 (451 to 600 cubic inches piston displacement) and class 2 (301 to 450 cubic inches), both running in one class for a distance of approximately 275 miles. Trophies will be offered for stock chassis in class 3 (231 to 300 cubic inches) at approximately 205 miles, and class 4 (161 to 230 cubic inches) at approximately 135 miles, while special trophies will be awarded to the winner in classes 1 and 2, competing in unison for the Vanderbilt Cup.

Entry blanks, now in the hands of the printers, will be mailed from the new office of the Motor Cups Holding Association, Denon Building, Mineola, L. I. Entry fee for Classes 1 and 2 will be $500 for each car; for Classes 3 and 4 $250 for each car.

A meeting of the Motor Cups Holding Association took place on Monday afternoon last, at which details of the race were acted upon, and the definitte announcement of a race authorized by W. K. Vanderbilt, Jr.

The course, as tentatively selected, is triangular in shape, with each side practically straight. The turns can be easily negotiated.

EXCELLENT PROSPECTS FOR FAIRMOUNT RACE

PHILADELPHIA, Sept. 13—The contest committee of the Quaker City Motor Club has been relieved of all but the actual running of the Fairmount Park race by a body of friends of the four local charitable institutions which have been named as beneficiaries. This body has taken the burden of looking to grandstands, parking spaces, tickets, ushers and the hundreds of smaller details off the hands of the committee and is working hard to have everything in readiness. In addition, the Q. C. M. C. has the active support of the city officials, who stand behind the club in all its arrangements, and, in fact, is a co-promoter with it. What this means in the matter of course protection and preliminary practice is manifest. The city will also take good care that the chances of accident are minimized. Last year officers were stationed every 80 feet around the eight-mile course; this year, with the assistance of the local militia, the cordon of guards will be doubled.

The Trophy That Will Be Contested For

The accommodations committee has arranged for 1000 parking spaces, distributed at the eight best points of vantage round the course. That this number will be much too small is apparent from the recent announcement that the Norristown Automobile Club and the Delaware County (Pa.) Automobile Club had each pre-empted 100 spaces, which together with the 50 already taken by the Q. C. M. C. disposes of one-quarter of the available accommodations. Similar applications are expected from many up-State, New Jersey and New York clubs. Runs to Philadelphia have already been arranged by several Pennsylvania clubs. As the race does not start till mid-day, it is possible for automobilists living within a radius of 100 miles to leave home in the morning and reach Philadelphia in ample time for the start.

Highway Commissioner William H. Brooks is personally giving his attention to the condition of the roadway. This year's course is identical with that of last year, which alone is a great testimonial in its favor. Oil wagons and steam rollers have been at work all the week, and will continue till the day of the race. The entire course will be ironed out several times by the heavy rollers; depressions will be filled up where Parkside avenue debouches into the Fifty-second street entrance, and the new cut-off road built last year will be still further widened and improved. The narrowest bit of road on the course is 20 feet wide. The exact length of the circuit is 7.8 miles, and the 25 laps called for will make a total of 195 miles.

The start and finish, as last year, will be on the South Concourse, in front of Memorial Hall, a relic of the Centennial Exposition of 1876. Repair and supply pits will be located immediately in front of the main grandstand on the South Concourse. There is naturally a great demand for parking spaces and box seats at this point, and the committee will get around the difficulties of allotment, and, incidentally, add a little to its receipts, by auctioning these choice viewpoints off to the highest bidders. The Warner Instrument Company is to erect and operate free of charge the score-board showing the positions of the first three cars which proved such a success at the Indianapolis track. An auxiliary prize of $100 cash has been hung up by G. H. Stetson for the driver of the fastest lap, and others of a similar nature are expected from local papers and business houses.

The following committees have been named by the Quaker City Motor Club to care for the details of arrangement:

Chairman—Dr. Joseph S. Neff.

Vice-chairman—Dr. Laurence F. Flick, Dr. Charles C. Hatfield, Dr. T. Mellor Tyson, Theodore M. Etting, Frank Hardart, Sr.

Treasurer—Mayor John E. Reyburn.

Secretary—Wm. F. Gleason.

Finance Committee—Dr. Laurence F. Flick, chairman; Daniel Baugh, Dr. Ward Brinton, Charles D. Burk, Louis C. Madeira, Col. Edward deV. Morrell, Joseph Walsh, James M. Wilcox.

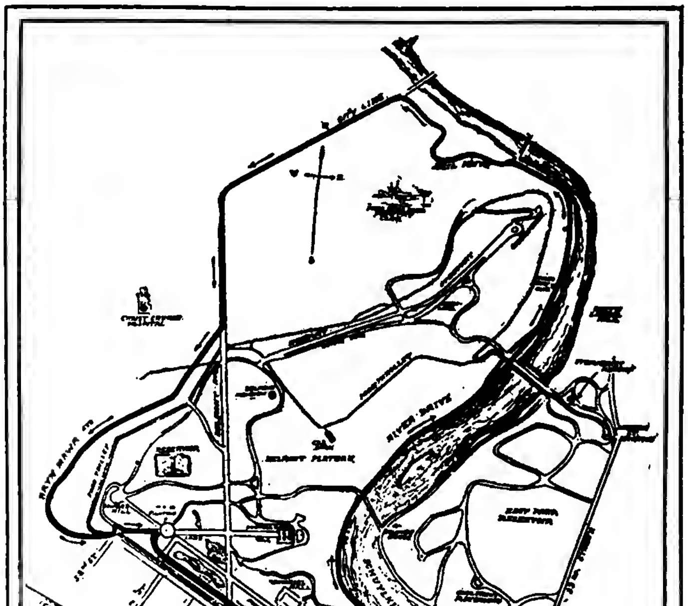
Publicity Committee—George M. Graham, "North American," chairman; Richard J. Beamish, "Evening Times"; H. L. Buckley, "Press"; John Cleary, "Inquirer"; Herbert C. Crowhurst, "Bulletin"; Harry C. Harbach, George W. B. Hicks, Richard Kain, "Record"; William M. Matos, William Rocap, "Ledger"; H. Starr Richardson, "Star"; George M. Schell, "The Automobile"; Frederick L. Weede, "Telegraph"; Clyde Woolson, "Item."

Police and Ushers Committee—Dr. J. Willoughby Irwin, chairman; Jacob H. Baltz, Samuel Castner, Jr., Frank A. Craig, Fred C. Dunlap, Dr. C. Lincoln Furbush, Arthur Folks, H. Laussat Geyelin.

Committee on Stands and Parking Places—Dr. Charles J. Hatfield, chairman; W. J. Clothier, Frank Hardart, Sr., Philip H. Johnson, William M. Ker, Robert L. Montgomery, W. D. Robinson, Edward D. Solenberger, Dr. J. Gurney Taylor, Richard C. Wood, J. R. Ludlow Gibbons.

TWO CHICAGO CLUBS IN ANNUAL BATTLE

CHICAGO, Sept. 13—The second annual reliability team match between the Chicago Automobile Club and the Chicago Athletic Association is scheduled for Thursday. There will be no technical committee examination of the cars at the completion of the match and only club members who are not affiliated in any manner with the motor car trade, are eligible to drive. N. H. Van Sicklen is captain of the Chicago Automobile Club team, and Charles T. Knisely, of the C. A. A., the same as last year.



Course of the Philadelphia Fairmount Park Race

CHICAGO MOTOR CLUB'S 1,000-MILE

Chicago, Sept. 13—Announcement was made to-day by the Chicago Motor Club that its annual reliability run this year would be held October 12, 13, 14 and 15, and that as usual it will be a 1,000-mile journey, spread over four days. The first day will carry the contestants 250 miles through Illinois, Iowa, and Wisconsin, and the night will be passed at Plattesville, Wis., returning to Chicago the second day. On the third day the run goes into Indiana, with the night stop at Indianapolis and the return made the fourth day.

On the first day the route goes through Elgin to Dubuque, Ia., and then to Plattesville, Wis., for the night. Returning the second day, the trail passes through Madison and Milwaukee back to Chicago. Going out again the third day, the way is through Joliet and Kankakee, Ill., to Crawfordsville, Ind., and from there to Indianapolis. The fourth day, coming back to Chicago, the contestants come by way of South Bend and Michigan City.

The rules have not been announced as yet, but the A. A. A. classification scheme will be followed.

One entry has been made—a Falcar, which will be driven by W. H. Pearce, who handled the car in the Indiana trophy road race, and which will be No. 1 in its class. The reliability this year goes into territory heretofore not touched by the Chicago Motor Club and the route selected covers all sorts of going. In Wisconsin many hills will be encountered, and it is expected the run will be the best of all the local organization has promoted and it has several record-breakers to its credit.

ANOTHER 24-HOUR RACE FOR BRIGHTON

New York, Sept. 14—The Motor Racing Association has announced that it will hold a 24-hour race at Brighton Beach this month. The dates have been set for Friday and Saturday of next week, September 24 and 25. The track has been materially improved since the last contest, and the surroundings have also been given attention. The oval has been resurfaced entirely and will be made as smooth and hard as possible. All the posts and fences around the infield have been removed, and the trench covered over, so that if any car runs off the track or is dangerously crowded in rounding the curves, its crew need not fear the consequences. Still more to the point of avoiding accidents is the step taken by the drivers' committee in deciding to give all operators a close examination. The committee is composed of Joseph Tracy, chairman; Guy Vaughn, and Arthur Campbell. Some criticism has been made regarding the proficiency of certain drivers nominated in recent events, and unless the ones hereafter are well known they will have to undergo a rigid inspection. The contestants will be asked to decide whether they desire a rule requiring a change of crews at least once every three hours. A system of block signals is being arranged at the entrance to the track from the paddock, to prevent a car from going upon the course when another is flying down the home stretch. At a meeting of the Motor Racing Association held to-day it was decided to admit lower-priced cars in the 24-hour race. This action resulted in the immediate entry of four Buicks, Chevrolet and Burman being named as two of the drivers. It is expected that a dozen cars will start in the race.

DE PALMA MAKES THREE NEW RECORDS

St. Paul, Minn., Sept. 11—Three new records for circular tracks were set up to-day by Ralph De Palma and his Fiat "Cyclone" in the meet on the State Fair track. In a one-mile race with Kilpatrick and his Hotchkiss De Palma lowered his own record of 0:51 flat, made on this track last year, to 0:50 4-5. He took two successive slices off the three-mile record, the first in a match race with Kilpatrick, in which he negotiated the distance in 2:38 4-5, and the second in the ten-mile race, in which he made it 2:38 flat. He won the ten-mile in the time of 8:49 3-5, another record.

ATLANTA'S SHOW SPACES DRAWN

Atlanta's National Automobile Show will have a representative display of American and foreign cars, this having been made known in the drawing for space which took place September 8 at the headquarters of the N. A. A. M., No. 7 East Forty-second street, New York City.

Under the supervision of S. A. Miles, general manager of the N. A. A. M., and Alfred Reeves, general manager of the A. M. C. M. A., the drawing proceeded with some 60 manufacturers seeking space. Naturally the main hall was apportioned to those who secured first choice, the fortunate ones including Packard, Franklin, Winton, Peerless, Pierce, Stevens, Maxwell, Mitchell, Stoddard-Dayton, Cadillac, Oldsmobile, Pope-Hartford, and Woods. In what will be known as Taft hall, which is nearly as large as the main hall, and is located on the main floor in the front part of the building, will be exhibited Rambler, White, Premier, Mora, Marion, Reo, Locomobile, Ford, and Buckeye.

On the elevated platform overlooking the main hall, there will be Marmon, Austin, Dorris, Glide, American, Jackson, Moline, National, Knox, Chalmers-Detroit, Elmore, Stearns, Pennsylvania, Hudson, Babcock, and Apperson.

Those in the main part of the building will include Autocar, Studebaker, Studebaker E-M-F, Standard, Jewel, Hupmobile, Overland, York, Selden, Speedwell, McIntyre, Brush, and Cartercar. In the basement will be located Columbus, Renault, Sultan, Streator, Fiat, Black, Interstate, Great Western, Rauch & Lang, Allen-Kingston, and Rapid commercial vehicles. The Rapid Motor Vehicle Company, Pontiac, Mich., have taken the largest space allotted to any one concern.

Members of the Motor and Accessory Manufacturers have drawn for space, but the announcement has not yet been made.

HOMER W. HEDGE VICTIM OF TYPHOID

Captain Homer W. Hedge, automobile and aeronautic enthusiast, died September 10 at his home, 31 West Eighty-fourth street, New York, of typhoid fever, after an illness lasting a week. Captain Hedge was the principal organizer and first president of the Aero Club of America, and one of the founders of the Automobile Club of America. As captain in the First Signal Corps, National Guard of New York, he had many friendly connections with men in the military service.

Born in New England forty-eight years ago, Mr. Hedge came to New York at an early age and took up advertising as his business. He was soon in business for himself, and at the time of his death was president of the Homer W. Hedge Company, advertising agents, at 366 Fifth avenue. In the fall of 1905 Captain Hedge, together with Cortlandt Field Bishop, J. C. McCay, A. Lawrence Rotch, Augustus Post, Colgate Hoyt, Charles Jerome Edwards, and Dave Hennen Morris, organized the Aero Club of America, and he was elected its president.

Captain Hedge is survived by his wife and daughter, Elizabeth. But few of his friends in the city knew of his sudden illness, and all expressed the greatest regret when the news of his death was made public.

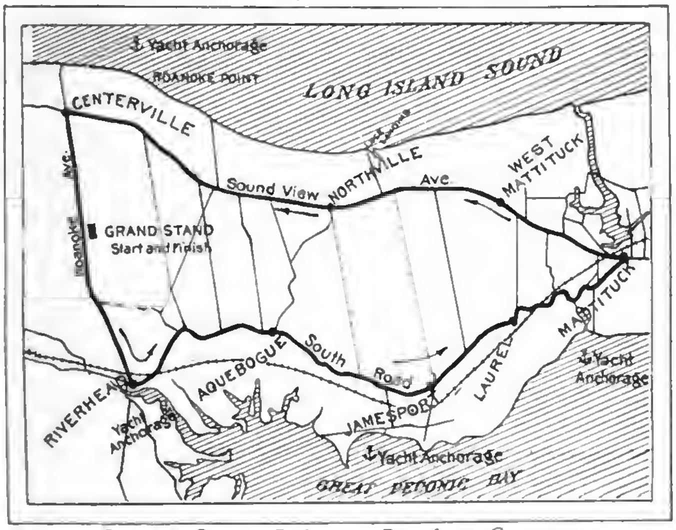
H. M. ADAMS, ROYAL SALES MANAGER

Cleveland, Sept. 11—Hobart M. Adams, long in the employ of the White Company, of this city, at the head of its Ohio sales department, has accepted the position of general sales manager for the Royal Tourist Car Company. The acquaintance of Mr. Adams with the trade extends throughout the country. His engagement with the Royal Company comes after its first season's output has been marketed, and that, too, as rapidly as manufactured. The company is the reorganized former Royal Motor Car Company, and the output of the present season, which was conservative, will be nearly doubled during the coming year, says George J. Dunham, president of the company.

Connecticut's new motor law went into effect September 1. All registrations expire December 31 of each year.

EASTERN LONG ISLAND'S STOCK CAR DERBY

On Sound View Avenue, Speed is Possible.



Map of Long Island Derby Course.

Said to be Only Dangerous Turn in Course

"LONG ISLAND'S Stock Car Derby" will take place September 29, over what is known as the Riverhead-Mattituck course. The A. A. A. stock chassis definition, of course, will govern. The Motor Contest Association, with headquarters at 1777 Broadway, is the announced promoter of the event, but all Suffolk county is engaged in the proceedings to a greater or less extent. The county's sheriff will provide the police protection of the course, assisted by scores of motorcyclists. 'Tis said that a Supreme Court judge has accepted the position of honorary referee.

Five classes will be provided for in the Derby racing, from $851 to $4,001 and over, the trophies for which will be given by Long Island towns and the Long Island railroad, besides several from other sources. In addition the participating drivers will receive one-half of the profits of the meet, providing any surplus remains.

The course is pronounced by such well-known drivers as Robertson, Strang, and De Palma, as being one of the fastest in the country. There are two stretches of nearly nine miles each, and only two towns are touched, one being little more than a village. Situated some distance from a trolley line, the crowd present will have to come mostly by automobiles and motor boats, there being four landings for the latter within a short distance of the grandstand. The course is a wide one for the most part, and runs through picturesque country. Its oiling will be done by the county, with the best of material supplied by the Standard Oil Company. The start and finish will be about three miles from Riverhead.

With practically five races in one means that there will be five finishes within an hour, as the small cars will travel 91 miles, the next class, 113 miles; third class, 136 miles; fourth class, 182 miles; and the big cars will bea sked to cover 227 miles. Predictions are that over 60 miles an hour will be the average of the big winner.

Recently at the Lowell races, W. J. Morgan, president of the Motor Contest Association of New York, and A. D. Corwin, discussed the final arrangements with Chairman Hower and other members of the Contest board. Alden McMurtry was designated as the representative of the Contest board to supervise the races, and George Robertson was named to look after the interests of the drivers.

The course is some 80 miles from New York City, which means that a comfortable half-day tour is available to those who may care to drive to the eastern end of Long Island.

SYRACUSE TRACK MEET THIS WEEK

SYRACUSE, N. Y., Sept. 13—Preparations have been completed for the third annual automobile track meet of the New York State Fair Association. This will be held on Saturday and already the entries promise the most successful event of the series. There are nine classes in all, six of which are for automobiles and three for motorcycles, including five and ten-mile races, a 50-mile, and time trials. Cash and trophies have been set up as prizes, and if any car succeeds in breaking the track record of 51 seconds, the trophy will be in money instead of a silver cup. The track is considered to be the best one-mile circuit in the country, without dust, and as hard as could be desired. The executive committee in charge of the meet is composed of H. W. Smith, M. W. Kerr, C. Arthur Benjamin, Forman Wilkinson, F. R. Bump and J. H. Valentine.

Lancastrians Who Won Third Place

Allen Sheldon and H. O. Smith

Second and First Prize Winners

FROM QUAKERTOWN TO CAPE MAY IN 50 PREMIERS

PHILADELPHIA, Sept. 13—Fifty green-and-white pennanted Premier cars left this city last Saturday morning on the first annual Cap May reliability run of the Motor Company of Philadelphia, local agent for the Premier. Leading the procession was the "Flying Squadron," composed of the three Glidden Tour Premiers, with President H. O. Smith of the Indianapolis company on board. All the cars in the run except five belonged to private owners, gathered from Philadelphia and the neighboring cities, and these had brought their wives and families with them in expectation of a day of merrymaking.

The object of the run was to equal as near as possible the time of a pathfinding car which had been secretly sent over the road in advance. The winner turned out to be B. E. Block, of Norristown, who received the silver loving cup offered by President Smith and the Premier Company. T. E. Gibberson, of Toms River, was awarded second prize, a fully equipped lunch hamper; S. N. Root, of Lancaster, got a set of Thermos bottles and a smaller hamper, and Mrs. William J. Hendren, of Philadelphia, won the ladies' prize, a silver Thermos bottle with four cups, for making the best guess of the winner's time. The figures were not announced, for the reason that auxiliary prizes had been offered to the citizens of the towns along the route guessing nearest the official time, and many of these estimates had not yet been received and tabulated.

Arrangements for the run had been progressing for the past two months, and the entire route was resplendent with gaily colored posters. Naturally the residents of the towns and villages to be passed through were on the lookout and a rousing reception was everywhere accorded the tourists. At Camden Mayor Ellis joined the party and proceeded with them to Cape May. At the latter city a committee of citizens met the tourists and complimented them on having made the journey without stragglers or accidents of any kind. Though the cars were slightly spattered with mud, every member of the party was present and enthusiastically ready for the fun.

A triumphal arch had been erected on Ocean Boulevard, and as each car passed under a gun was fired, which was responded to by the tooting of every conceivable kind of horn, siren and other noise-making device. All cars were finally parked in front of the Cape May Hotel, where preparations had been made for an elaborate dinner. Afterward the visitors attended a complimentary concert and dance of the Cape May Motor Club.

The entire party remained over until Sunday as the guests of the Premier Company, and enjoyed some fast racing on the magnificent beach in front of the hotel. The return trip Sunday afternoon was accomplished as enjoyably as the Saturday run, and likewise without mishaps. The fifty cars reached Philadelphia with full ranks, and disbanded for their homes with pleasant recollections of the trip. Every participant hopes that the promise implied in the name, the "first annual" run, will be fulfilled, and that they will have an opportunity next year to repeat their pleasant experience. In this desire, the participants are not alone, the townspeople along the route being of the same idea. The principle of interesting the towns is commendable.

Where the Cars Were Parked at the Finish in Front of the Big Hostelry at Cape May—The Cape May Hotel

Automobile Wheels, Rims and Tires

By Thos. J. Fay

BARRING the use of inferior grades of wood, and assuming that all wheels, insofar as the woodwork is concerned, should be of selected grades of second growth hickory, or equally good growths of wood, there still remains many points of detail leading to quality on a high plane, or the reverse.

In rear wheels, since the twisting moment of the motor must be transmitted to the spokes of the wheels, this torsional effort must be resisted by the wood at the miter, and if the hub-flanging is not clamped tight, it is highly improbable that the joints will be free from "working," which later condition soon leads to something worse.

Clamping Bolts Must Be Prevented from Turning—When hub-clamping bolts are tightened up, unless they are so pinned that they will not turn when the nuts are tightened up, it is difficult to apply sufficient pressure, and in the absence of this pressure the clamping effort will be insufficient. Fig. 19 depicts a hub in which the clamping bolts are provided with means for preventing the bolts from turning when the nuts are being tightened, a flattened extension, of triangular shape, just under the heads of the bolts, engages in a slot in the flange. In this hub the flange is made integral with the brake-drum, which also serves for the sprocket wheel, and the torsional effort is taken by integral metal at all points so that the woodwork is not required to labor under shock loading. As an incident attention is called to the use of a single (large) annular ball bearing in this particular case. It is because the bearing is very large that it may serve, and in some ways the scheme is commendable.

The nuts used on the hub-clamp bolts, in this example, are castellated, and in relation to this phase of detailing, it is enough to point out that it is not necessary to provide castellated nuts if the flanges do not have to be removed, which is true in almost every example of hub used in automobile work. When the nuts are not castellated, if they are screwed up tight, owing to the elastic qualities of the wood, they will stay on, although it is common shop practice to rivet over the heads to prevent them from backing off. There is no objection to this practice, although it is not necessary to mutilate the heads or nuts in the process.

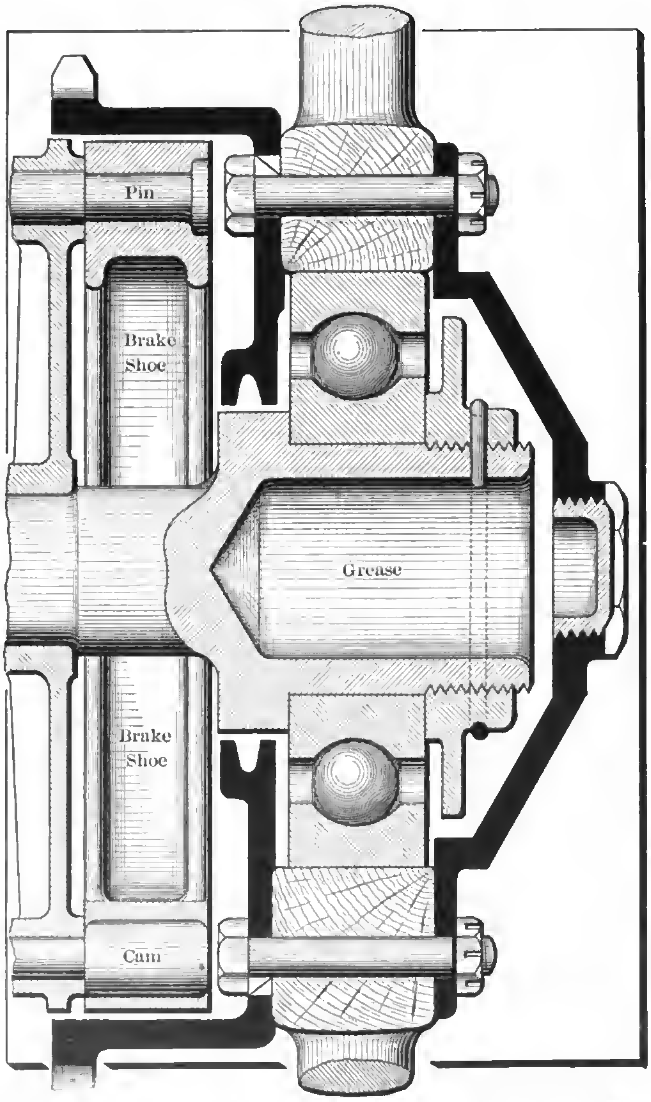


Fig. 19—Section through rear wheel with combination brake drum and inner flange

Spokes Are Made in Divers Details of Contour—A certain symmetry of contour is necessary if spokes are to be machine made, and there is positively no objection to this method of manufacture, provided the spokes are not sacrificed to the process. Fig. 20 depicts a well-made spoke, in which all the advantages known to the art of wheel making are embodied, and the depth of flanging is that which experience has dictated as adequate for the needs. This example (taken from the Thomas Model M) represents a 1910 effort, and has the benefit of much past experience. The dimensions are given so that this detail of the subject will not have to be discussed further, excepting to say that the brake-drum is bolted to the spokes in the manner as shown, which ties the drum to the spokes at a considerable radius, and without a particle of doubt, eliminates excess twisting moment on the woodwork.

The ability of a spoke, if it is well shaped, is represented by the thickness in the axle plane at the hub-flange, and in this case this dimension is 1¾ inches. The second point of importance is at A-B, at which point the major diameter is also 1¾ inches, but in the plane of the wheel, instead of, in the plane of the axle At the tenon engaging the felloe, this spoke is 1⅝ inches of the major diameter, which is in the plane of the axle, and in the plane of the wheel the minor diameter of the elliptic section is 1 3-16 inches, which dimension prevails in this plane from the point A-B out to the felloe.

In some types of spokes the section at the engagement of the felloe is round (to unit radius) and reduced gradually, to the point in the section marked A-B, rather with the expectation that the spokes will be very flexible at this point in the section, and in order to reduce the tendency of the spokes to work at the miter between the hub-flanges. The trouble with such spokes is that they are not easily fashioned by a machining process, and it is highly improbable that they will prove to be of greater flexibility than the type as here illustrated.

Fig. 21 shows a section of the wood at the miter in another type of wheel, in which the radial depth of flanging was 2¼ inches, and the axle thickness of the wood was 2⅛ inches. This wheel was used on a 60-horsepower car and worked so well, insofar as this part is concerned,

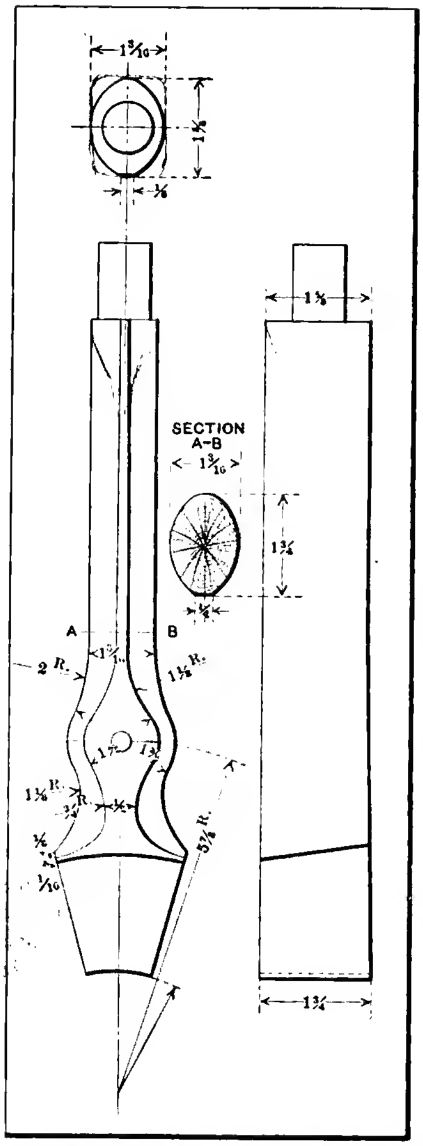


Fig. 20—Rear wheel spoke in Model M Thomas car depicting proportions, twisting, bending, and compression

that it will serve as an example of a safe depth of flanging, and also as a guide in fixing the sheer section of the spokes from the point of view of stresses induced when cars of great power skid if the wheel is not dished. Fig. 22 shows the same spoke at the tenon engaging the felloe, indicating the manner in which the spoke is wedged into the felloe, but this plan is defective unless the wedge is placed 90 degrees around from the point shown, in order to eliminate the tendency of the spoke to split the felloe. In any case it is a good plan to bolt through the felloe on both sides of the spokes in order to avoid the splitting tendency, which is accentuated when cars are driven around turns of short radius at an exceedingly high speed.

Fig. 23 depicts the Schwarz type of wheel, showing how the miter is overlapped, thus making it possible to true up the woodwork, at will, independently of the hub, and that this plan aborts the tendency of the miter to work loose, is one of the claims of the maker. They stand up well.

Advantages of Dishing Wheels—Referring to Fig. 24, it will be seen that the felloe is not in the plane of the miter, and the dish of the wheel is outward. When a car is going at a relatively high speed around a turn, the outer wheels are stressed in such a way that the tendency is to set a dish in them just reverse to the dish given by the wheel maker. The shorter the spokes are made, the greater will the dishing have to be in order to be sure that the spokes will be enough longer than the radial distance from the hub end of the spokes to the bearing against the felloe. If the spokes are longer than the radial distance from the hub to the felloe, then, when stresses are set up, tending to dish the wheel in reverse, all the spokes will serve as members in compression, and the rim on the felloe will have to do the work. As the figure shows, the excess length of spokes, marked "difference" in the figure, represents the versed sine of the angle of the spokes.

Wood is of such great strength in compression that it renders wheels practically indestructible even though the sectional area of each spoke may be reduced considerably, considering the use of from 10 to 14 spokes in each wheel. Since dishing transfers skidding stresses to the rim, inducing compression moments in the spokes, it eliminates shearing moments at the flanges of the wheels, and for this reason it is not necessary to have the spokes of very great width in the plane of the axle, near the hub. If the wheels are dished, remembering that this practice results in transferring all strains to the rim of the wheel, it is plainly indicated that the stationary rims of the wheels must be of sufficient strength to sustain under the pressure. Just what the side pressure might be under ordinary conditions is not necessary to consider, since it is possible to conceive of a case in which all the weight resting on both rear wheels might come as a lateral thrust, if the inner wheel leaves the ground, and if the outer wheel is in

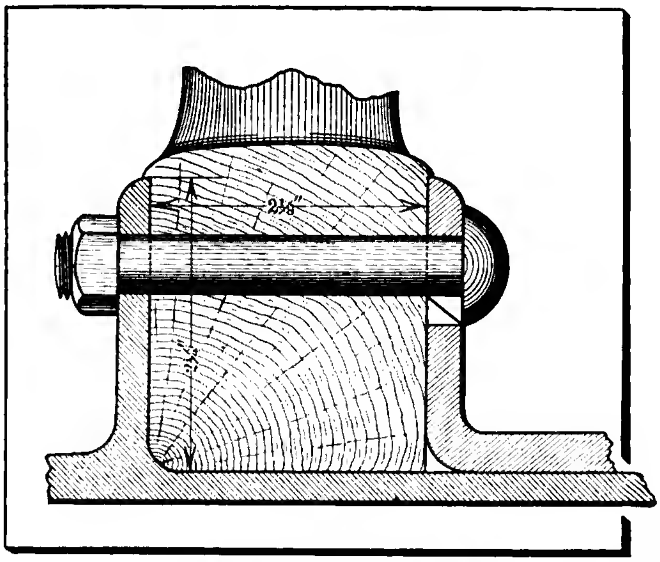


Fig. 21—Section of a hub at the miter, showing depth of flange and scheme of clamping

a rut so that it cannot skid. Taking this as a basis, it is only necessary to compute for the effect of centrifugal force of the car and involve the angle of the spokes, in order to ascertain the thrust of the spokes, tending to disrupt the rim.

Practical Details Involving the Woodwork—In automobile wheels, if the rim proper is placed over a stationary rim as it is in demountable work, the chances of wheel trouble may come, as in ordinary carriage wheels, by what is known as "rim binding." A rim-bound wheel will not give satisfaction, and if the same wheel is allowed to stand for a time in a damp place it will warp out of true, and in this warped condition it not only looks unsafe, but will be unsafe since the stresses will not then be disposed uniformly in the section of all the spokes.

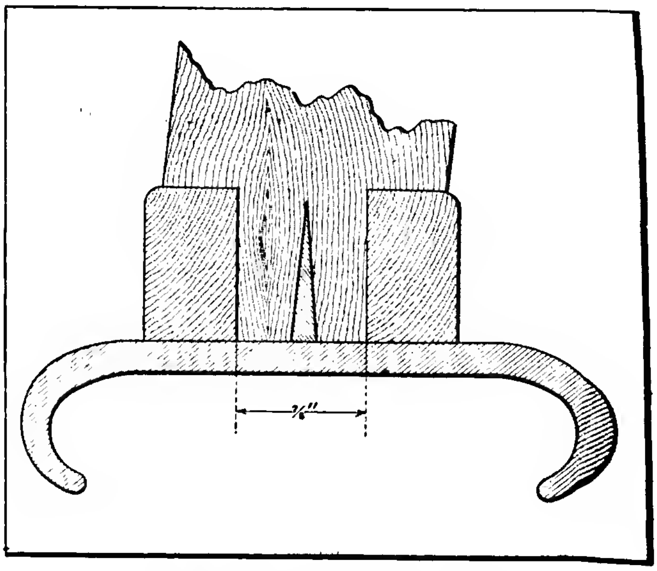


Fig. 22—Section of felloe depicting tenon and method of wedging which will split the felloe

Undue pressure of tires will spring spokes sidewise, and "bastard spokes" will have a wide influence on the results. Take a wheel, for illustration, having half of the spokes of suitable selections of second growth hickory, and the balance of "swamp" or willow hickory (this grade of hickory is soft and spongy), it will not behave like the regular (accepted) wood, and with a little pressure, wheels so made will spring out of true. Dampness will do much to engender wheel troubles of this sort, and in view of the amount of washing which automobiles naturally

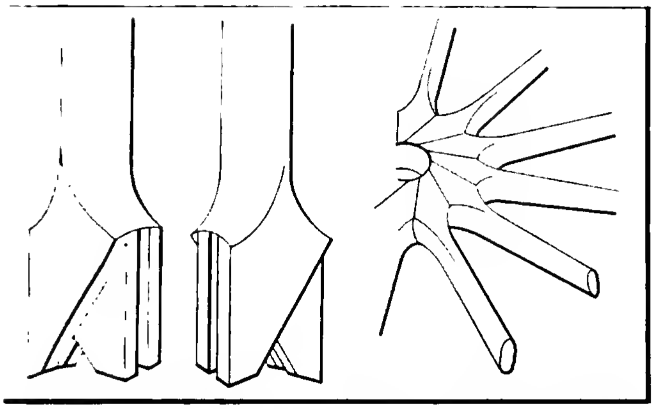


Fig. 23—In the Schwarz wheel the miter joints are made using a dovetail and tenon

fall heir to, it is of the greatest importance to select wood for wheels that will be free from bastard varieties and to put the wood through a uniform seasoning process.

So-called second growth hickory is becoming more scarce every day, and in England, for illustration, there is a growing tendency in favor of wire wheels. In America, in view of the rusting question, it is not believed that wire wheels will find favor just so long as wood holds out, and while it may be necessary to lower the standard a little in time, even so wood has not as yet reduced in quality so much that it is necessary to put up with the rust problem. True, it is barely possible that high nickel steel wire spokes may ultimately be made, in which corrosion may be practically eliminated, but it is a well established fact that merely nickel plating the metal work is not good assurance of long service without the attending rust evil. Wire wheels may be made strong enough for the purpose—of this there is no question—but wheels have to roll through water, mud and whatever else abounds in city streets, so that the rust question stands in the way, and it represents a formidable barrier to the use of wire wheels.

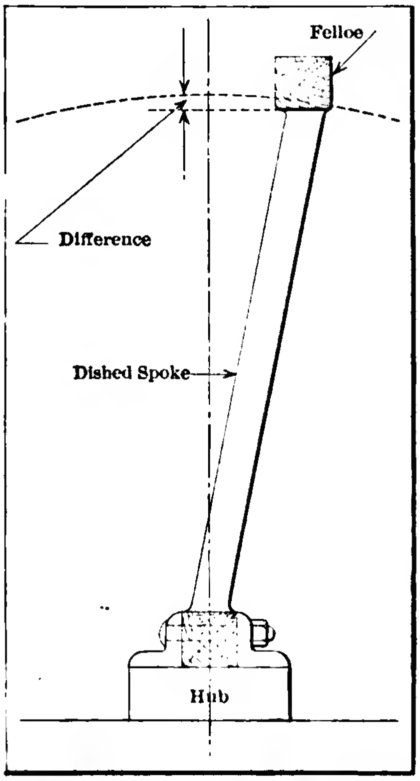


Fig. 24—Section of a wheel showing the dish, which has strength to resist skidding and lateral stresses

When a car falls into the hands of the user, unless the woodwork of the wheels is kept water-tight by persistent applications of paint, crooked wheels will be in evidence, and wheel failures will follow. It is a fair inference that many wheel failures are due to lack of paint, copious applications of water and wild driving.

Front Wheels Have But a Single Duty—When the driving is done through the rear wheels, the duty of the front wheels is limited to fixing the direction of the car, aside from the question of acting as rollers, which is common to all road wheels. Driving moments are not engendered, because there are no twisting moments of the character which must be borne by the rear wheels, and the spokes may, therefore, be reduced in section accordingly. Fig. 25 shows front wheel spoke work used in the same car as the rear spoke work shown in Fig. 20. The section A-B is slightly less (12 spokes are used in both front and rear wheels) and in the absence of the brakedown, the front wheels are somewhat more resilient. All necessary dimensions are given in the figure. A brief inspection of these two figures representing the front and rear wheel spokes as used on the same car, and that a high-powered, high-speed vehicle, will show that for assembling and other conveniences, the lateral depth has been kept at the same figure, 1 3-4 inches, while the variation to account for the differing nature of the work done by the two comes into the thickness, this being 1 3-16 inch for the hard-worked rears and but 1 inch for the fronts. While seeming a very small difference, this nevertheless is 19 per cent increase of what is really a diameter.

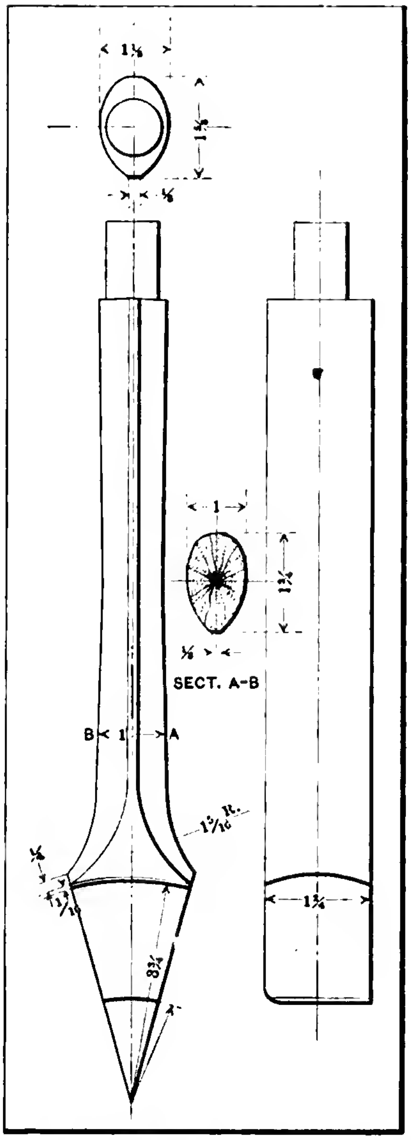


Fig. 25—Showing a front wheel spoke suitable for resilient work

(To be continued)

RELATION OF AIR TO GASOLINE

Because automobile gasoline is composed of various percentages of the several available fractions of hydrocarbon distillates, it is quite out of the question to fix upon the relative proportions of fuel to air, on an exact basis. Since, however, the average carbureter is capable of altering the ratio of air to fuel over broad ranges, it is not necessary to know the exact ratio in order to attain the best results. In the meantime, an approximation is necessary, since, in designing, and adjusting carbureters, it is well to fix upon the ratio in such a way as to have the variations allowed for, up and down, from an approximate average. The mixture becomes explosive when 10,000 volumes of air dilute one volume of gasoline. The best results follow when the relation is one volume of liquid gasoline to 8,000 volumes of air. With one of gasoline to 3,500 of air, it is non-explosive.

Some Hints on Ignition Testing

By C. Wadsworth

SINCE the life of any automobile ignition battery necessarily depends on the current-consumption of the spark coil, it is evident that if adjustments are made in conformity with the indications of current-measuring devices, the battery will last longer and all parts of the ignition system will give better service. Moreover, the installation of such instruments as a permanent part of the ignition circuit puts the operator of the car in possession of a continuous and *visible* record of performance through which faults can readily be detected and remedied under working conditions and often while the car is in actual operation.

It is well known that by adjusting the coil-vibrator or contact screw, the consumption of current can be varied within quite wide limits, reduction of the gap at the vibrator increasing the current consumption, too small a gap causing rapid depletion of the battery, as well as pitting and sticking of the vibrator points, while increasing the gap reduces the current consumption, too wide a gap lessening the flow of current to such an extent as to give rise to skipping or misfiring. It is also well known that what has been said about the gap at the vibrator points applies with equal force to the gap at the spark plug points.

Just what adjustments of the coil-vibrator and spark-plug gaps should be made in order to secure the highest degree of sparking efficiency and battery economy with a given coil may conveniently and accurately be determined by means of the apparatus shown in Fig. 1, which is made a fixed part of the battery circuit to show whether the operating conditions of the ignition system are normal or otherwise.

The device shown is a voltammeter especially designed for eliminating guess work in ignition testing under working conditions. It consists of two instruments, an ammeter and a voltmeter, mounted on a common base that is attached by screws directly to the dash if of wood, or to an insulating block in case the dash is of metal. The voltage of the primary, or battery, circuit is measured by the instrument at the right, while the strength of the current in amperes is measured by the one at the left. Both instruments operate on what is commonly known as the D'Arsonval principle, a permanent magnet being employed to create a strong magnetic field of practically unvarying intensity, within which a rectangular coil of fine wire, wound on a centrally pivoted aluminum open-frame bobbin, mounted between the pole pieces of the magnet, is made to rotate, against the opposing influence of a spring, by the current that passes through it. Attached to the coil bobbin or frame is a pointer that moves over a scale so graduated as to indicate the strength (amperage) or the pressure (voltage) of the current, causing a deflection of the swinging coil from its normal or zero position.

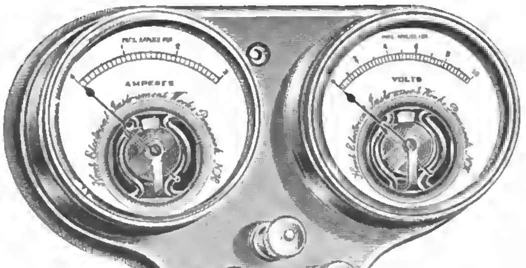


Fig. 1—Hoyt Voltammeter which simplifies ignition testing

Method of Reducing Current Losses—An extended description of the details of construction and principles of operation of the instruments would here be out of place, but attention may properly be called to the fact that by the use of a suitable resistance coil placed inside and forming part of the circuit of the voltmeter, the current loss due to its operation is reduced to a negligible factor, notwithstanding that the voltmeter is connected across the main leads of the circuit, as shown in Fig. 3, in the same manner as an incandescent electric lamp.

The ammeter is connected in series in the primary circuit, but the current is made to pass through a conductor, SH, termed a shunt, which, while of somewhat higher resistance than the rest of the circuit, is of sufficiently low resistance to make the current loss due to its use a negligible factor also. The coil of the ammeter is connected in parallel with the shunt, forming a divided circuit, a very small portion of the current passing through the coil of the ammeter and the balance through the shunt.

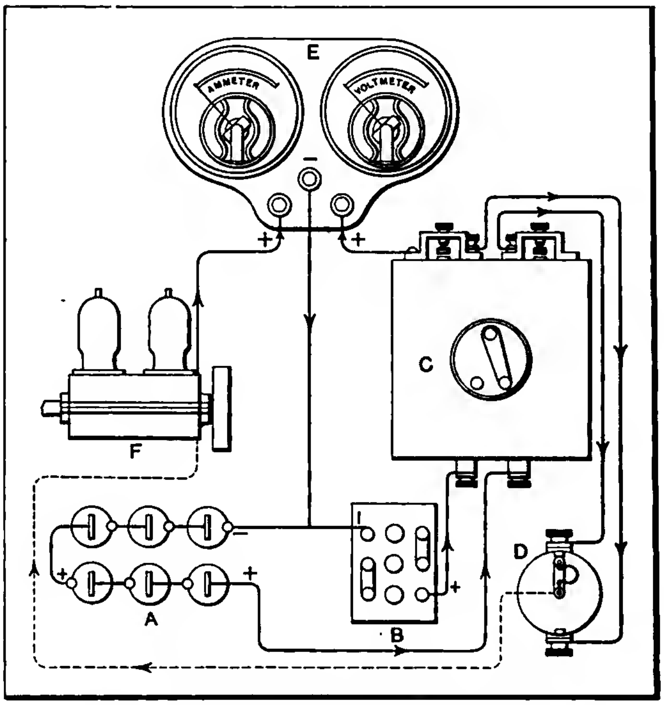


Fig. 2— Shows Method of Connecting the Voltammeter

On consulting Fig. 2, which is a conventional diagram, showing how the voltammeter is connected up, it will be seen that the carbon or positive terminal of the dry-cell battery A, and also the positive, or plus (+), terminal of the secondary, or storage, battery B, are connected to the terminals of the coil C, from which wires are led to the timer D by which the primary circuit is closed. From the contact screw of either of the coil units, a wire is led to the right-hand binding post of the voltammeter, and the zinc, or negative (—), terminals of both batteries are connected to the center or negative binding post terminal of the voltammeter, as shown, instead of to the ground, as is usual.

Current Flows Through the Primary Winding—The return-circuit wire is attached to the left-hand binding post of the voltammeter. Current from the primary battery A, or from the secondary battery B, whichever happens to be in use, passes through the primary winding of the coil C when the circuit is closed by tbe timer D. From the coil C, current flows into the voltmeter through the wire attached to the right-hand binding post, and out to the center binding post and thence back to the battery. When the timer closes the circuit through the coil a part of the current that flows through the timer ground circuit, passes into the ammeter and out to the center binding post, thence back to the battery. Most of the return current passes directly from the left-hand binding post to the center binding post through the shunt SH. The return circuit between the timer and engine in Fig. 2, and between the timer and left-hand binding post in Fig. 3, is indicated conventionally by a dotted line, the direction of current flow being shown by the arrows.

On reference to Fig. 3, it will be seen that the voltmeter V indicates the condition of the circuit regardless of whether the circuit is closed or open. This diagram also shows how the voltmeter is connected across the two main leads of the circuit beyond the switch S. If it were connected up between the switch and the batteries, it would be in circuit all the time, regardless of whether the coil switch S was open or closed, but by connecting it across the main conductors just the other side of the switch, as shown, it is in circuit only during the time that the switch S is closed.

As the timer T makes and breaks the main circuit at a point still farther on, the voltmeter indications are not affected by the operation of the timer. In other words, the voltmeter practically forms a closed circuit of very high resistance, including only that part of the battery circuit which lies between the batteries and the coil. The ammeter, however, forms a part of the main circuit beyond the coil and therefore responds to the makes and breaks of the timer, but the voltmeter does not.

Voltmeter Forms a Closed Circuit—The voltmeter circuit, when the switch S' is closed on the dry battery side, is indicated on Fig. 3 by the three-dot-and-dash line, which is intended merely to show that, as stated above, the voltmeter serves as a closed circuit in which the direction of current flow is as shown by the arrows. The current flowing from the dry battery DB, through the switch primary coil P', timer T, ground and left binding post of voltammeter, passes through the shunt SH and ammeter coil A, which is connected in parallel with the shunt, so that a pre-determined portion of the current passes through it, the balance of the current passing through the shunt. The respective resistances of the shunt and ammeter coil being known, it is an easy matter for the manufacturers to calculate the current which will pass through the combined circuit.

Ordinarily the method of wiring shown in Fig. 2 will correctly connect the instruments in circuit, but with some types of coils, as, for example, the Kingston, the wire leading to the right-hand or voltmeter binding post, must be attached to one of the hexagon nuts on the bottom of the coil box, as shown in Fig. 3, to which the same reference letters as are used in Fig. 2 are applied.

Similarly the copper or brass strip by means of which the several units of some coils are connected, may also be used, instead of the contact screw block, as a place of attachment for the wire leading to the voltmeter.

How to Proceed with the Test—In proceeding to make tests with the voltammeter, after having connected it up as indicated, the first thing to do is to make the distance between the spark-plug points as nearly uniform as possible, so that the width of the gap shall not exceed 3/100 inch and then file the platinum points of the vibrators and contact screws so as to be sure that they are perfectly flat and true as well as smooth.

For this operation, a Nicholson XF Swiss file, about number 6 cut, should be used, because the ordinary fine-cut file is too coarse and cuts away too much metal. After filing the points, the contact screws of each unit should be screwed down until the vibrator has a play of about 1/16 inch between the screw and the iron core.

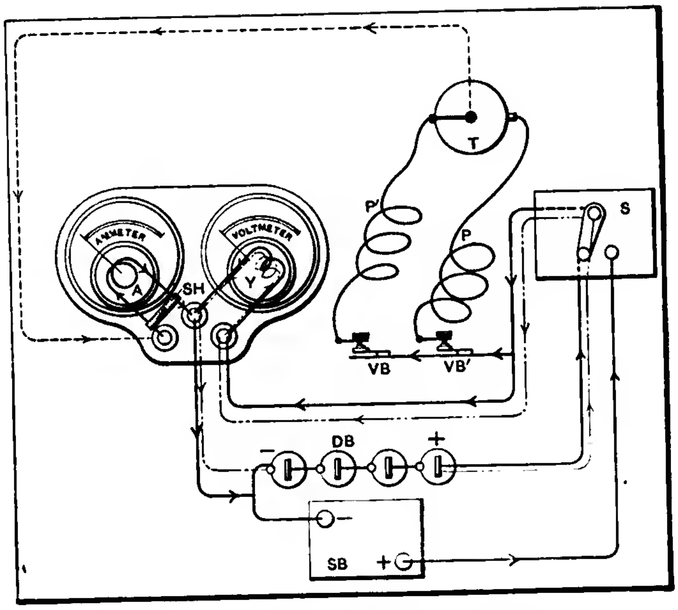


Fig. 3—Voltmeter Indicates Condition of Circuit

Then, with the gasoline supply to the carbureter shut off and compression relief cocks open, turn the engine over until the timer makes contact and sparking takes place in one of the cylinders, any one being equally good.

Note the reading of the ammeter when the timer closes the primary circuit, and if the current consumption of the coil is greater than 8/10 ampere, increase the vibrator gap by unscrewing the contact screw, and thus decrease the flow of current. Should the vibrator fail to act, however, screw down the contact screw and thus decrease the gap until the vibrator is brought into action. Proceed in the same manner to adjust each of the vibrators until the current consumption of the coil units is equal throughout their number.

In making adjustments while the engine is at rest, the circuit being closed by the timer for a considerably longer interval of time than when in actual operation, it is necessary to set them for a current consumption about twice as great as is de-

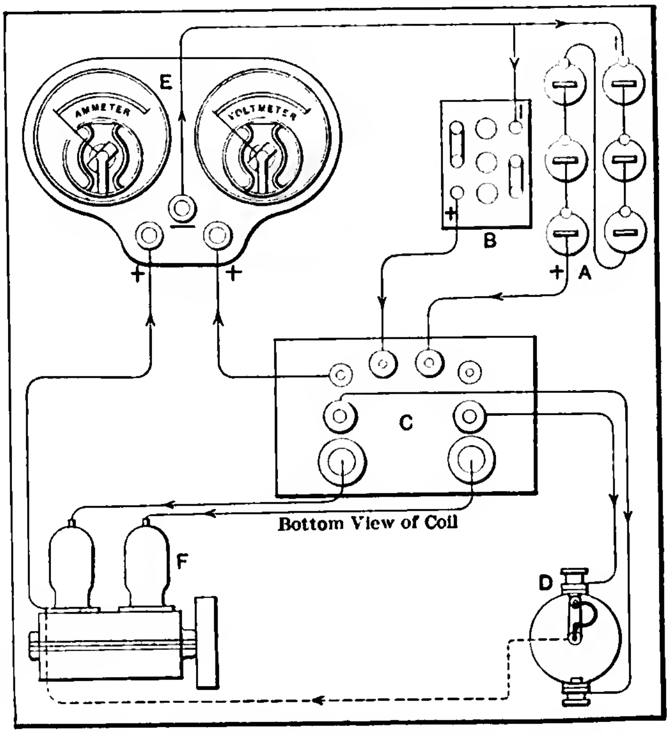


Fig. 4—Wiring Diagram, Showing Coil Binding Posts

sired, because in actual operation the flow of current through the coils is intermittent, and the ammeter needle will stand at a point representing the mean current flow. For example, a two-unit coil adjusted to take ¾ ampere would show from ⅜ to ½ ampere on the ammeter, depending on whether the period of make or period of break is the longer.

Effect of Construction on Consumption—Since the construction of a coil affects the current consumption, and wide variations in the sparking efficiency of different makes arise from differences in usage as well as construction, no definite rules can be given for the exact point at which a coil vibrator should give best results. Generally speaking, however, it may be said that a coil adjusted to operate on less than 3/10 ampere will give a thin, weak spark which would only fire a rich mixture. When adjusted to take more than 8/10 ampere, trouble will be experienced from pitting and sticking of the platinum contact points and from rapid deterioration of the battery.

With the voltammeter in circuit, observation of the normal rate of deterioration, after adjustments have been made, enables the operator to ascertain the relation between mileage and battery consumption. For instance, if a car will run 300 miles when the current consumption is such as to cause a pressure loss of ½ volt, then the car will run another 300 miles with a like drop in voltage, whether the battery is of the primary dry-cell or of the secondary storage type. Hence a glance at the voltmeter will enable the operator to judge what mileage can be obtained from the battery before it is exhausted.

Whatever may be the cause of a change that affects the battery circuit, the voltmeter gives instantaneous indication thereof, the needle or pointer remaining steady only so long as conditions are normal. With a loose contact, the needle would oscillate back and forth; with a broken wire it would not move form zero; with a poor contact due to a corroded terminal, the reading would be lower than normal; and in case one or more cells should become short-circuited, the needle would drop to an extent depending on the scale value of the cells cut out. If the pointer does not remain steady on that point of the scale representing the voltage while the car is in operation, look for the trouble at once and remedy it.

What the Ammeter Reading Signifies—The operator having also familiarized himself with the significance of the ammeter indications, a glance at it shows whether there is a normal flow of current through the coil. Any departure from normal conditions, in fact, any change in the circuit that causes a variation in the quantity or volume of current flowing through the coil, is shown and can be accounted for by the behavior of the ammeter, whose indications serve as a reliable guide in locating ignition troubles. Poor contact is shown in a diminished current flow; too small a gap between the vibrator or spark points is indicated by an abnormally high reading; and a short circuit at the spark plug, due to soot or breakage, will cause the needle to be thrown to the extreme point of its movement. A loose connection causes oscillation, while a broken wire is indicated by stoppage of the engine and zero reading of the ammeter. Study of the accompanying table will give some idea of the extent to which the voltammeter can be made of service in detecting ignition troubles.

As to the durability of the instrument when permanently attached to the car, and therefore subject to constant vibration, it may be said that a distance of more than 20,000 miles has been covered without recalibration or repairs. The cost of cleaning, adjusting, and recalibrating one of these instruments probably would never exceed $2.00. As with watches and clocks, however, to insure long life and accuracy, the instrument should be sent back to the manufacturers once a year to be checked up, or calibrated, and to have the bearings readjusted if necessary. The ordinary owner, driving his own car, should never attempt this.

TABLE OF COMMON IGNITION TROUBLES AND REMEDIES

Reading of Voltmeter	Corresponding Ammeter Reading	Cause	Remedy
Steady.....	Regular.......	Normal conditions..........	None necessary.
Oscillating needle.	Irregular......	Loose contact in battery circuit—Leakage of secondary current—Short circuit or exhausted cells.	Tighten connections—See that timer contact is made evenly—Eliminate leakage.
Uniform or gradual drop.	Regular.......	Normal deterioration of battery.	None required.
Abnormal drop.	High.........	Rapid deterioration of battery because of short circuit at plug or in battery box—Improper adjustment of coil-vibrator or spark, plug gaps, latter being too narrow—One or two exhausted cells.	Eliminate short circuit—Readjust vibrator and spark gaps—Remove exhausted cells.
Normal....	Low..........	Poor contact in timer, vibrator, or connections—Short circuiting of cells	Clean contacts, eliminating effects of corrosion or wear.
Normal....	High.........	Sooted spark plug—Gaps at vibrator or spark plug too small—Decreased coil efficiency.	Clean spark plugs—Increase width of gaps—Readjust tension of vibrator spring.
Normal....	Irregular......	Poor timer contact.........	Fix timer.
Normal....	Zero..........	Broken ground wire........	Put in new wire.
Zero.... ..	Zero..........	Broken wire between coil and battery or broken battery connections.	Put in new wire.

APPLICATION OF HEAT TO THE MIXTURE

While it is true that the rate of flow of liquid gasoline will increase with increasing temperature of the liquid, and even considering the fact that if heat is not applied to the liquid it will not vaporize, these considerations do not alter the vapor condition and the performance of the mixture in route to the motor, from the carbureter. Since automobile gasoline is a composite of several fractions of the hydrocarbon, and since all of the fractions do not hold to the same volatility, it is advantageous to prepare the mixture, in route, with the idea of affording the best results. If heat is applied to the mixture after it leaves the carbureter, the less volatile fractions will be more or less vaporized, and the performance in the combustion chamber will then be superior. It may not be possible to vaporize some of the heaviest contents, but it is fortunate, perhaps, that the percentage of such fractions is low, relative to the whole content. In the meantime, what is wanted is a means of supplying the right number of heat units, at some constant desirable temperature, rather than a limited amount of highly heated air, as is sometimes the practice. The practice of furnishing heat at the point of vaporization is also gaining in favor, daily.

WIRE-DRAWING IN CARBURETERS LIKELY

Frequently it is observed that the intake to the carbureter is so restricted that noise issues and a little further investigation in such cases will disclose, in all probability, that wire-drawing is one of the ills. It is not alone the noise that is objectionable in such cases; the power of the motor will be less, due to the restriction which has the effect of reducing the weight of mixture that enters into the cylinders, and the power of a motor is undoubtedly proportional to the weight of mixture that enters the cylinders, assuming, of course, that the same is in acceptable form and that it is completely burned. True, there must be a depression in the carbureter in order that there will be a difference in pressure, so that gasoline will be sucked into the train of air; equally true, it is of the greatest importance to have the depression as low as possible in order that the power of the motor will be a maximum. If the depression is but slight, provided the carbureter is properly designed, the amount of fuel entrained will be adequate for the purpose. If, on the other hand, the depression is very large and holds considerable fuel, it will soon be found to be wasteful of the liquid. This large depression is the base of the modern "puddle" type of vaporizer.

54 ENTRIES IN FRANCE'S COMMERCIAL VEHICLE TESTS

By W. F. BRADLEY.

PARIS, Sept. 8—Fifty-four commercial vehicles of all classes have been entered for the month's reliability tests, to commence October 15 and end November 15. The importance of the trials, which are organized by the Automobile Club of France, has been very much enhanced by the assistance of the government. There are two distinct sets of regulations for the single competition, one being drawn up by the Automobile Club of France and the other by the War Department. All vehicles fulfilling the requirements set forth by the military authorities can claim a military subsidy of a rather important nature. Any purchaser of the type of vehicle approved of in these tests can enter into an agreement with the Government whereby on presentation of his automobile once a year and an agreement to sell on prearranged terms in case of war, he can claim a subsidy of $600 on the purchase of the vehicle and $200 on each of the three following years. Thus he will receive $1,200 within a period of four years.

This is the first time such an arrangement has been made, the Government having previously encouraged commercial vehicles by giving a few prizes in the Club's competition and purchasing two or three of the most successful vehicles. The new system will be beneficial to the manufacturer because of the impetus it is likely to give to trade. Many firms that at present stick to horses will be induced to adopt mechanical traction in view of the Government subsidies. It is not surprising, therefore, that most of the fifty-four vehicles are taking part in the tests under the army regulations.

There are three distinct classes in the competition, consisting of trucks, road trains and omnibuses. The trucks are subdivided into five distinct classes, beginning with vehicles carrying from 880 to 1,320 pounds and ending with heavyweights taking more than a three-ton load. The road trains are divided into three classes for traction engines, trains having several trailers for goods, and trains having several passenger-carrying trailers. The omnibus section has also three classes of, respectively, 6 to 10 places, 11 to 20 places, and more than 20 seats.

The headquarters of the competition has been fixed at Versailles, eight miles to the west of Paris. Here a large shed has been built, capable of housing sixty automobiles, with a private box for each, electric light, telephone, central heating, etc. There is a large covered courtyard for the washing of the vehicles, and sufficient room for all of them to proceed to their private boxes without hindering or in any way handicapping the others. The large amount of fuel necessary for such a fleet of automobiles will be stored in a separate building, the roof of which is double and about one foot apart. The space between the two layers of planks is filled with sand. Thus if the building caught fire, the lower roof, on being burned, would allow the sand to fall onto the fire below. The same system has been adopted for the central hall in which the automobiles will be housed.

Commencing Monday, October 18, the commercial vehicles will make daily journeys from Versailles, through the surrounding country and home to their garage, after having covered about ninety-five miles. As the country around Versailles can provide all kinds of roads, from rough pave to perfect macadam, and from level stretches to grades of 12 per cent., everything that is necessary to test the vehicles is at hand. On October 20, however, a longer journey, in four stages, will be made to Clermont-Ferrand, in central France. After one day's exhibition, a return will be made to Versailles by stages of about 90 miles, and from then to the end of the competition the daily trips out of the once royal city will be continued.

Under the military regulations the vehicles will have to make several of the journeys in convoys, at a speed set by the officers, and with a determined distance between each unit of the procession. Fuel allowed during the contest is gasoline, benzol and carburetted alcohol, for all three of which consumption will be controlled. The final classification is based on economy of operation per ton mile and regularity of running.

The firms entered in the competition, most of them having several vehicles, are Lorraine-Dietrich, Berliet, Krieger, De Dion, Saurer, Delaugère & Clayette, Berna, Peugeot, Panhard-Levassor, Clement, Malicet & Blin, Desmarais & Morane, Schnieder, Cohendet, Vinot & Deguingand, Aries and Société Francaise de Constructions Automobile.

France's Motor Plowing Match

PARIS, Sept. 8—At present only three firms are entered for the motor plowing match to be held in conjunction with the Amiens agricultural motor exhibition at the end of this month. The firms are the Compagnie Internationale des Machines Agricoles (the International Harvester Company's products), Vermond & Quellenec and the Société Generale de Moto Culture.

The competition is intended to show the most suitable type of motor-driven plow by putting them to work under conditions that are as near as possible a reproduction of those pertaining on a farm. On each of the two days that the test lasts the motor plows must turn over, under predetermined conditions, not less than two and a half acres of land. Fuel, water and oil required for the test must be taken in advance to the field to be worked and placed in suitable vessels, which will be sealed by a member of the committee. Tanks can only be filled from these sealed cans under the supervision of the committee, the plugs being sealed up again as soon as the supply has been taken. As economy of working is the basis on which the awards will be made, these precautions are necessary.

Work will begin at 7:30 a. m. on each of the two days, will be interrupted for one hour and a half for lunch, and carried on until 4 o'clock. While in the field no one but the operators will be allowed to touch the motor plows, and no fuel can be taken out to them except under the control of the committee.

TESTS OF GAS AND ELECTRIC LIGHTS

The headlight tests conducted by the Royal Automobile Club in London afforded an excellent opportunity to compare acetylene and electric lamps, as both of these types were well represented. The entries included 23 acetylene lamps, 8 electric, one kerosene, and one oxygen-gasoline. The electric lamps had an average candle-power of 24.2, and an average current consumption of 0.88 watts per c.p.; however, one lamp, entered by Vandervell & Company, gave 33 c.p. on 22.3 watts, at the rate of 0.68 watts per c.p. The acetylene lamps averaged 20.8 c.p. on a consumption of 0.037 cu. ft. of gas per c.p.-hour. In the opinion of the judges of the test, ample illumination is afforded by a lamp of about 20 candle-power, which should be obtained on a consumption of 0.75 cu. ft. of gas (about 3 ounces of calcium carbide per hour) or 18 watts. This estimate, of course, presupposes efficient optical arrangements. Two headlights, two side lamps and a tail-light could therefore be run on rather less than 60 watts, which, allowing an efficiency of 75 per cent. for the dynamo, would take but one-tenth of one horsepower. A 6-volt, 60-amper-hour storage battery would run such a set of lights for six hours on one charging. The summary of the tests showed that with a given lamp the best results were obtained when the lamp was placed at a height of either two feet or seven and a half feet (as when on the roof of a closed car). When the lamp was placed at a height of three or four feet, a downward inclination made the dazzle worse. The worst of all positions tested was that with a height of five feet and no inclination; with the lamp in question the object was visible only at 22 feet. With the same lamp at a height of two feet and inclined five degrees downward, the same object was visible at 64 feet, the superior range being due to lessened height.

VULCANIZERS—THEIR WORK

Editor THE AUTOMOBILE:

[2,013]—Will you give me some information on the process of vulcanization? Are any of the gasoline vulcanizers practical for an automobile owner to use? Also, in the matter of acid (what acid?) cure, is this, in any way, injurious to the tire, and if so, to what extent? Is it a practical thing for an outside shoe? In fact, any information whereby automobile tire troubles may be lessened or remedied will be very welcome.

Nichols, Conn. W. T. K.

The process of preparing rubber to be used in the form of tires is not a long one, nor is it complicated, consisting of but a few steps. The crude rubber is cleaned, sulphur added to it and then baked into a unit by the application of heat. The cleaning process is called curing, and it is in this part that the acid is used. A rather long extract from the description of the whole process is given below. This, we think, explains the whole process in details sufficient for any one not a rubber expert.

Crude rubber, which is to be used for industrial purposes, is first subjected to a very thorough cleaning process. The fact that it is rendered plastic by heating, and that it retains the form given to it in this state at lower temperatures, facilitates its working. The working processes consist in cutting, rolling and kneading. The crude rubber is first laid in water for some time and is then cut by a constantly wetted, rapidly rotating circular cutter, into pieces of different sizes. The rubber chips thus obtained pass from the cutting machine between two rollers which turn at unequal speed and deliver a continuous brown-colored strip of rubber. By means of special kneading machines or masticators and rollers, the purified rubber is worked up into a homogeneous mass and is then dried. Frequently two closely spaced rollers are used, which are heated from the inside and rotated at equal speed. The main factors affecting the most important uses of rubber are the influence of temperature changes on its elasticity and its limited resistance to chemical agents. These weaknesses must be almost entirely eliminated by vulcanization; that is, the treatment of rubber with sulphur at a high temperature. This process consists in mixing rubber with from 8 to 20 per cent of sulphur, and at the same time with other desired ingredients, such as zinc sulphate, lithophone, talc, magnesia, chalk, etc. By means of rollers and kneading machines this mixture is first worked up into a homogeneous mass and is then heated. Of the admixed sulphur from 1 to 2 per cent is chemically united with the rubber, while the rest is either evaporated or remains as a mechanical admixture in the rubber.

The heating of the rubber sulphur mixture is one of the most difficult processes in rubber manufacture, as too high a temperature easily produces a horn-like substance, and if the temperature is too low, the process must be repeated. It is usual to work at between 110° to 140° C., and to continue this temperature for a time depending upon the mass worked upon. The most practical method of heating consists in the use of special steaming apparatus, cylindrical cauldrons, which are heated by steam and closed in front by a gas-tight cover. These contain inside wheeled trucks for the reception of the articles to be vulcanized. In order that there may be no change of form during the heating process the articles are placed in forms which are strewn with talc to prevent them from sticking. Heavy sheets of rubber are laid between iron plates; these layers are wound with layers of fabric on a drum. Fabric is vulcanized between heated rollers, driving belts in a heating press, etc. Instead of sulphur, sometimes other substances are used for vulcanization, such as the sulphur compounds of antimony, barium, calcium and lead. Rubber articles are given a red color by means of sulphur antimony and a white color by means of lithophone, magnesia, chalk, etc.

Another authority gives the range of vulcanizing temperature as between 130 and 150 degrees C., which is equivalent to from 266 to 302 degrees Fahrenheit. Still others specify different quantities of sulphur. Thus it is that experts agree on many of the details, but the main process as outlined above does not differ greatly.

The ordinary owner and operator of a car only uses the vulcanizing process to unite new pieces of rubber, such as patches, with the older and vulcanized, therefore different, rubber of the tire. The use of the vulcanizer is necessary to do this work in a proper manner, and one that will hold, just as if the two, the old tire and the new patch, were an integral part of one another. Aside from this, which amounts to making repairs in a proper manner, the average owner has no use for a vulcanizer nor for the process. The purchase and use of one, however, is a very desirable thing, since it enables the owner to attend to his tires at the first sign of trouble, and attend to them in a proper manner. In this way small and apparently insignificant cuts may be repaired before they grow and develop into large and unsightly wounds which may not be cured. This will result in prolonged life and increased mileage for the tires, which in turn reduces the cost of motoring per mile. This latter would be sufficient in the course of several seasons' driving to more than make up for the initial cost of the vulcanizing outfit.

GARAGE FLOOR CLEANER

Editor THE AUTOMOBILE:

[2,014]—Will you please inform me of something that I can use to clean the floor of a private garage, something that will remove oil and grease, and can be applied with the hands and not do them any harm.

New Rochelle, N. Y. B. GULLE.

A hot saturated solution of common washing soda will do very well. This can be made up in quantities and stored against future use. If this method is used, be sure to reheat it before using, the boiling point being about right. Since that will be too hot to apply with the hands, use any old broom or brush to "slosh" it around on the floor. An equally good, if not better, solution to use for this purpose is trisulphate of sodium, marketed by several chemical companies and sold at from four to five cents per pound at retail. This can be used cold and will not injure the most delicate hands: on the other hand, it will clean them very thoroughly, so that users of this solution use it for the hands as well as for the floors. This is strong, however, and may be used to remove paint.

The hands can be cleaned very thoroughly by the use of a mixture of soap powder and powdered pumice stone, the exact proportion varying with individuals, which proportion is soon determined by any one using it. For this reason the mixture, being indeterminate, it is not advisable to make up very much at one time.

GRINDING HUM OF GEARS

Editor THE AUTOMOBILE:

[2,015]—I have a * * * * * * Model F car; can you inform me through "Letters Interesting, Answered and Discussed," how I can eliminate that grinding hum from the gears? I have adjusted the differential gears both ways, but it seems to make little difference. J. C. BALL.

Kalamazoo, Mich.

This is a kind of trouble that we have never heard of as applied to this particular make of car. If it were the engine gears you might help it a little by substituting a fibre or rawhide gear for one of the intermediates, this usually sufficing to take out all humming and whirring noises.

You do not say what gears are at fault, but from the mention of the differential we suppose that you have reference to the transmission gears. Try the use of a different lubricant—that is, if you are using oil, resort to grease, and if using grease, try heavy oil. The writer has had unusual success with a combination of oil and grease for transmission gears, although none of the experts seem to think that this is right. The oil experts advocate oil at all times, while the firms making grease say that this should be used early and late, to the exclusion of everything else. It will not be possible to make the substitution spoken of above in the transmission, so you will have to look for looseness, and, failing that, experiment with oils, greases, and other lubricants until you obtain a noiseless lubricant, or one that will render your gear box noiseless.

PREFERS LIGHT OIL

Editor THE AUTOMOBILE:

[2,016]—H. L. Towle's article in your issue of August 19 contained an idea that I have always maintained, regardless of the manufacturer's instructions, to use a light oil when a transmission contains a plain bearing, and one that I find is seldom used.

Out of six Franklins that have come under my observation, one, and that the one I have been driving, have used a light oil. In fact, my transmission has never had anything heavier than Zeroline, the others using anything from dope to 600 W oil, with a result that instead of using from one to four bronze bushings inside of the main driving pinion within 10,000 miles, my car has better than 35,000 miles with practically no indications of wear at this point.

This result, I believe, would confirm the statement that "if there are plain bearings to be lubricated * * * * oil is almost invariably essential."

Billings, Mont. MURRAY B. FRENCH.

By "dope" the writer above means a mixture of oil and grease which is neither the one nor the other, being liquid at times and solid at other times. The writer has used this combination with the best of success in heavy truck transmissions, in which there were but four plain bearings on the differential, all of the transmission bearings being radial ball bearings or plain (not tapered) rollers.

WANTS HAND TIRE PUMP

Editor THE AUTOMOBILE:

[2,017]—Will you please ask some of your advertisers to give information, through the columns of "The Automobile" or "Letters Interesting, Answered and Discussed," where I can obtain a good, efficient hand air-pump that will readily put a pressure of 100 to 125 pounds into a tank in the garage, on which (the tank) a pressure gauge is permanently attached, making it possible in this way to fill a tire quickly and accurately? The value of such an outfit is in knowing exactly what the pressure is instead of guessing at it—and always guessing wrong when in a hurry. The pressure in the tank can be restored at odd times and maintained for ready use. A piece of pipe 8 or 10 inches in diameter and 10 feet long makes a good air reservoir.

Lima, O. C. F. LUFKIN.

The scheme outlined above is a good one, if any garage cared to follow it, but a much better one would be to have a power pump to fill the tank. This will not only pump the tank up quicker, and more surely, but the useless and exhausting physical labor connected with pumping against say 100 pounds pressure will be eliminated. With a power pump, there would also be no necessity to use so small a reservoir, the size in the suggested case being doubtless governed by the ability of one or several men to fill it and maintain the pressure within it at all times.

For the larger tanks, numerous makers of such outfits advertise in THE AUTOMOBILE, which statement is also true of power pumps. Since there is very little call for large-sized hand-pumps, very few of them are made or advertised. Doubtless, any one of the hand-pump makers would be glad to make up one on a special order. This would, however, be very expensive.

Another point to which attention is called in this connection is that with the power pump the garage man need not confine himself to the pressure stated above, 100 to 125 pounds, but can have from 150 to 200 pounds or higher if desired. This is worth considering with the modern tendency to larger tire sizes, which should, of course, have greater pressure. Thus, 95 pounds is recommended for a 5-inch tire; probably 110 would be about right for a 5 1-2-inch tire. At that figure, a single set of four 5 1-2-inch tires would exhaust the tank as suggested above, with pressure at 110 pounds.

CARS IN VARIOUS COUNTRIES

Editor THE AUTOMOBILE:

[2,018]—Will you please give me an approximate idea of the number of automobiles in use and the number produced in the past year in each of the following countries?

Denver, Col. R. H. HEAD.

Anything of this sort is always in the nature of a guess, except in the case of England, where it just happens that the Royal Automobile Club has compiled very complete and exact figures on this subject. France, too, can be given rather closely for a census was taken there, but as to this country and Canada it is only a very broad estimate. The figures follow:

	Total in Use	1909	Remarks
United States	200,000	80,000	Also 50,000 motor cycles
England	90,000	30,000	Also 65,000 motor cycles
Germany	21,000	5,800	Also 20,900 motor cycles
France	43,600	6,000	
Canada	3,000	500	

WINTER COOLING MEDIUM

Editor THE AUTOMOBILE:

[2,019]—Will you please advise me through "Letters Interesting Answered and Discussed," what would be the objections to using a very light oil for cooling as well as lubricating during the winter months. I have a Model T * * * * *, which is one of the early 1909 models and has a pump. Or, if you would advise against using the oil for cooling purposes, what would you advise using when the daily temperature is very low, around 30 below for weeks at a time in winter? E. W. J.

Norway, Mich.

Oil is very good for this purpose and if properly used, will raise the efficiency of the engine. To obtain this, you must select an oil which has a very low freezing point as well as one which is known to possess the peculiar quality of stiffening up very little under very low temperatures. Such an oil is marketed and sold for use with refrigerating machinery, and is known as refrigerating oil. In using oil, the supply need not be very great, that is, it is not as important as in the case of water, which is liable to steam away, in time. If for any reason, you could not obtain a proper oil, any oil picked up at random could be used, but would require a lot of care. Some prefer the use of alcohol or alcohol and glycerine. With the former a temperature of 30 below can be safely used, while the latter is more serviceable for slightly higher temperatures, minus 15 being its limit. The following table shows:

Alcohol Per cent by Weight	Freezing Point Fahr.
25	-3
30	-9
35	-16
40	-25
45	-36

GARAGE PLANS AGAIN

Editor THE AUTOMOBILE:

[2,020]—Will you please advise us whether you have published or any of your advertisers have offered plans of garages in the columns of "The Automobile."

Coatesville, Pa. C. R. & CO.

We have in preparation an article on the subject of garages, in the course of which plans of a number of private ones will be given, as was suggested in our reply to Letter 1,985 in the August 19 issue. This article will begin in an early issue and will run through several copies, all phases of the private garage being discussed.

HOW TO FIX CARBURETER

Editor THE AUTOMOBILE:

[2,021]—Will you please tell me why my two-cylinder engine, size 4 1-2 by 5, will not start on one or two crankings? I am positive that everything is all right. Occasionally it goes off on first turn and then again, under some conditions, I crank until red in the face, without results, especially in cold weather. The carbureter is a 1 1-2-inch * * * set between the two cylinders, with easy rounding curves in the pipes, on a level with the bottom of the cylinders. If I put gasoline in the priming cock, it will start on the first turn every time. The compression is good, as the valves have just been ground in. I have a 6-60 storage battery, the gasoline is 65 degree, and after starting the engine runs elegantly and has plenty of power, opening or closing the throttle making very little difference.

E. St. Louis, Ill. HARD STARTER.

From a perusal of the facts in your case, it would seem as if the trouble is in the level of the gasoline in the carbureter at starting, that is, the fuel level is such that not enough of the liquid flows into the mixing chamber in normal position. To remedy this, lower the nozzle so as to raise the level comparatively, trying 1-32 inch for a starter. This will cause more liquid to rise in the standpipe or nozzle, which will allow easier starting. To compensate for the extra fuel supplied in running, it will be necessary to allow the auxiliary air valve to open more than it does now. This, however, you will find out by trial after you have made the change in the nozzle level.

This same subject has been treated at various times in the past in different ways, and you are referred to the previous letters on the subject. These are: Letter 1876, May 13; letter 1910, June 17; letter 1940, July 15; letter 1952, July 22d.

Although there are no symptoms of trouble there, it would be well to overhaul your ignition system thoroughly at the same time.

LONG STROKES—MARINE USE

Editor THE AUTOMOBILE:

[2,022]—In the May 13 issue of "The Automobile" I noticed mention of a new French automobile engine (or, possibly, an airship engine) which had a rotary valve in the head and an unusually long stroke compared to the bore. The bore was about 4 inches and the stroke 9 1-2 inches. I would like to ask if this proportion is applicable to marine engines of the multiple cylinder type, with any prospect of success or advantage over the engine with bore and stroke more in keeping with the usual standard, say 4-inch bore and 4 to 5-inch stroke. G. W. TYRRELL.

Perth Amboy, N. J.

The use of a long stroke and the advantages appertaining thereto are available for any engine whatever, regardless of number of cylinders or purpose for which the engine is to be used. For marine use, however, it has an unusually applicable feature, that is, the long stroke motor delivers power at the slow speeds which are nearly always used in marine screws. This would eliminate gearingdown, as is necessary with a short stroke, high-speed engine, or its usual equivalent, throttling the engine, which reduces the power very materially. The latter is believed to be one of the reasons why the rating of marine engines is so small for equal bores as compared with automobile engines, that is, the makers appreciate that at the slow speeds used in marine work the engine will not deliver much power, and consequently rate them very low.

This is very apparent in the rating of any well-built marine engine, of which a single instance will suffice. One well-known maker builds among others three engines with a six-inch bore and seven-inch stroke. These are made in two cylinders, rated at 14 horsepower; four cylinders, rated at 28 horsepower, and six cylinders, rated at 42 horsepower.

With equally good material, workmanship, and construction, automobile engines of these sizes would rate according to formula at 28.8, 57.6, and 86.4 horsepower, respectively. But a manufacturer making an engine as large as any one of these would rate it higher, so that an average rating for these would be say, 33, 67, and 100 horsepower. The difference between the latter figures and the actual maker's rating for marine service is the difference between a speed of say 350 revolutions per minute, the maximum for marine use, and possibly 900 r.p.m. as the speed at which the engine might be run in an automobile, if it was desirable.

Now, these figures represent the power from an engine "more in keeping with the usual standard" as you have aptly put it. For a long stroke, which in this particular case would be anything from 9 inches up, the rated amount of power would be developed at a much slower speed, and at the rated revolutions, 350 per minute, more power would be produced. The engine in question (Anzani) had a ratio of bore to stroke of 1 to 2.56. This ratio applied to the engine in question would give it a stroke of 15.36, or to make it an even figure, 15 inches. That size of engine, 6 by 15, would deliver power more nearly like the automobile rating and accomplishment than like the ordinary marine engine, and that, too, at the speed of the marine power unit, namely, 350 revolutions per minute.

To show this matter to the lay reader in as simple a manner as possible, the accompanying curves have been plotted. This represents the imaginary curves of a six-cylinder engine for various lengths of stroke plotted upon the same ordinates as an actual power curve of a 4½ by 5½-inch engine. Six lengths of stroke are shown varying from 3½ inch up to 8½ inch all for the same 4½-inch bore. The former represents a ratio of bore to stroke of 1 to .78 and the latter, 1 to 1.89.

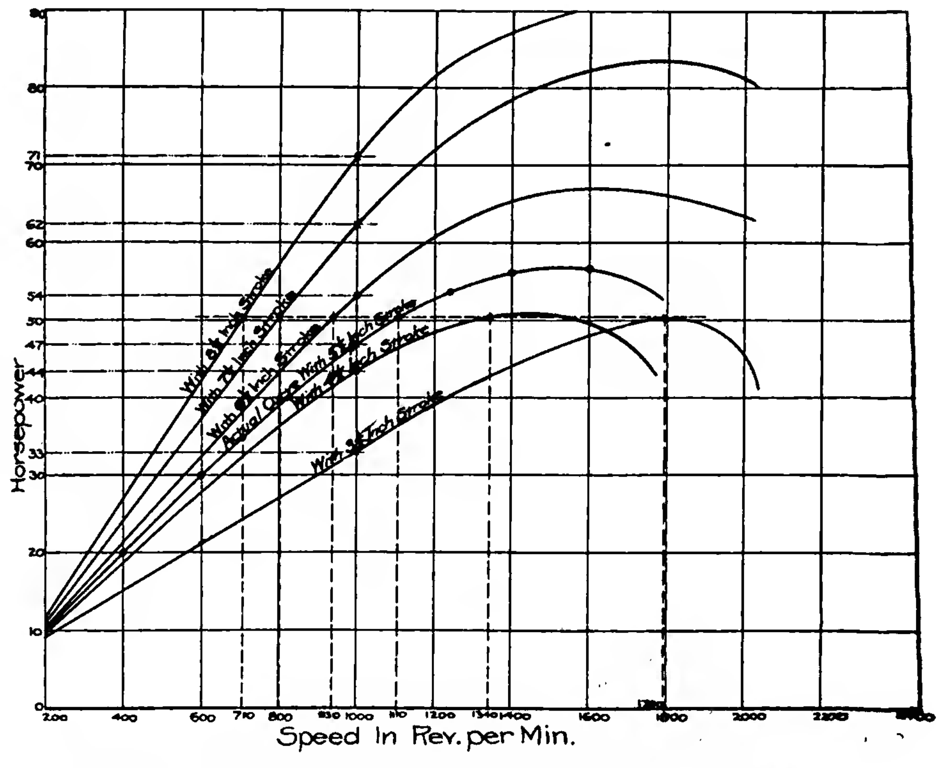
While these curves are imaginary, they are based upon accurate knowledge of what engines of the various strokes would do as exemplified in various special motors built abroad and at home. Attention is called first to the flatness of the curves of power for the shorter strokes, which gradually decreases until the line of equal bore and stroke is crossed, beyond which each curve is more steep and has less sign of a flat top or maximum point than its predecessor. Thus, the curve of the very short motor, 4½ by 3½, shows a very marked peak, at which the maximum power is developed, this being the only point at which that power is developed, the output increasing gradually but very slowly up to that point, and falling off very sharply beyond it.

With the longer strokes the falling off becomes less marked, until with the longest stroke, 4½ by 8½, there is nothing of this sort to be seen, the power increasing very markedly from the start of the test up to the maximum speed recorded, its steepness at this point being such as to lead one to the supposition that testing at a higher speed would continue to yield more and more power. Data are available for a motor of smaller bore, yet of comparatively the same ratio of bore to stroke, which continued to yield increasing power in about this ratio up to 2,400 revolutions, at which point the steepness of the curve had changed very little from that obtained at 1,500 revolutions.

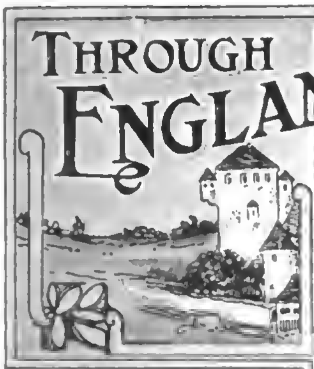
Attention is, moreover, called to the speed and power as there depicted. Thus, taking any speed at random, let us see what power will be developed at the different speeds. At, say, 1000 revolutions, the 3 1-2-inch stroke motor gives but 33 horsepower, the 4 1-2-inch stroke 44, 5 1-2-inch 47, 6 1-2-inch 54, the 7 1-2-inch 62, and the 8 1-2-inch 71. If the square motor be taken as a standard, these results mean a loss of 25 per cent in the short motor, and the following gains in the longer strokes: 5 1-2 6.8 per cent.; 6 1-2 22.7 per cent.; 7 1-2 41 per cent.; 8 1-2 61.5 per cent.

At a slower speed the differences are even more marked, as, say, 600 revolutions At this low speed, the 3 1-2 stroke develops 21, the 4 1-2 28, the 5 1-2 30, the 6 1-2 32, the 7 1-2 37, and the 8 1-2 43. In percentages these do not surpass the other figures, but considering the additional value of pulling power at slow speeds, the gain in the case of the three longer strokes of 14.3, 32.1, and 53.6 per cent. power over the square motor is of greater worth than the higher percentage of gain at the increased number of revolutions.

To compare the power output in another way, select the varying speeds at which some one power would be developed, as, say, 51 horsepower. This is only developed in the 3 1-2-inch stroke motor at the very high speed of 1,790 revolutions. Anyone could tell that in this the speed of 1,340 necessary to develop this power with a 4 1-2-inch stroke was a marked superiority. The same is true, but in a more marked degree, with the increased lengths, as exemplified by 5 1-2 1,110; 6 1-2 930; 7 1-2 805, and 8 1-2 710. To make the point more apparent, select a slightly higher power, as 52 horsepower. The two shorter stroke engines will not develop this at all, while the 5 1-2 stroke does it easily at 1,130 revolutions, the 6 1-2 at 950, the 7 1-2 at 820, and the longest stroke, 8 1-2 at 725. The selected facts and the diagram, itself, will at least afford some study, enough to more than pay for the time and work of making it. Anyone having in his possession actual and accurate tests of six-cylinder engines of this bore, 4 1-2 inches, and strokes differing from the one actual curve, 5 1-2-inch stroke, is invited to send in the figures. Or, curves based on accurate tests of four-cylinder engines, will be equally valuable and accepted as gladly.



Superimposed Power Curves of Motors with Same Bore and Varying Strokes




Through England's Heart with an American Car

By J.P.H.

To spend only a week or ten days on a motor tour of England is like rushing through the Louvre or the British Museum with catalog in hand and only stopping long enough before each picture to tick it off, and then passing on to the next, just to say one has seen it. Still, one can crowd a lot of pleasant sightseeing even into a brief period, as E. S. Partridge, of New York City, and his friends discovered when they recently made a flying tour in a 60-horsepower Stearns car.

Leaving London by the only straight road out of town—a relic, by the way, of the days when the Romans were building roads in England, and built them straight—the first place of interest is St. Albans, probably the oldest cathedral town in Great Britain. The ancient structure, restored some years ago, stands a little off the highroad, and the merest glimpse of its square tower is all that is available in passing.

Here begins the famous coaching road known as the Holyhead road, on which the Irish mails used to travel in the days when railroads were unknown. It is still a fine, smooth road, with glorious spreading meadows on both sides, dotted here and there with a field under cultivation. Through Dunstable, Towcester, Daventry, we come to Dunchurch. Coventry, the home of the British motor car—not to speak of Lady Godiva and a few other celebrities—is only a dozen miles from Dunchurch. Here the Daimler cars are made; the managing director is an American, Percy Martin, who has introduced many American methods.

The beaten track past Coventry is through Warwick and Worcestershire, otherwise "Shakespeare's Country," but, unfortunately, the imperative duty of making a call upon relatives in the city of his birth, compelled our skipper to steer the Stearns on the broad highway from Coventry to Birmingham, the Chicago of England. Two days' rest in "Brummagem" and we were once more on the wing for our flying trip through the heart of England. Heading northwest for our next destination, Nottingham, we are reminded of a bit of ancient history as we pass through Ashby de la Zouch, the scene of the famous tournament which Sir Walter Scott has immortalized in Ivanhoe. But the worst of a motor tour, especially where you want to get over a lot of country, is the way one has to skip these interesting places, even though you may make a mental reservation to come back some future day when you can stay a little longer.

Much the same conclusion was reached on leaving Nottingham, where the road passes through Sherwood Forest, an enchanting spot with the branches of the greenest trees we ever saw meeting arch fashion across the smooth gravel roadway. Visions of Robin Hood and his Merrie Men, not forgetting old Friar Tuck, seem to flit among the shadows cast by the sunshine through the waving foliage. Our next objective was Doncaster, the only town in England where they are not ashamed to own that horse racing is a profitable game. Indeed, it is said that the profit on the Doncaster racecourse, which is one of the finest in the country, pays all the local rates, poorhouses, roads, municipal government and all the rest of it except the King's taxes for the central government in London. However that may be, certainly Doncaster looks prosperous enough.

The Great North road, which used to be the connecting link between England and Scotland, leads from Doncaster north to the ancient city of York. It is a magnificent road, and like all the best roads in this country, dates back to the days of the Romans. How those old warriors built their roads, which are still as smooth as city boulevards, although their edges are covered with grass mounds, the accumulation of centuries, is a marvel. To "open 'er up and let 'er go" is only natural on such a smooth stretch as this, and we should certainly have done so but for a little warning we had shortly after leaving Doncaster, which damped our enthusiasm for some time after.

Standing by the roadside was a man with a bicycle and a yellow armlet around his sleeve. As we approached him, our guide signalled to him, and in response he threw back the lapel of his coat disclosing a red disk of about three inches diameter pinned to his vest. The performance had an air of mystery.

E.S. Partridge and J.P. Holland at Brooklands

"Police trap," exclaimed the guide, at the same time motioning to the skipper to slow down. Then he explained that the man with the red disk was one of the Automobile Association patrols or scouts. His job was to keep track of police traps. Where the road is clear he will notify passing cars that there is nothing to fear, but when there is danger ahead he shows the red disk. He had scarce finished this explanation when we saw behind a hedge two figures that looked suspiciously like plain clothes cops, and a little further along the road we came

Warwick Castle, the Ancestral Home of the Great "King Maker"

across a man in uniform who glowered at us as we passed at a fifteen mile an hour pace. The game of trapping motorists is, in some sections of this country, almost as profitable as horse racing in Doncaster.

To read English history in bricks and mortar- onc should visit Old York. Whatever induced the early settlers of Manhattan to dub their town New York is certainly a mystery, for anything more unlike the old city of that name it would be difficult to imagine. The ancient city walls, York Minster sooty with age, the old Shambles, Pettergate, Bootham Bar, and all the rest of the landmarks which centuries have left make York a museum of antiquities in which the modern street car, not to speak of our Stearns, seemed as much out of place as an ox team would be in Broadway, New York.

From Harrogate north to Bolton Abbey, one of the most picturesque ruins in England, the road was not exactly up to the standard of the great highways we had been traversing; in fact, all these old abbeys seem somehow to be sidetracked from the modern trunk highways, and, moreover, to be, many of them on the highest bit of ground for miles around. The particular peak on which Bolton Abbey stands, midway between Harrogate and Shipton, has a gradient of twenty-five per cent. in places.

Through Shipton and Settle an up and down road leads to Kendal, the front door of the Lake District. Getting into Kendal is a ticklish job by car to the man who enters for the first time, and especially if, as on this occasion, the roads be wet. Signboards by the roadside warn drivers that "This Road is Very Dangerous," meaning that unless one's brakes are in good condition the driver had better proceed gingerly on low gear. For a mile or so the winding tortuous road sinks and sinks at every yard till the foot-brake band begins to rebel at being called to act so often. Then just as you imagine you must have got to the bottom or thereabout, the road suddenly drops at a gradient suggestive of falling off a house, and before you know it you are in the narrowest, crookedest street since leaving London. This is Kendal. A mile or so of similar narrow alley, with an occasional open market place, where you pick your way among heaps of garden refuse and crowds of straggling market people, brings you on to the road for Windermere, the queen of England's lakeside resorts. Two days' rest here was altogether too brief to allow more than the fleetest glimpse of the marvelous beauties of this jewel of British scenery.

"When Knights Were Bold," one of the most amusing comedies of recent years, pictures the hero of the play suddenly awaking in the middle of the twelfth century, or, as he puts it, "seven hundred years behind the times." That is about how it felt next morning at Chester. The furniture of the hotel must have been centuries old, but one gets used to that sort of thing traveling around England. It was outdoors that we got the surprise. It had been just growing dusk when we arrived the night before and the fantastic shapes of the buildings did not particularly strike us. But coming out into the street in the clear sunny morning and suddenly finding oneself surrounded by buildings that look for all the world like the stage setting of a scene from "Henry V," well, it certainly did make us feel a bit stage-struck, if nothing worse. Even the British "Bobby," with his helmet and silver buttons, seemed a part of the show somehow. A stone's throw from the hotel was an archway crossing the street, which the "buttons" informed us was the old Town Wall. At his suggestion we investigated this relic at closer range, and found that we could ascend to the parapet by a stone stairway from the street, which we did, and had the satisfaction of walking half a mile on the old ramparts returning for breakfast at the hotel.

Conway Castle, Wales, and the Beautiful Bridge Adjoining

Then off and away from the earliest Roman camp in England, westward to Wales to the delightful watering place, Llandudno, nestling under the wall of old Conway Castle, an ideal spot for a lazy summer holiday. Thence direct south brings us into an enchanting country of woodland and valley, which grows wilder at every step until we reach a perfect fairyland of fern-covered dells, dancing waterfalls, leaping rivulets, sheltered under moss-grown trees from which hangs a drapery of verdure which resembles nothing so much as old lace. This is Bettws-y-Coed. Of course it is Welsh, and so is Llangollen (pronounced Clangothlan), where we envy the lounging holiday makers who have time to stay to admire the beauties of this wonderful valley. Still we were glad even for the all too brief peep at this scenic gem of North Wales.

The Valley of Llangollen, a Scenic Gem in Northern Wales

There is one curious feature of traveling over England which has puzzled many people, and that is, the variety of dialects encountered. To attempt anything like a description of the many varieties is a bigger job than I propose to tackle. At the same time I think one can find some explanation of the variation when hurrying over the country in a motor car and noticing how the general appearance of the land seems to be echoed as it were in the lingo of the natives. Thus from Bath down to Exeter or Plymouth the main feature of the road was the high hedges on either side, making the roadway little better than one continuous green alley, through which the hum of our wheels reverberated as though another car was following us. In the same way whenever we accosted a native in these parts his talk seemed to be full of a buzzing sound that made it most difficult to understand. I don't know if this explanation is very clear, but if it is a bit obscure then it is only in keeping with the lingo I speak of, which was simply "thick."

Of the last day's run in this flying trip I must make short work. Through Exeter, Salisbury, Basinstoke, Bagshot, and through Windsor Forest we drove, arriving at Weybridge in time for the bank holiday motor races on the Brooklands track. Here we found many old friends and a fairly enjoyable afternoon's racing. During the course of the afternoon we were introduced to Major F. Lindsay Lloyd, the manager of Brookland's track, and our best persuasion was exercised to obtain his permission for a trial run of the Stearns around the track after the race was over. He, however, declared that much as he would like to grant the permit, it was absolutely impossible.

Leaving the grounds after the race was over, however, we had to cross the wide asphalt track. One or two cars which seemed to be going around the track proved a temptation not to be resisted, and the first thing we knew the skipper had turned Stearns' nose to the left and was headed with wide-open throttle for the big bend behind the grandstand hill.

Although we were five up, she responded like a grayhound to the call. Speed? You never know what speed means till you try to find it at Brooklands. Up and up the scooped out banks we crawled sideways as our car flew ahead, and then down into the straight nearly a mile long, and once again around a curve that simply adds momentum for the next mile straight. Over sixty for the first lap! And now we are just beginning to warm up. Round the big bend once again, higher up the bank this time and we dash into the straight. The asphalt ribbon rushes under us and a double-header railway train on the track above us is passed as though it were standing still.

But when we slowed down at the gate and Major Lloyd overtook us in his little car and said what he thought about our disobeying his express injunctions—well, it took all the pride out of us, and we offered to submit to any penalty he might impose for our disobedience. Certainly, the experience was cheap at any price short of confiscating old Stearns herself. And for anyone who wants to know just what a car can do and what it feels like to get every inch of speed out of a car, the journey across the ocean is worth while if it ends at Brooklands. But I would certainly advise them to get a permit from Major Lloyd first. He is one of the most genial of good fellows, and will strain a point to oblige a visitor. But when he says "No," he means it, and the applicant had better retire gracefully.

We cannot hope to rival England's charming rural scenes or the romantic and historical interest of her cities, but we can at least hope that some one will build us a Brooklands.

A Street in Holcombe Village—Typical of Devonshire

Grand Stand and Starting Point of the Recent Aeronautical Tournament on the Betheny Plain, at Rheims

CHAPIN BELIEVES IN AEROPLANE AS FUTURE INDUSTRY

PARIS, Sept. 8—After touring extensively in Europe, visiting many of the French and Italian factories, and being an interested spectator at the Rheims aeroplane races, Roy D. Chapin, of the Chalmers Detroit Motor Company, left Paris for London this week with the intention of sailing for New York towards the middle of the month.

Mr. Chapin was more impressed with the aeronautical movement in France than with the progress that is being made in automobiles.

"The French have reached a settled stage," he said to THE AUTOMOBILE representative, "whereas in America we are all alive on the automobile question and are making progress daily.

Paulhan In Flight at Rheims, Just Before His Accident

"In the matter of flying machines it is different. The Rheims week was a marvelous demonstration, fully proving, if any proof were needed, that the aeroplane is not a scientific toy, nor a passing fad for wealthy and idle sportsman. Flights were made there which showed the real value of the aeroplane as a means of locomotion. I feel certain that as the result of things they saw during the flying week at least fifty Americans will become the possessors of aeroplanes during the next twelve months.

"I am not inclined to believe, however, that there is any opening for an industry for the next four or five years. At present the aeroplane is a scientific and a sporting proposition. It is not, however, sufficiently developed to be independent of the weather and state of the land over which flights are to be made. Until it gets to such a state of perfection that it can go out in any ordinary weather it is not likely to be important as an industry.

"One of the most remarkable features of the movement is the attention that has been given to lightweight motors. There were some marvelous pieces of engineering on the aeroplanes at Rheims, one of the finest pieces of work being the seven-cylinder rotary Gnome motor used by Farman and Paulhan. It appears quite likely, however, that as the aeroplane progresses the necessity for specially light motors will become less and less. At the same time this does not diminish the value of the work done towards the lightening of motors.

"I am pleased that Curtiss won the Gordon Bennett cup for America, for it will waken up the country to the importance of flying as nothing else could have done. All the Wright flights with the exception of those at Washington have been done in secret, and the only other public flights have been those made by Curtiss down East. Thus the Middle West and the West have never had an opportunity of seeing an aeroplane, and quite naturally have never had much interest in them. The winning of the cup will change all this.

"Though we have no intention of jumping into the aeroplane business immediately—it is doubtful, indeed, if any American automobile manufacturer will do so—we are keeping a close watch on the flying movement. You can be certain that when the time arrives we shall not be the last to get into the swim."

Santos-Dumont Breaks Speed Record

SAINT CYR, FRANCE, Sept. 13—Santos-Dumont to-day made a cross-country flight of eight kilometers in about five minutes. His speed was at least 90 kilometers (56 miles) an hour. The machine was a monoplane weighing but 300 pounds.

BRITAIN BECOMES KEEN ON AERONAUTICS

London, Sept. 8—The past four weeks have witnessed a surprising outburst of interest and enthusiasm in matters aeronautical throughout England. For some time there has been a growing feeling that the country was falling behind in a matter which was of supreme importance to it on account of its insular position, and this feeling has been brought to a head by the success of the recent Rheims aviation meet. Aero clubs are now in course of formation at all the important centers, and this bringing together of interested parties is bound to produce practical results in the near future.

So far, there are not more than a dozen complete aeroplanes in the country and only three or four have yet made proper flights. But of these Cody's machine must be ranked as equal to any of the foreign productions. No alterations have been made in the machine since the first successful flights three weeks ago. The latest performance was made last Saturday, when, after several passenger flights, a cross-country journey of eight miles was made. This was reliably timed to occupy 9¼ minutes, equivalent to a speed of 52 miles an hour. As the fastest performance at Rheims was the 48 mile-an-hour circuit of Bleriot, also on Saturday last, Cody seems entitled to the honor of record-holder. Doubtless an officially timed attempt will be made to decide the point.

There are several projects on foot for holding aviation meets over here, and the one most likely to materialize is that at Blackpool. The authorities of this enterprising seaside resort, noted for its motor meets in the earlier days, went as a deputation to Rheims, and, according to their report, sufficient promises of entries have been received to make success assured. Details have not yet been settled, but the date is likely to be during the second week of October, and the prizes will exceed $30,000.

The Aeroplane Club has also been endeavoring to arrange a meet at Wembley Park, only a dozen miles from the metropolis, but as a permit was never obtained or even asked from the ruling body—the Aero Club—it is unlikely that continental aviators will risk the suspension which would certainly follow their participation in an unauthorized meet.

Fortunately for the success of future meets, the Rheims contest has shown that it is not necessary to provide so extensive a track as was previously thought necessary, but that a circuit of three miles is ample. In view of this fact, the Brooklands authorities are clearing the large space within the track, and doubtless aeroplane events will soon figure on the program.

Timers' Stand and One of the Signal Poles at Rheims

Prizes for flights are becoming too numerous to mention. Some of these will serve a useful purpose, but others are impossible of realization and the action of the donors is to be deprecated. Of this nature is the prize offered by a London firm—obviously for purposes of advertisement—for the first flight across London. A twenty-mile flight across the crowded city would be accompanied by great danger to both aviator and the people below, and it is felt that steps should be taken to put a stop to these publicity dodges. Quite another thing, however, is the generous prize of $20,000 offered to the Aero Club by Baron de Forest. This is to be awarded to the aviator who flies the longest distance without a stop from any point in England to the Continent.

At the Rheims Tournament the Hospital Service and Emergency Equipment Was Complete in Minutest Detail

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HOW SHALL MATERIAL BE PROVEN

With the growing importance of metals in the modern chassis has come a call for more accurate and dependable information relative to the qualities and composition of the more common metals, as well as those of the highest grade. Engineers have asked: "Of what avail is it to use and pay the price for steel of 175,000 pounds tensile strength, when in service this metal yields but the equivalent of 150,000 pounds and in other ways does not behave as well as an apparently inferior material?"

So it was that the establishment of laboratories became rather general, these being confined mostly to machines for measuring the physical qualities of the material. As time passed, it was found out, by sad experience, that the metal would not always do the work claimed for it. The first impression was that the alloy steels had been overrated, and, laboring under this delusion, many manufacturers went back to steels of simpler composition. Others, more far-sighted, asked whether they were actually getting the chemical composition for which the claims were made and for which they were paying. This necessitated the establishment of a chemical adjunct to the physical laboratory.

While this second step forward brought results, several years of service brought forth many complex problems of a different nature, resulting in the necessity for other and widely differing testing machines. This is exemplified by the torsional machine, to measure torsional or twisting ability, a quality formerly neglected. Another is the machine to apply alternations of stresses, measuring and evaluating them at the same time. In this work experimenters came in contact for the first time with the century-old work and results of Wohler and Fairbairn, which were soon shown to be in line for revision and modernization.

Thus it was that the function of the laboratory underwent a change. From the former place where much money was expended, it became a place where money was saved. This resulted in its being given a more intelligent consideration, and a more prominent place in the factory, both as to location and as to personnel. To-day the tendency, as shown in an able article on this subject elsewhere in this issue, is toward the most importance for the laboratory and its resulting work.

AUTOMOBILES DEMAND ATTENTION

Not so many years ago automobiles were regarded as presumptuous intruders on the public highways, existing only on the suffrance of the other users. In England, until the passage of the "Motor Car Act," which only recently saw its tenth anniversary, automobiles had to be driven at a speed of not more than four miles an hour, preceded by a man on foot carrying a red flag. Holland, we believe, once seriously considered excluding them altogether. The day of such annoyances is by no means past; but now the great army of automobile users need not beg humbly for scattered favors. They can ask for their rights in a way not to be neglected.

The State authorities of Massachusetts recently instituted a census of road traffic as novel in form as it was commendable. The details and figures are given elsewhere in this issue. The results of this census, although not surprising to well informed and observant travelers, will be somewhat startling to those who have not been keeping abreast of the times in this respect. Briefly, the figures show that over one-third of the road users in Massachusetts are automobilists. Nor can it be said that this proportion is exceptional. Many will be found to assert that the same would be found true in every State north of the Ohio and the Potomac and east of the Mississippi. We can hope for no better fortune than that the authorities of these States will institute censuses similar to that of Massachusetts. Then the blindest cannot deny the conclusion.

One-third forms a very respectable minority. With such a weight of numbers the automobiling public with reason can demand certain reforms for which formerly it could but petition. First among our needs is a National Highway Commission, with such powers and appropriations as will enable it to give substantial aid in the building of trunk highways, as well as guiding and directing State constructions. Then we will have uniform State laws, abolishing arbitrary speed limits and compelling all road users to carry lights at night. Finally there will come National registration. Once Utopian dreams, these benefits lie now in the automobilist's grasp if he will but use the strength of his numbers. Organization is the source of all power, and clubs will now assume even greater importance.

HALF OF MASSACHUSETTS' TRAFFIC IS MOTOR-DRIVEN

BOSTON, Sept. 13—Preliminary figures from the data acquired in the recent road census taken by the Massachusetts Highway Commission reveal the remarkable information that 45 per cent. of the traffic over the State roads is motor-driven. Though well aware that the use of automobiles over the State roads had grown very rapidly, the Highway Commission was surprised to find that it made up so large a percentage of the total use of the roads, and it is now preparing detailed data covering the entire State.

The census was taken the week of August 22 to 28, and there were established 240 stations at which a count was taken for fourteen hours each day of the week. At a few stations also a twenty-four-hour count was made. All vehicles but bicycles and motorcycles were counted, and they were divided into six divisions, four for horse-drawn vehicles and two for motor-driven. The count was also kept in two-hour periods. When the census field work was completed the commission had nearly 1,700 cards, and these are now in the hands of its clerks, who are transferring the original figures to sheets, computing totals by districts, routes, and for the State at large, figuring averages and percentages.

The work is so complicated that in only one section of the State has it begun to approach completion. This division includes Essex, Middlesex and Suffolk counties and a part of Worcester and Norfolk counties, the area being the northeast corner of the State, north of Boston and east of Worcester. In that division there were 77 observers' stations, some of which were on the main routes of automobile travel, such as those of the North Shore, to Worcester, Lowell and Lawrence.

In advance of the official compilations, Secretary A. B. Fletcher, for his own information, took a few totals from this district, and his calculations gave the remarkable total of 45 per cent. motor-driven traffic. Out of a total of 24,019 vehicles counted in this district 10,622 were automobiles, which is exactly 44.4 per cent. This percentage may not hold as strong in the central and western parts of the State, or it may run higher; no figures are yet available for the other districts.

According to Mr. Fletcher, the heaviest traveled spot on State roads in the State so far discovered is in the city of Lawrence on the State road leading to Haverhill. At this station the observer counted an average of 2,440 vehicles each day of the week of the census, and one day nearly 4,000 vehicles passed his post. The numbers ran so high that the highway commission feared an error had been made, but investigation confirmed the figures of the observer. Of the average of 2,440 vehicles a day, 820, or 33.61 per cent., were automobiles. Another very heavily traveled place, where the ratio of motor vehicles to horse-drawn was just about the reverse of that at Lawrence, was discovered near President Taft's summer home at Pride's Crossing, North Shore. On the Shore road the observer counted an average of 1,611 vehicles a day, the automobiles averaging 976, or 60.58 per cent. of the total. At Weston Center, on one of the main routes to Worcester, the average number of vehicles was 990, and 38.59 per cent. were automobiles.

Much information of great value to the commission and to everybody interested in road maintenance is sure to be derived from the census figures, which, when wholly worked out, with deductions drawn therefrom, probably will be prepared in such form that they can conveniently be distributed. Another week's census of the State roads, and also of roads in the Metropolitan park and Boston park systems will be taken next month.

Up to the first of this month motorists had paid the State of Massachusetts this year in registration and license fees the sum of $151,635.52, this sum having been received by the State Treaurer from the Highway Commission and credited to the road maintenance account.

NATIONAL GRANGE GREATLY INTERESTED IN ROADS

MEMBERS of the National Grange evince much interest in the Second Annual National Good Roads Convention to be held in Cleveland, September 21-23, and several officers of the Grange will take the platform to help along the work. Ex-Governor N. J. Bachelder, of New Hampshire, present master of the National Grange, will speak on the opening day on "The National Grange and Good Roads." He will be followed by George S. Ladd, a special good roads lecturer of the Grange, who will speak on "The New England Plan for Connecting Lines of Trunk Highways." September 22, T. C. Laylin, master of the Ohio State Grange, will speak on "The Farmers' Interest in Road Improvement," and F. N. Godfrey, master of the New York Grange, will tell of the work being done by the members of his organization and the good roads legislation in his State.

The National Grange, in conformity with the resolution adopted at its annual meeting a year ago to the effect that the Grange favors the general policy of good roads construction by the various municipalities, counties, and States, and that it also advocates the enactment of legislation by Congress making Federal appropriation for the improvement of highways, is lending its enthusiastic support to the bill recently introduced in Congress by the Hon. Frank D. Currier, of New Hampshire, providing for the creation of a National highways commission. The bill has been endorsed by the various State granges throughout the country, showing clearly the increasing interest of the farmers in good roads, and the realization of their benefits.

"The farmers recognize the need for better roads, and realize how largely such roads would contribute to their comfort and prosperity," said National Grange Master Bachelder in a recent address. "They are anxious that well considered plans for road improvement should be submitted to the State and National legislatures, and will do all in their power to aid in securing the adoption of such plans. They have made up their minds that Congress must devote a share of the annual appropriations to the construction and maintenance of our roads. National aid will not lessen local road activity. On the contrary, the roads constructed with Federal assistance will serve to stimulate everywhere the desire for better roads, and will be the means ultimately of giving the entire country a uniform system of scientifically constructed public highways."

The order of the Grange, or Patrons of Husbandry, was founded 42 years ago, and now has affiliated branches in 28 States, with a total membership of one million. The unit of the order is the local grange composed of the farmers of one community. The National Grange is the national organization composed of the masters of the State granges, each State having equal representation. The farmers of the country were virtually the first road-makers, and in many localities the work of maintaining the roads is still in their hands. One of the big features in the grange movement for good roads is the proposition for the construction by the New England States of trunk lines of highways. This subject was recently presented before the New England State governors by the State Highway Commissioner of Connecticut, James H. MacDonald, and as a result of the favorable action taken at that time plans are now under way to present the matter in a proper form before the State legislatures.

A. M. C. M. A. COMMITTEES MAKE PLANS

New York, Sept. 13—Decorative plans for transforming the Grand Central Palace into a French trellis garden were approved at the meeting of the Committee of Management last week. Inasmuch as the show this year will be the only international one it is expected to be of greater importance than ever, and the show committee, consisting of R. E. Olds, chairman; S. H. Mora, H. O. Smith, D. J. Post, and Benjamin Briscoe, is bending every effort to make it so. The exhibition will take the place of the Paris Salon, which will not be held until the fall of 1910.

In addition to considering the show plans, the committee transacted much other business of importance. S. H. Mora chairman of the membership committee, reported that four new concerns have been admitted to membership, and a number of applications will be considered at the next meeting. Charles Lewis, president of the Jackson Automobile Company, has been appointed the representative of the A. M. C. M. A. at the good roads convention of the A. A. A., to be held at Cleveland. Plans for an exposition in Berlin, Germany, of American goods were discussed, for the promoters have set aside 10,000 square feet of floor space for American automobiles and the interests of the members of the association have been placed with the show committee. The dates set are for next May, June and July.

Those present at the meeting were: H. O. Smith, Premier, chairman; C. G. Stoddard, Stoddard-Dayton, vice-chairman; S. H. Mora, Mora, treasurer; James W. Gilson, Mitchell, secretary pro tem.; W. H. VanDervoort, Moline, auditor; Benjamin Briscoe, Maxwell; R. E. Olds, Reo; Charles Lewis, Jackson; W. C. Marmon, Marmon; D. J. Post, Veeder Manufacturing Company, and Alfred Reeves, general manager.

NEW FACTORY FOR FIRESTONE COMPANY

Akron, O., Sept. 13—On a tract of ground in this city, 15 acres in extent, will soon be erected one of the largest and most complete tire factories in the world. It will be built by the Firestone Tire & Rubber Company, which has outgrown its present plant and will make it the largest concern in the world producing only rubber tires. The erection of the new buildings will show the rapid expansion of the company, for it is comparatively young in this industry. It was founded in 1900 by H. S. Firestone, but it was not until the fall of 1902 that Firestone tires were produced in a factory of their own, and that a small one-story structure in which were employed 20 men. As the product became better known the building had to be enlarged, until at present the firm occupies an immense four-story factory equipped with the best machinery obtainable, and employing 600 men. Even this has become insufficient, however, and the new plant is to be the result. Both pneumatic tires and solid ones will be manufactured as in the past, and the output will be far greater than that of any time heretofore.

ANNOUNCEMENT OF 1910 ALCO MODELS

Providence, R. I., Sept. 7—The 1910 Alco models have just been announced by the American Locomotive Company, and both the cars and their prices show noticeable changes. The Alco has now definitely abandoned the chain drive for its own system of shaft drive, in which the load-supporting member of the rear axle is a solid drop-forging. This drive has been thoroughly tested in the Alco town cars and taxicabs, in which it has been always used, and its adoption in the larger models is in no way remarkable. Another important change is the adoption of the Bosch dual system of high-tension ignition, which includes a storage battery with the magneto, although both work on the same set of plugs. The use of the battery enables the motor to be started on the spark. With these changes goes a considerable reduction of prices. Last year's three models will be continued in general in this year's 22-horsepower town car, 40-horsepower four-cylinder and 60-horsepower six-cylinder.

CHANGES IN ATLANTA TRADE CIRCLES

Atlanta, Ga., Sept. 13—The automobile map of this city has received some great changes within the last few days, through the establishment of new agencies, the moving of old ones, and the opening of new buildings. One of the most important was the formation of the Corker Motor Car Company, with the following officers: President, S. A. Corker; secretary and treasurer, E. H. Ellerby; manager of city sales, C. H. Alexander; manager of out-of-town sales, M. Z. L. Fuller, recently of the Haynes Company. The company will handle the Haynes cars for the States of Georgia, Florida, Alabama, Tennessee, North and South Carolina, and the Matheson car for this State. A commercial line will probably be added as soon as a garage can be obtained or built.

Winton cars will soon make their début to Atlanta in the handsomest show rooms for automobiles in the city. Herman Haas, the new agent, has secured one of the stores in the new Masonic Temple, where he is spending considerable money for fittings and furnishings. J. S. Goldsmith has taken the agency for the Speedwell cars, having closed a contract through S. E. Edsall, of the Speedwell factory. A location has not as yet been secured. The new Olds-Oakland Company will in a few days move to its new show rooms at 132 Peachtree street, and will have a special garage built shortly.

The new Murphy building has given space for two concerns, one the Steinhauer & Wight Company, handling the Packard, Pope-Hartford, and Cadillac; and the other, J. E. Levi & Co., the new agent for the Reo and Premier. Each concern will have two stores combined and will take possession shortly.

BUFFALO'S AUTO TRADE ACTIVITIES

Buffalo, Sept. 13—The taxicab business is making great progress. Up to the present time the E. R. Thomas Motor Company has delivered, all told, 1,942 taxicabs, and has under way some 700 of this type, with a demand quite in excess of the output.

The Pierce-Arrow Motor Car Company is fast completing preparation for the prompt delivery of 1,500 cars during the delivery season for 1910. About 1,500 men are in full swing.

The Allyne Brass Foundry Company reports deliveries from the Buffalo branch of more than a carload a week of aluminum, brass and bronze castings, mostly used in automobile work.

The Crosby Company, at its large plant, is delivering vast quantities of drawn and pressed steel to the automobile trade in the shape of hubs, covers, brake-drums, body irons, etc. The process used by the company permits the use of fine grades of steel, induces lightness with strength of parts, and from the point of view of delivery there is no process that is more conducive of results.

ONE BY ONE HORSE-CABS DISAPPEAR

Baltimore, Sept. 13—Taxicabs are fast taking the place of horse-drawn cabs in this city. The latest convert is Harry L. Stewart, who has turned his stables into a garage for taxicabs. Next week he will begin a taxicab service which will represent an investment of $80,000. As a starter 25 Alco machines will be put in commission, with more to follow if they are found necessary. The cars will have blue bodies with red wheels, and the taximeters will be driven from the front axles.

METEOR FACTORY IN CONFLAGRATION

Davenport, Ia., Sept. 10—The Meteor Car Company had a disastrous fire last night which completely destroyed its entire factory, with the exception of the office building. With the latter, however, were saved all drawings, patterns, jigs, special tools, etc., and, in fact, all necessary working material for the 1910 models. The company cannot determine how long it will be before operations are resumed, but will do everything in its power to get under way again in record time.

Rambler Eastern 1910 Test Car leaves factory — driven by G.S Patterson of Cleveland Branch

Rambler 1910 Test Car leaving factory for 5,000 mile test trip to South and Middle West

UNIQUE BUT THOROUGH ROAD TEST

KENOSHA, WIS., Sept. 13—One of the most unique methods of testing a car was pursued in the try-out of the 1910 models of Thomas B. Jeffery & Company, makers of the Rambler. The method had all of the advantages of a factory or expert test, and in addition the merit of making the various agents familiar with the new car in advance of the time, which would otherwise be the case. It consisted of sending out two of the newest additions to the Rambler family, one to the East, and the other to the South and West. These were manned by drivers from the various agencies, each crew driving on to another agency, and there turning the car over to the crew selected by the manager there. In most cases, the picked crew consisted of the manager himself.

Included in the itinerary of the eastern car were Cleveland, Toledo, Pittsburgh, Harrisburg, Philadelphia, New York, Boston, Albany, Buffalo, and back to the factory through Cleveland, Toledo and Chicago. The car traversing the West went from the factory to Chicago, South Bend, Indianapolis, Louisville, Nashville, St. Louis, Kansas City, Omaha, and thence back to the factory through Chicago, in charge of J. T. Stewart, of the Coit Automobile Company of Omaha. Not only did this method of testing the car put it up against every kind of road conditions, as, for instance, an impassable mud-hole in Kansas, which delayed it for 13 hours, but a wide experience in driving on the part of the various dealers was assured. The details of the car will be announced later on. Both cars returned to the factory in perfect condition, but it was thought wise to defer the announcement of the details until all of the agents who had driven the cars had written in and reported their widely differing experiences with the test cars.


Rambler Eastern Test Car reaches Frazier's Garage South Bend, Ind.


Prince Wells, Louisville agent driving 1910 Rambler Test Car


Rambler 1910 Eastern Test Car at Toledo


Rambler 1910 Test Car reaches Chicago in charge of J T Stewart

1910 Test Car [illegible] Headquarters, Cleveland


Kingman St.Louis Implement Co take charge Test Car for trip to Kansas City


Manager Rockwell of Boston Branch receives Rambler Test Car at New York and drives it to Hartford, Conn.


E.G. Anderson of Rambler Auto. Co Kansas City, driving Test Car from Kansas City to Omaha

NEWS IN GENERAL

A Party of Franklin Travelers on a Tryout of 1910 Franklin Automobiles
Photograph taken on top of Mt. Taupin, New York

Sample of Franklin Testing—On one of the recent test runs which the H. H. Franklin Manufacturing Company, of Syracuse, N. Y., is daily giving to its dealers to show the Franklin 1910 automobiles under severe road conditions there were men representing automobile interests from the Atlantic to the Pacific. In the party was H. J. Banta, Spokane, Wash.; H. R. Grant, Seattle, Wash.; J. D. Moore, Boise City, Idaho; W. S. Jewell, New York City; Robert LaPorte, Philadelphia, and Capt. Barker, of the United States Army, located at Fort Leavenworth.

The trip was down the Onondaga valley from Syracuse to Cardiff, one of the steepest hills in New York State, and about a mile in length, to Lafayette, along the ridge overlooking Onondaga valley to Tully, from Tully to Preble, where a climb up Mt. Taupin, a very steep ascent of 1,000 feet, was made. From this point the route turned to the east and went over a succession of hills varying in length and steepness, all of which were exceedingly rough and rugged until the valley of Sherburne was reached.

From there the course turned to Utica, from which point a return run was made to Syracuse. One of the cars on the trip, a 1910 six-cylinder model, here started on a record run to Syracuse, a distance of 55 miles, which it covered with its load of seven passengers in 1 hour 15 minutes, which is equal to the running time of the Fast Mail, and but ten minutes slower than the Empire State Express.

The whole demonstration was planned with the idea of putting the 1910 machines over a very severe course in order to demonstrate to the Western dealers that the cooling properties of the 1910 Franklin were beyond question of doubt.

Remy Company Plans More Branches—Owing to the great western demand for Remy magnetos the Remy Electric Company, of Anderson, Ind., manufacturer of the Remy mechanical ignition systems, has completed plans for the establishment of branch selling offices at Kansas City and San Francisco. Although locations have not been secured at this time, it is expected that a corps of experts will be in the two western marts by January 1, 1910. Edward F. Willett, who has been connected with the New York selling office, will be put in charge at San Francisco, and Ross E. Luellen will be sent from the factory to manage the Kansas City offices. These men will be assisted by experts from the factory. The expansion of the Remy Company during the season of 1909 has been marked by the establishment of branch selling offices in Chicago, New York, and Detroit, and the addition of twelve new fire-proof buildings to the factory. The increased facilities for manufacture and distribution, however, will be needed for 1910, as 80,000 Remy high-tension magnetos have been sold to automobile manufacturers on minimum specified delivery, and contracts are still being received.

Klaxon Makers Enter European Fields—The Lovell-McConnell Manufacturing Company, the maker of the famous Klaxon horns, has arranged to sell its horns in Europe as well as all over this country. With foreign patent rights it has established the Klaxon Company, Limited, with its head office at 41 Rue de Berlin, Paris, and with selling branches in London, Berlin, Brussels, and Milan. A gold-plated Klaxon has been shipped from the Newark factory to the foreign representative to be given to the Queen of England. The business in the United States has assumed enormous proportions and is constantly increasing, both for automobiles and motor boats. Miller Reese Hutchinson is also the inventor of the Acousticon for the deaf, and a few years ago spent some weeks in London and restored the Queen's hearing to 90 per cent of its normal by his application.

English Firm Gets Timken Rights—The Timken Roller Bearing Company, of Canton, O., has made arrangements with the Electric & Ordnance Accessories Company of Birmingham, England, to manufacture roller bearings in that country for foreign trade. The Birmingham firm is controlled by Vickers' Sons & Maxim, Ltd., of London, one of the largest English commercial concerns. By this means the Timken products will be furnished to the automobile trade of Great Britain and the countries on the continent. There are few bearings of this type made in Europe, and it is expected that the American ones will meet a large field. The builders of the Wolseley cars have adopted them after exhaustive tests upon the roads.

Watch the Wheels—The experts of the Fisk Rubber Company have found that a great deal of tire trouble is occasioned by the fact that the wheels of the automobiles are not lined up properly. Frequently when the wheels strike curbs or other obstructions the axles or knuckles are slightly bent, and inasmuch as this is not particularly noticeable, the owners do not have the trouble remedied. Tires in such instances wear out with astonishing rapidity, and the Fisk men now make certain that the wheels are true before putting on the tires. When the tires are on wheels which toe in or out the stress falls to one side of the tread instead of on its center, and autoists are warned to look out for this.

Moline Factory Enlargement—Following the most successful season in its history, the Moline Automobile Company, East Moline, Ill., has just awarded a contract for the construction of another factory building. It will be 100 by 125 feet in size, with four stories, thereby increasing the floor space of the present plant by 50,000 square feet. Chassis and body assembling will occupy most of the extra room, and some will be utilized as a warehouse. The excellent showing made by the three Molines in the Glidden tour for the Hower trophy has created a widespread demand for Moline agencies, and the enlargement is the result of the increased business.

New Departure-Bristol Merger—According to President Rockwell of the New Departure Company, of Bristol, Conn., who is also president of the Bristol Engineering Company, these two companies will be merged as soon as the necessary formalities can be complied with. This action meets with the unanimous approval of the stockholders of both companies. It has been persistently rumored that the Bristol Engineering Company, which employs 200 men, was seeking another location because of lack of room, but the merger is expected to provide sufficient accommodations.

American Oil Company Doubles Capacity—At a recent meeting of the board of directors of the American Oil Company, of Jackson, Mich., it was agreed to double the capacity of the works, and to build a two-story brick office. These changes are to accommodate the growing trade in the American automobile oils, greases, and soap. An increase of 100 per cent was made during the year, and it is steadily becoming larger. The company now has branches in Chicago, Detroit, Saginaw, and Kalamazoo, and distributing agencies in Omaha and St. Louis.

Pierce and Thomas Teams in Base Ball Series—The question of base ball supremacy of the Pierce-Arrow and Thomas automobile plants in Buffalo has been a warm one during the season, and on Labor Day and the preceding Saturday the two came together. The Pierce-Arrowites won both games, the first by a score of 15 to 1 and the second with the tally 10 to 2. Now the Pierce men want to arrange a series with the Buffalo club of the Eastern League as soon as the latter's regular season is over, to determine the championship of the city.

Hokanson Agency Reorganizes—The Hokanson Automobile Company, of Madison, Wis., has reorganized under the same name, increasing its capital stock from $40,000 to $70,000. C. F. Spooner is now president, Emil Hokanson, vice-president, G. P. Miller, secretary, and Rudolph Hokanson treasurer and manager. The company plans to extend its system of branch garages and agencies through western and southern Wisconsin, and will also take up the manufacture of tops and other accessories.

Pope Mfg. Co.'s Additional Plant—The Pope Mfg. Co., of Hartford, Conn., has virtually acquired the plant formerly known as the Pope tube mills, situated just south of the Hartford Rubber Company's factory. During the old bicycle days this was one of the busiest factories in town, but it has now been for a long time unoccupied. The Capital avenue works of the Pope Mfg. Co. now employ nearly one thousand men, and it was deemed a matter of economy to acquire another building for the overflow.

Owen Thomas Stockholders Meet—The meeting of stockholders and directors of the Owen Thomas Motor Car Company, of Janesville, Wis., scheduled to be held in Chicago, September 7, to choose a location for the proposed plant of the company, has been postponed. However, it is believed certain that the plant will be in Janesville. Two Owen Thomas "Sixes" are already on the road.

Mitchell Works Three Shifts—A rush of orders for the 1910 models from all parts of the country has made it necessary for the Mitchell Motor Car Company, of Racine, Wis., to adopt the 24-hour day, and beginning this week three eight-hour shifts will be employed for at least three months. The company has already 900 men on its payroll.

IN AND ABOUT THE AGENCIES

Selden in Several Cities—Selden cars will be sold more widely during the coming season than ever before and agencies are being established in many important automobile centers. The Selden Car Company of Georgia will occupy a new and handsome garage building in Atlanta on November 1. It is located on Carnegie Way, opposite the Orpheum Theater and near the Piedmont Hotel. A five-year lease has been obtained. At San Antonio, Tex., the Selden will be represented by the A. E. Staacke Automobile Company. One of the most attractive stores now in Boston's automobile business has recently been opened by the Selden Motor Car Company of Massachusetts, at 801 Boylston street. The Selden Car Company of Pennsylvania was recently incorporated, and is located at 336-338 North Broad street. Louis Caswell, formerly sales manager of the Selden Motor Vehicle Company, is identified with the Quaker City business and expects to give it his personal attention.

Speedwell Agencies—The Speedwell Motor Car Company, of Dayton, O., has announced the following agencies for the coming year: Henry Dryfoos, Jr., Hazleton, Pa.; H. F. Van Cleave, 4209 Morgan street, St. Louis; Motor Car Sales Company (George W. Graham), San Antonio, Tex.; J. W. Goldsmith, Jr., & Company, 790 Peachtree street, Atlanta, Ga.; Budd M. Robinson, Joplin, Mo.; Hollis-Rand Company, Rochester, N. Y.; Thompson-Cuthbert Company, Portland, Ore.; Newbold Speedwell Company, Evening Star Bldg., Washington, D. C.

Pullman, Philadelphia—The Longstreth Motor Car Company, located at 1407 Race street, will handle the Pullman in the Quaker City and vicinity. The company will move shortly into new quarters, now in preparation, at 257 North Broad street.

Continental Tires, Nebraska—The Continental Caoutchouc Company, of New York, has delegated the agency for the state of Nebraska to the Western Automobile Supply Company, 1920 Farnum street, Omaha, Neb.

PERSONAL TRADE MENTION

Lewis H. Van Cleft, well known to automobilists as the steward of the Hotel Cadillac, New York, has recently opened his own café in the Gainsborough studio building at 222 West Fifty-ninth street. This is just off Columbus Circle and in the midst of the automobile district. On last Thursday evening Mr. Van Cleft entertained a number of the New York automobile writers and trade at a dinner to mark the opening of his season.

J. D. Cary, who has traveled for the past year in the South representing the B. F. Goodrich Company of Akron, has severed his connection with that concern to enter the employ of the Federal Rubber Company of Milwaukee, Wis. Mr. Cary will have full charge of this company's interests in the South among the automobile and carriage trade.

W. McKean White has become one of the chief aides to Alfred Reeves, general manager of the A. M. C. M. A., in the conduct of the Grand Central Palace show. Mr. White until recently was connected with THE AUTOMOBILE's editorial department, previous to which he was automobile editor of the Philadelphia *Times*.

Harry A. Mayer, of Baltimore, has joined the sales force of the Auto Supply Company, 208 West Saratoga street. He has been until recently with the James G. B. Davy & Company Supply House.

William L. Scribner, formerly of the E. R. Thomas Motor Company of Buffalo, has joined the engineering department of the R. L. Morgan Company, at Worcester, Mass.

OBITUARY

Charles E. Brown, vice-president and treasurer of the Shortsville Wheel Company, of Shortsville, N. Y., died on August 28.

FIRESTONE COMPANY ELECTION

AKRON, O., Sept. 13—At the regular meeting of the Firestone Tire & Rubber Company the following officers were elected: President and general manager, H. S. Firestone; vice-president, Will Christy; secretary, S. G. Carkhuff; treasurer, L. E. Sisler. The annual report showed an increase in sales of about 50 per cent. over the previous fiscal year, and in order to keep pace with the demands the concern is about to erect an immense plant.

HERCULES COMPANY ENLARGES

INDIANAPOLIS, Sept. 13—The Hercules Electric Company, of this city, has started its third factory enlargement since January 1, and is negotiating for the purchase of additional ground for further operations. This is caused principally by a new arrangement with Roger B. McMullen, of Chicago, by which he will hereafter handle the sale of the Kurtz high tension magnetos made by the local concern, in addition to his other automobile accessories. The size of his order was such as to require an immediate increase in the size of the plant, in order that deliveries may be made according to promises. With the prospective enlargements this will be assured. The Hercules Company cites this as another instance of the steadily increasing popularity of magneto ignition.

HARROUN BUMPER PATENT UPHELD

CHICAGO, Sept. 11—The Turner Brass Works of this city has had sustained the Harroun patent under which its bumpers are manufactured. Fifteen days after the filing of the suit against the Vanguard Mfg. Co. for alleged infringement, Judge Sanborn of the Circuit Court granted a preliminary injunction restraining that company from manufacturing, selling or using bumpers infringing on that patent during the pendency of the suit in question. The Turner Company has at present nine suits under way and means to fight each one. Any further infringements may result in other suits.

OLDFIELD HOLDS REMY BRASSARD

Barney Oldfield is now the possessor of the Remy brassard, the trophy offered the victor in the 25-mile free-for-all at Indianapolis. The fact that the handsomely wrought silver shield bears with it a cash reward of $75 each week makes it doubly precious to the great driver. The value of the trophy naturally produced a keen struggle. De Palma finished second in his Fiat, and Zengel was third in the Chadwick. Oldfield's time for the 25 miles was 21:21.7. The trophy will be raced for again at the September meet at the Speedway.

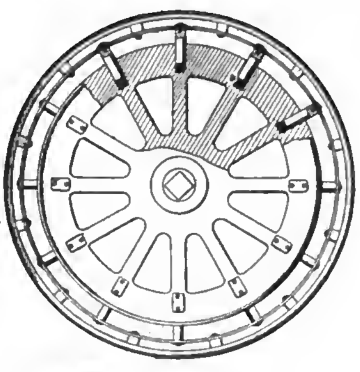
Remy Brassard Now Held by Oldfield

SOME SELECTED AUTOMOBILE PATENTS

Issue of August 17, 1909

931,048. Spring-Wheel—Ludwig Flum, Chicago. Filed June 26, 1908.

Interest in spring wheels and other methods of putting the tire manufacturers out of business, continues unchanged either in quantity of inventors and inventions or quality of the same. Flum's idea is to have a multiple felloe, three being shown in the patent office drawing. Of these, one seems to be very heavy and an integral part of the hubs to which it is connected by means of heavy, stiff spokes of short length. Beyond

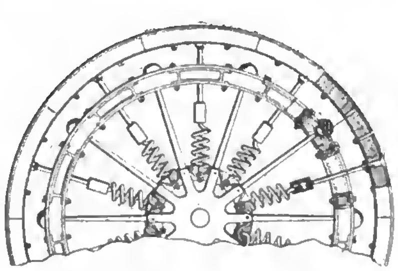


Flum's Spring Wheel Has Three Felloes

this, and attached to it by means of small diameter pistons, which are free to slide up and down, is the second felloe. This appears to be of very light spring steel construction, and carries on its outer side the true felloe to which the tire, or substitute for a tire, is fixed by short lugs. The construction seems to be, like many others of its kind, lacking in side strength.

931,214. Vehicle Wheel—Barrett C. Oblinger, Independence, Mo. Filed April 3, 1908.

Like Flum, Oblinger shows a partiality toward the multiple felloe, but uses only two. One, the inner, is firm and unyieldingly attached to the hubs by spokes of the usual variety, the ends of which project through the felloe and are capped with rubber buffers on the extension. This felloe is of a built-up construction, which is doubtless intended to yield some slight give or spring. The other or outer felloe is attached to a second series of spokes, one being placed between each two of the first-mentioned spokes. The secondary spokes have spring ends at the inner or hub ends, the attachment being a spiral spring connected to a spring steel plate. Like others, this would

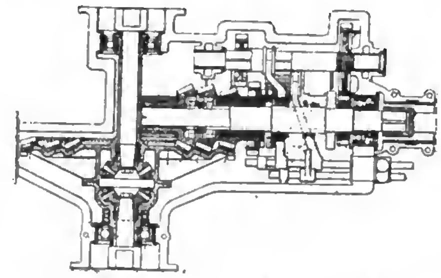


Oblinger Uses Spring Spokes Instead

have little lateral strength, while with the usual number of spokes, there would be little elasticity, since the rim is divided into half as many segments as there are spokes, resulting in each segment being large. It would therefore be either too stiff or too weak. It is difficult to see how freedom of movement could be combined with rigidity for driving.

931,288. Change Speed Gear—Powell Evans, Philadelphia. Filed March 6, 1907.

This is the well-known Evans transmission, which has been manufactured and marketed almost since the filing of the claim over two years ago. The principal feature of it is the number of direct drives which may be obtained as compared with others which yield but one direct drive on

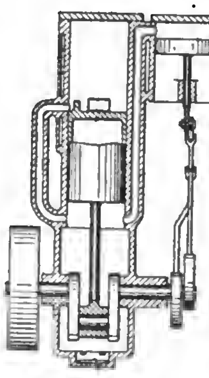


Change Gear Gives Direct on All Speeds

the high gear. With this form three differing drives are direct, this result being obtained by the use of three sets of bevel gears and pinions. All of these are driven from the engine and may be put into service at will by the use of the jawed clutch with which each is equipped. A single additional sliding gear gives all other speeds and the reverse.

931,346. Internal Combustion Engine—Erik A. Rundlof, Stocksund, Sweden. Filed Aug. 28, 1908.

Two cycle engines, like spring wheels, never fail to interest the inventors. This one differs only in that a separate chamber is provided for the compression of air or fuel as the case may be. This then passes into the crankcase, and thence through the transfer port into the cylinder. One point missed by the inventor is that the extra power absorbed by this separate compression chamber would wipe out all margin of present advantage over the four cycle, if any such actually exists.



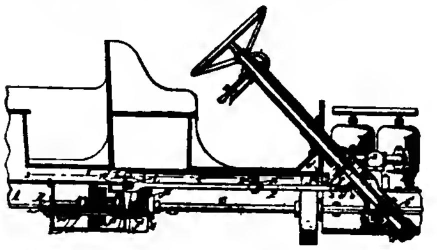
Rundlof Two-Cycle Engine

Issue of August 24, 1909.

931,770. Controlling Device for Change-Gears—Albert F. Krause, Buffalo, N. Y. Filed April 10, 1908.

The gear-change lever on the steering post so popular a number of years ago was abandoned primarily because it did not admit, with the construction in use at that time, the operation of a selective type of change-gear. In the opinion of designers, the selective change-gear had more weighty advantages than the steering-post control lever, and so the latter, other reasons aside, was dropped. At present it is almost entirely out of use.

Mr. Krause's invention is intended to reinstate this type of control in its former popularity by providing means for its use in connection with the now universal selective gears. The lever on the post has a movement in two planes, the usual swinging motion parallel to that of the steering wheel, and another up and down, which are imparted to a sleeve surrounding the steering column, the sleeve either revolving or sliding longitudinally. In the diagrammatic drawing shown, the sidewise motion of the



Device for Controlling Gears from Post

lever is used to select the desired sliding member, and the upward and downward motion to mesh its gears with those of the lay shaft.

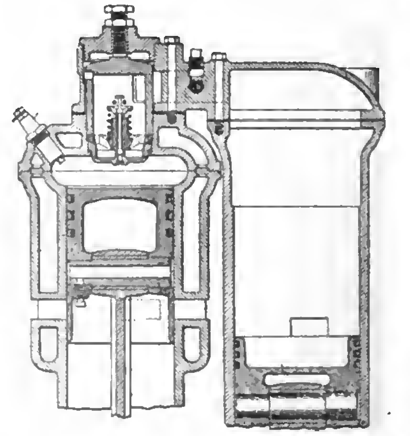
931,879. Automobile Tire—Charles E. La Fleur, Philadelphia, Pa. Filed Sept. 13, 1907.

This tire is of the usual construction in so far as it is built up of a woven carcase, a cushion of resilient rubber, a breaker strip of fabric and a rubber tread. However, the tread is made rather thicker than usual, and has a deep circumferential groove hollowed out of it, nearly reaching in to the breaker strip. A special tread is inserted in this groove, composed of fabric embedded in rubber, very tough and of small elasticity, in which the numerous layers of fabric are vertical when the tire is in position on the wheel, so that the ends of the fibers of the fabric may be brought to the surface to take the wear. The material of which this fabric is to be made is not specified; however, the tire should in any case be practically puncture-proof as long as the fabric layer remains of good thickness.

Vertical Fabric Prevents Punctures

931,837. Internal-Combustion Engine—Harry W. Beach, Montrose, Pa. Filed March 22, 1905.

This invention relates to a form of two-cycle motor in which the incoming charge enters through a valve in the cylinder head. The construction, as shown in the drawing, includes a separate pumping cylinder; al-

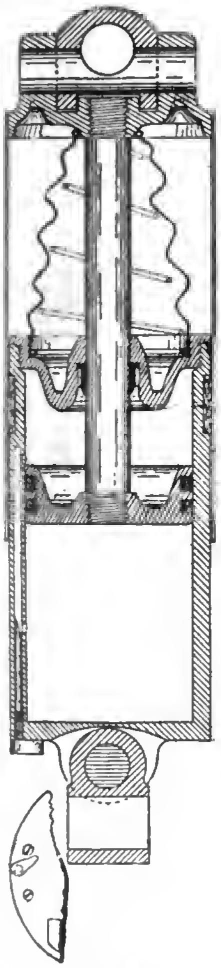


Beach Two-Cycle with Pumping Cylinder

though presumably crankcase compression could be used, this would involve a long passage up the length of the cylinder, which would be undesirable for many reasons.

Information for Auto Users

The Kilgore Shock Absorber—This device has been on the market and in practical use for the last five years and, like everything else in the automobile line, has been improved from year to year. It is now considered a standard article by the automobiling public. The Kilgore Mfg. Co., of 585 Boylston street, Boston, composed of prominent Boston capitalists, equipped a thoroughly up-to-date factory and commenced delivery of the improved shock absorber in January, 1909. Since that time it has been necessary to add to the factory and to run considerable overtime.



PLAN OF KILGORE SHOCK ABSORBER

The cut shows a cross section of the device. It consists primarily of a cylinder attached to the axle of the car and a piston attached to the frame. The principle is similar to that of the pneumatic door-check to prevent slamming. The cylinder is double-acting, so that either an upward or a downward movement of the piston compresses the air and acts to check the motion. A small air passage is drilled in the wall of the cylinder, allowing the air to pass slowly from one side of the piston to the other. If the piston makes a sudden jerk, however, this passage cannot accommodate the air fast enough to keep pace with the movement, and a damping influence is at once exerted. If the piston travels too far in either direction it covers up the opening in this passage, and the remaining air is compressed until the movement is totally checked.

The passage has a valve which may be adjusted to regulate the size of the opening as desired. Once set, this need not be changed. No resistance is offered to the normal action of the springs, but a sudden or violent movement is at once checked.

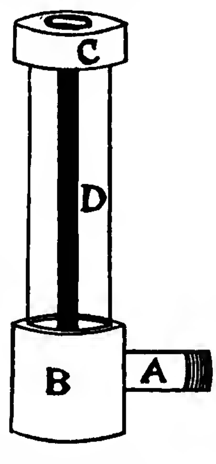
The shock absorber is constructed in the best manner throughout. The cylinder and piston are made of bronze, accurately bored and turned; the latter is fitted with two rings. The cylinder head screws in and has a packing gland to prevent air leakage around the piston rod. The upper end of the rod has a cap which carries a universal joint, connected in turn to the frame. From this cap a telescoping tube of seamless brass extends down over the cylinder to make the construction mud-proof. The lower end of the cylinder is made fast to the axle also through the medium of a universal joint, so that the device cannot be wrenched or strained by any movement of the car.

Firestone Demountable Rims—The new Firestone demountable rim is adaptable to any quick detachable tire, as well as to the regular clincher. Stay bolts are thus abolished and the security and time-saving features of the quick detachable rim are secured. This advantage can only be appreciated fully by the user of clincher demountable rims who has once attempted the extremely difficult operation of removing and refitting a regular clincher tire, with its short-stem stay-bolts, on the spare detached clincher rim. That weakness makes such rims a positive disadvantage, after the spare tire has once been used. There is also the possibility of more than one puncture occurring on the same trip. With the new type of rim, the user has one change immediately available through the spare tire, and, if necessary, can make additional changes with all the ease inherent in the detachable type of rim.

THE NEW FIRESTONE DEMOUNTABLE

The Firestone type of demountable rim is held in place by a ring of triangular cross section, in turn retained by eight bolts passing through the felloe of the wheel. The parts are so designed that they cannot stick from rust or accumulations of dirt. All angles of contact are so blunt that wedging of parts is impossible. There are no thin, narrow, wedge shapes, no complicated parts. No special tool is required. The entire operation is so simple and easy that there is no temptation to try it the wrong way. The demountable rims are adaptable to all quick detachable and clincher tires, and may be fitted without changing the present tire equipment in any way on practically any car, new or old.

"Apco" Crankcase Oil Gauge—The Auto Parts Company, of Providence, R. I., is making an oil gauge specially adapted to use on the crankcases of Ford models N, R, S and T. It is a small, simple device, readily applied with the assistance of a pair of pliers in ten minutes. Its use obviates the necessity of stooping down to try the oil with the cock; instead, the amount in the case is immediately indicated at a glance. The maker points out that oil costs money, and too much oil is not only wasteful, but also likely to cause sooted plugs and excessive carbon deposits in the cylinders, in addition to making the car a nuisance by giving out clouds of pungent blue smoke. The gauge is furnished with attachments for any Ford car. The company also makes a tool for redressing and cleaning the threads of tire valves, which looks as though it might give good service on occasions which frequently are all too familiar to the automobilist.



APCO OIL GAUGE FOR CRANKCASES

"Tray Plate" Storage Batteries—The Tray Plate Battery Co., of Binghamton, N. Y., has just moved into a new factory which will enable it to produce its "High Efficiency" batteries on a larger scale than heretofore. This company's batteries show a neat and workmanlike design, and their 6-volt, 60-ampere size used for automobile ignition is averaging 1200 to 1500 miles per discharge, according to the vibrator adjustment. These batteries have only recently been put on the market, after a three years' practical road test had eliminated every weak point which could be found.

The grid used is of the "checkered" type, which not only gives a greater capacity per square inch of plate surface, but also makes a plate of exceptional strength and durability, calculated to withstand the hard usage to which batteries in automobile service are constantly subjected. By a special process, the active material in the plates is made exceptionally hard and porous and the tendency to sulphate is materially diminished. Only rubber separators are used in the construction.

"HIGH EFFICIENCY" STORAGE BATTERY

The battery illustrated herewith weighs 27 pounds; its dimensions are 6 1-2 by 6 3-4 by 8 1-2 inches in height. This company also makes batteries especially designed for use in electric lighting systems, obviating the difficulties of gas generators and tanks. It has published a booklet on the relative cost of different ignition systems which, together with catalog No. 109, will be gladly mailed on application.

This company's line of batteries built for high rates of discharge are also worthy of attention among autoists who are contemplating the equipment of their cars with electric lighting systems.

INDEX TO ADVERTISERS

THE AUTOMOBILE

THE VITAL PROBLEM OF THE ROADS

35 M.P.H. Over Oiled New Jersey Road

50 M.P.H. Over Unoiled New Jersey Road

CLEVELAND, Sept. 21—In solving the vital problem of the roads the day has gone by when it was necessary to argue as to their value to a community. All are now agreed on this phase of the subject; the difficulty is to obtain the money with which to build. Then comes the really greater question of what kind of a road to construct to meet modern traffic conditions. Ex-Governor N. J. Bachelder of New Hampshire, Master of the National Grange, this morning, in one of the opening addresses of the Second Annual Good Roads convention, made direct reference to the startling change that has come in the movement for improving the surface of our highways.

This gathering of good road workers amalgamates the National Grange, U. S. Office of Public Roads, American Road Makers' Association, and the American Automobile Association, with the latter body through its Good Roads Board carrying the burden of the promotion of the affair, this time under the chairmanship of George P. Diehl of Buffalo. The manufacturers of automobiles are also aiding appreciably through the N. A. A. M., A. L. A. M., and A. M. C. M. A. The 1909 committee from the various organizations consist of: N. J. Bachelder, L. W. Page, J. H. MacDonald, L. R. Speare, Geo. C. Diehl, Robert P. Hooper, Charles T. Terry, W. F. Bonnell, S. D. Waldon, Coker F. Clarkson, Alfred Reeves, and F. H. Elliott.

In the assemblage which is attending the sessions in the Chamber of Commerce hall are grangers and autoists and road makers of national importance from all over the country, the former being the most plenteous in number. The Cleveland Automobile Club is doing the entertaining honors in no scant manner. The proceedings embrace in the Second Regiment Armory a comprehensive exhibit of road-making machinery and materials and sample bits of construction.

Roads are being talked about from early until late, and the discussions which follow the readings of the various papers of the experts are instructing and entertaining. The deliberations impress even the layman with the stupendous importance of the subject, and when Lieut.-Gov. F. W. Treadway this morning gave utterance to the statement that in his belief it was the greatest issue of the day his words elicited prolonged approval.

Even now before the convention has concluded its labors there is talk of next year's event, with three cities in action for the honor. St. Louis has Samuel Capen, president of its automobile club, as an exponent, backed by the mayor and local business organizations; Rochester, N. Y., is being energetically heard from through Bert Van Tuyle, who is secretary of the New York State Automobile Association; and Milwaukee has an effective shouter in James T. Drought, secretary of the Wisconsin State Automobile Association. Other candidates are known to be in the background and will be heard from before the dispersal Thursday night.

In the vicinity of Cleveland an unusually large number of contracts for road construction have been completed or are in process of completion at the present time. Nearly every type of road is provided for, which makes it possible for the convention delegates to gain an excellent idea of what might best suit their respective localities. This Committee on Practical Demonstrations contains well-known engineers from various states, cooperating with whom are the Cleveland city and Cuyahoga

50 M. P. H. Over Unoiled New Jersey Road in Recent Experiments

It was then that City Solicitor Newton D. Baker appeared on the scene and supplied a rhetorical welcome to the City of Cleveland.

G. A. Will of the Minnesota delegation arose and spoke of the most excellent good roads work of Governor Johnson, whose death was announced in the morning papers. Suitable resolutions were offered and unanimously adopted.

Chairman Diehl then took charge of the convention. Before introducing the following speaker the chairman referred to the enormous amount of work accomplished by the National Grange, whose aid was most essential in furthering highways' improvement.

State Highway Commissioner James C. Wonders of Ohio gave the history of the roads movement in Ohio, the first real work having been begun in 1907 by the State Highway Commission. Twenty counties and an expenditure of $240,000 represented the beginning, mostly in the eastern counties of the state. Gravel roads were the most numerous and satisfactory because of their reasonable cost, though brick paving at a heavier first cost proved the best surviving roadway. Moreover, the latter allowed more speed, which is not wholly distasteful to farmers.

county engineers. While this inspection is scheduled for Wednesday afternoon, not a few of those in attendance have covered more or less of the diversified route. Brick pavement is exceedingly popular in this state, and excellent samples of it are available for the inspection of the convention participants.

Tuesday Morning's Opening Session.

President L. R. Speare called the convention to order shortly after 10:30 o'clock. He read a message from Governor Harmon regretting the inability of the chief executive to give an official welcome from the State of Ohio. Likewise Mayor Tom L. L. Johnson was an absentee, ill health preventing his attendance. In the course of Mr. Speare's brief remarks, full credit was given to the press for the abundance of publicity given to the convention and good roads matters generally, with a further reference to the progressiveness of the Automobile Club of Springfield, Mass., which was the real originator of good roads gatherings wherein all classes of road users were invited to participate. The first National convention was that at Buffalo a year ago under the direction of Robert P. Hooper, then the Good Roads chairman of the A. A. A., the success of which was sufficient to insure a continuation of these meetings under the direction of the automobilists.

Lieut.-Gov. Treadway was next introduced, explained why he was a delinquent, and graciously told his hearers that they were welcome in the Commonwealth of Ohio. He referred to the roads question as the greatest issue of the day, and said when it was settled many other minor matters would be attended to at the same time.

Master of the Grange Bachelder said that a million grangers had preached the story of roads in and out of season and were entitled to a goodly amount of credit for the now unanimous chorus for good roads, which had become a National movement. The speaker asserted that other work was necessary besides the holding of conventions and meetings, which, nevertheless, gave excellent opportunity for a valuable interchange of ideas. No arguments were now necesary for roads, and the farmer believes that the National government is in duty bound to give aid. This was made evident by the report of the Country Life commission which corresponds with more than 500,000 farmers.

During the session a telegram was read from ex-President William H. Hotchkiss of A. A. A., which contained congratulations upon the assured success of the convention and expressed regrets that he was unable to be present.

New Jersey Road with Clay Road Bed Surface—Fairly Satisfactory

What Happened in the Afternoon

First of the talkers of the afternoon was State Highway Commissioner MacDonald of Connecticut, who can talk roads on a 24-hour stretch without a pause and all the time supply material that is meaty and interesting. Connecticut is one of the most energetic States in the matter of roads, and follows very closely in the wake of Massachusetts and New Jersey. Commissioner MacDonald naturally takes pride in the work that has been accomplished.

George S. Ladd, the special good roads lecturer of the National

Grange, had an entertaining subject in "The New England Plan for Connecting Lines of Trunk Highways." Mr. Ladd's success in his special field has been exceptionally notable.

"The Farmer's Interest in Road Improvement" was the subject handled in a masterly fashion by the Hon. T. C. Laylin, Master of the Ohio State Grange.

The Hon. F. N. Godfrey, Master of the New York State Grange, had for his subject "The New York State Grange and Good Roads Legislation in That State." Mr. Godfrey knows the science of road making, and how to get roads built, and the $50,000,000 appropriation in New York State has its existence in the effectiveness of the campaign waged by the State Grange.

George T. Barnsley, of the Automobile Club of Pittsburgh, read the paper of E. J. Kent on "Good Roads in the State of Pennsylvania," which are not as numerous as automobilists would like to see, the veto by Governor Stuart of the Philadelphia-Pittsburgh highway having been one of the disappointments of the last Pennsylvania legislative session.

Illustrating Roads Building in France—Showing Tree Protection

A general discussion, limiting each speaker to two minutes each, concluded the program for the day.

Brief Details of Second Day's Session

CLEVELAND, Sept. 22—The morning session of the Good Roads conference to-day was comparatively brief, but the three addresses given were among the most valuable of the convention.

Logan Waller Page, Director of the Office of Public Roads, had for his subject "The Road Situation in the United States as Compared with Foreign Countries," in the course of which he explained in a concise manner why many of our efforts have miscarried.

Chairman S. Percy Hooker, of the New York State Highway Commission, gave an excellent talk on "New York State Trunk Lines," and President H. H. Gross, of the Illinois Farmers' Good Roads League, spoke about "Illinois Good Roads," admitting that his State is just awakening. Then followed the road inspection trip to the various suburbs of Cleveland, with luncheon at Euclid Park Beach Hotel.

Much interest was aroused by the exhibition of road-making machinery and materials. This is free to the delegates, and nearly all of them took advantage of the opportunity to visit it.

EFFECT OF AUTOS ON ROADS TESTED IN NEW JERSEY

NEWARK, N. J., Sept. 18—Popularly current notions of the effect of automobile traffic on roads received a severe setback in the tests conducted by County Engineer Owen on Ridgewood avenue, Glen Ridge. The results obtained all go to show that automobiles, even at high speeds, do not have as destructive an influence on the road-bed as heavy horse-drawn wagons. Over a mile stretch of road eleven automobiles, weighing from 2,000 to 3,800 pounds, were driven at speeds of from ten to sixty miles an hour. At a low speed the automobile tires merely compressed and packed the road surface. The limit of speed at which no effect could be observed was about twenty or twenty-five miles an hour. At higher speeds a stripping action began, which if continued would cause loosening of the surface. However, the only dust raised was that already loose on the road.

After the automobile had finished speeding, five heavy coal wagons were drawn over the highway to ascertain the effect of this kind of traffic. According to the county engineer's notations the result showed that the hammering of the horses' calked shoes and the iron-tired wagon wheels tended to bring about a complete breaking up of the road. Large stones that were undisturbed by the autos were displaced by the horses and wagons.

"The wear and shattering of the surface of macadam roads," said Mr. Owen, "is not due alone to the automobile, but to the

Massachusetts Supplies State Highway Like This in Goodly Quantity

Road Across the Pocono Mountains in Pennsylvania

combination of this sort of traffic with horse-drawn vehicles. The roads of the future which are to take this travel and the methods of road maintenance of the future must be adapted to this end and with this point in view. The results of these tests were not in accordance with the general expectation or accepted opinions. Instead of the high speed breaking up the surface and scattering the loosened particles, no such results were noted. The dust that had accumulated was in all cases the only medium distributed." Mr. Owen's figures on the results of autos traveling at varying speeds were as follows:

For Telford Surface—Ten miles an hour, no trace left in center, compression of dust at side; twenty miles an hour, the surface dust spread sideways, but no stripping; thirty miles an hour, surface dust begins to strip; forty miles an hour, surface under tire swept bare; forty-five miles an hour, dust lifted, surface stripped, but no breaking; fifty-five miles an hour, road stripped bare, but no breaking; sixty miles an hour, road stripped bare, but no breaking.

Oiled Road—Thirty miles an hour, heavy oiled dust raised about one foot; forty miles an hour, heavy oiled dust raised about one foot; sixty miles an hour, strips dust. The high speed on the oiled road had no effect on the surface, either by loosening it or scattering the particles sideways.

Clay-packed Surface—Fifteen miles an hour, compression only; twenty miles an hour, dust raised; thirty-five miles an hour, heavy dust raised, no breaking; forty-four miles an hour, heavy dust raised, no breaking; fifty-two miles an hour, heavy dust raised, no breaking.

Where the tests were held the roadbed is about eight inches deep, of which the surface coating, originally three inches thick, was reduced to about two inches. The road has not been repaired for three or four years. No attempt had been made at dust-laying—in fact, the avenue was purposely neglected for the tests. The effect of the continuous automobile travel of recent years was to lay the center completely bare of the dust covering and loosen the smaller stone. Few large ones were displaced in a length of half a mile. The dust covering which accumulated on the sides was packed down fairly hard and smooth. In a stretch of half a mile only slight abrasion was apparent.

What One Finds in Crossing the Plains of Colorado

PROGRAM OF GOOD ROADS CONVENTION

TUESDAY, SEPTEMBER 21—MORNING SESSION

Opening Address—Lewis R. Speare, president of American Automobile Association.

Welcome to Ohio—Lieutenant-Governor Treadway.

Address of Welcome—Newton D. Baker, City Solicitor of Cleveland.

The Second Annual National Good Roads Convention and Introduction of Speakers—George C. Diehl, presiding officer and chairman of the national committee, directing the convention.

Good Roads of the State of Ohio—James C. Wonders, State Highway Commissioner of Ohio.

The National Grange and Good Roads—Ex-Gov. N. J. Bachelder, Master of the National Grange.

AFTERNOON SESSION

State Aid—James H. MacDonald, State Highway Commissioner of Connecticut.

The New England Plan for Connecting Lines of Trunk Highways—George S. Ladd, special Good Roads Lecturer of National Grange.

The Farmers' Interest in Road Improvement—Hon. T. C. Laylin, Master Ohio State Grange.

The New York State Grange and Good Roads Legislation in that State—Hon. F. N. Godfrey, Master New York State Grange.

Good Roads in the State of Pennsylvania—E. J. Kent, vice-president Automobile Club of Pittsburg.

WEDNESDAY, SEPTEMBER 22—MORNING SESSION

Convention Called to Order—By George C. Diehl, National Good Roads Chairman of A. A. A.

Road Situation in the United States as Compared with Foreign Countries—Logan Waller Page, Director of Office of Public Roads, Washington, D. C.

California Believes in the Petrolithic Proposition

New York State Trunk Lines—Hon. S. Percy Hooker, chairman New York State Highway Commission.

Illinois Good Roads—H. H. Gross, president Illinois Farmers' Good Roads League.

AFTERNOON SESSION

Practical demonstrations and road inspections.

Complimentary luncheon will be served at the Euclid Beach Park Hotel.

THURSDAY, SEPTEMBER 23—MORNING SESSION

Postal Progress League—James L. Cowles, secretary and treasurer.

Treatment of Earth Roads—D. Ward King, Missouri State Board of Agriculture.

Macadam Roads—A. B. Fletcher, secretary Massachusetts Highway Commission.

Bituminous Road Materials—Provost Hubbard, chemist United States Office of Public Roads.

Road Maps and Signs—Powell Evans, president Automobile Club of Philadelphia.

General discussion.

AFTERNOON SESSION

Boat ride on Lake Erie. Steamer "City of Detroit" will leave foot of Superior street. Complimentary luncheon will be served on board.

Theatrical performance, Chamber of Commerce Hall, at 8.30 P. M., by the famous Hermit Club of Cleveland. Music by Hermit Club orchestra.

Mud Roads That Abound Through the Middle West Are Best Traveled in Dry Weather

WHAT ONE MAN OBSERVED IN THE GOOD ROADS PROBLEM

BURLEY B. AYERS is the chairman of the good roads committee of the Chicago Automobile Club. Years ago he was one of the leading wheelmen in the country, and during L. A. W. days, he was prominent in its efforts to obtain good roads. Recently Mr. Ayers took automobile trips which included parts of Illinois, Michigan, Iowa, Indiana and Wisconsin, and in the journal of the Chicago Automobile Club he has some interesting comments to make. Extracts from his story are herewith given:

"The reason why such great states as Michigan and Illinois do not have good roads may be traced to the tenant-farmer system. In these States most farms are occupied by tenants, while the owners live in the little cities or villages. The farmers have to support two families. The owner expects the farm to yield all possible for the tenant and himself, and hence the least expenditure upon buildings, fences, roads and such improvements. The money is put into the farm machinery. This is evidenced by the general appearance of the farms. In the midst of great prosperity, with great crops growing everywhere, farmhouses and barns and roads and fences are dilapidated.

"In Wisconsin it is different. The Germans settled it and are there still, or their descendants. They still own and occupy the farms, and they have put their money into the houses and barns and fences and roads, and keep putting it in. No farming country in America shows such amazing results of prosperity as Wisconsin. Old barns and houses have been torn down and new and beautiful structures erected. No other farming country shows as many great barns with slate roofs, as many farmhouses with bay windows and big plate-glass fronts. No other State can display so many fine front lawns in front of the farmhouse, and generally makes such an exhibit of genuine country luxury as Wisconsin. All because the owners live on their farms, love them, and put in money for improvements.

"Talks with farmers all through these States absolutely show this to be the case, and also show evidence of a return to the old resident habit again. The trolley car and the telephone together form the cause. Many owner-farmers say they would not live on their farms under the conditions of ten years ago. Then they had to walk the plow, walk the harrow, walk the seeding, walk and hew and split and toil until the body was exhausted and life lost its joy compared with the life of the dullest crossroads village.

"But new farm machinery gives a new aspect to life on the farm. No longer has the farmer to hitch up and drive to the village for anything—the trolley takes him. The telephone summons aid and supplies that are sent out by the next trolley.

"Motoring through the great Michigan highway (deeply sanded) between Kalamazoo and Detroit reveals a strange absence of farmers' rigs. The farmers explain that where the road was once crowded with them, the way is now cleared for the automobiles to struggle with the sand, while they go to town by trolley. In Iowa and Wisconsin a great many use their motor cars. Iowa is much like Wisconsin in that the farmers own their farms, make them handsome, and contribute to their roads.

"And the deduction is this: There will be no good roads until the ratio of profit between the owner and tenant is so arranged that there will be a comfortable margin to draw on for the roads. While the fight is still on between owner and tenant for necessary improvements on the farm itself, the owning farmers will beat any bill in the legislature looking toward road improvements. And when one looks back on the history of these movements—notably the Michigan good-roads movement that recently came to defeat in the legislature—the cause is to be traced to just this source.

"Farmers are wonderfully interested in automobiles. Throughout the above-referred-to journeys, they readily yielded more than their share of the road. Iowa and Wisconsin lead in farmers' ownership of automobiles. They have many good points to offer about handling them, too, and the writer learned from Iowa that steel-studded treads were very efficacious."

PLANS FOR ROADMAKERS' CONVENTION

COLUMBUS, O., Sept. 20—The executive committee in charge of the annual convention of the National Roadmakers' Association, which will be held in this city October 26 to 29, has named the following chairmen of subcommittees: Invitations, Governor Harmon; reception and registration, Max Morehouse, president of the Columbus Automobile Club; entertainment, Herman Hoster; publicity, M. M. Maxwell, secretary of the Ohio Good Roads Federation; transportation, J. C. Wonders, state highway commissioner; programs, badges and printing, W. Hague; hotels and headquarters, H. C. Pirrung; speakers, George W. Lattimer; exhibits and demonstrations, Walter Braun.

FRANCE WILL HAVE A SINGLE-CYLINDER RELIABILITY

PARIS, Sept. 15—France has held many a pure speed contest for voiturettes, but has never dreamed of running a reliability and endurance contest for her little one-lungers. Following the example of the English club, which has made famous its reliability trials, next Winter there will be a reliability trial in France, the participants in which will be standard models of small two-seated voiturettes. The full regulations have not yet made their appearance, but it is understood that the vehicles provided for will be small single, twin, and four-cylinder cars not exceeding ten-horsepower and fitted with a two-seated body. It is the smallest type of car made in France and one of the most popular.

December 5 to 19 have been fixed as the dates, and the trials will be held in the neighborhood of Paris. For fifteen successive days the competing vehicles must daily travel 124 miles—or a total of about 1,860 miles—at an average speed of not less than 15 1-2 miles an hour. In the running time will be included the filling of gasoline and oil tanks, the oiling of the cars and any adjustments that may be necessary. As the start will have to be made from a garage in the suburbs of Paris, and a return made to the same point each evening, over roads that are always poor in Summer and decidedly bad in Winter, considerably more than 15 1-2 miles will have to be maintained at times in order to keep up the average.

The competing vehicles are two-seated voiturettes, of absolutely standard model, the maximum engine dimensions of which are 4 4-5 by 5 9-10 for a one-lunger; 3 9-10 by 5 1-10 for a twin-cylinder engine, and 3 1-10 by 4 7-10 for a four-cylinder motor. Stoppages allowed are for tire trouble, the cleaning of spark plugs, the tightening of nuts, the regulation of brakes or chains. Even the changing of a sparking plug will cause the loss of a clean score diploma.

No mechanic is allowed, but in addition to the driver each car must carry an official observer supplied by a rival firm, who will be charged to note all road incidents. The contest is the first of its kind held in France, and as small cars and voiturettes are now receiving a large amount of attention entries are expected to be high.

Although reliability trials have been inaugurated, voiturette racing has not come to an end. The organizers of the annual race for small one-lungers have just anounced that the sixth annual will take place next year as usual, the date being August 21. The regulations, which up to the present have been a limitation of bore, with unlimited stroke, have not yet been published.

PLEASANT COURSE FOR TRADESMEN'S TOUR

FOR varied and picturesque scenery and uniformly good roads, Long Island, the "Land of Pastime," can hardly be surpassed, and the second annual tour of the New York tradesmen, September 28, 29 and 30, will lead them through the heart of that pleasant country. Three days' touring, from one end of the island to the other, will make an agreeable break in the monotony of the season. From an early morning start at Columbus Circle, the caravan will leave Manhattan by way of the Queensboro bridge and take the Jericho Turnpike for Krug's Corner, long associated with memories of the Vanderbilt Cup races. Smithtown, 43 miles from New York City, will be the first checking station, and the participants should have no trouble in keeping to schedule time on this stage.

Thence the road leads straight to Riverhead. The route selected by the pathfinding party lies through a vast expanse of pine forest like that of the Lakewood region, where the air is sweet with the fragrance of the pines. At Riverhead the tourists will be regaled with a Long Island dinner. Here the route meets the course of the Long Island Derby and follows it to Mattituck. The night stop will be Orient Point, the extreme end of the North Shore. The fishermen of the party will go out in Plum Gut after bluefish, and dancing and games will close the day.

After an early morning start the cars will retrace their trail to Mattituck and will stop at the grandstand to witness the Long Island Derby, which is expected to provide some good racing. A tire and rim competition has also been arranged to demonstrate the practicability of the new types of demountable rims. After luncheon in the grandstand the tour will continue to Riverhead and will then cut across country to the South Shore by way of Flanders and Goodground. Passing through the picturesque Shinnecock Hills and skirting Shinnecock Bay the tourists will reach South Hampton and Amagansett, the extreme end of passable roads in the South Shore sand hills. The second night stop will be at The Irving, South Hampton.

The third day's run will lie along the South Shore, through Quogue, West Hampton, Brookhaven, Patchogue and Blue Point, famous for its oysters; thence through Islip and Bayshore to Long Beach, the noon control, where lunch will be served at the Hotel Nassau. When the tourists regain New York, by way of the Merrick Road and the South Hempstead Turnpike, they will have covered approximately 335 miles. The rules are liberal and should appeal to private owners, hut the schedule will have a tendency to keep excitement and interest from waning. At the same time it will be distinctly an event for the whole family.

FLORIDA'S NEW LAW SEEMS REASONABLE

TALLAHASSEE, FLA., Sept. 11—The legislature at its last meeting passed the new automobile law, which is meeting with general approbation. No fixed speed limit is named, but speed must always be "proper and reasonable, having due regard to the traffic and use of the highway." However, at crossings, sharp turns, and approaches to bridges the limit is four miles an hour. Automobiles must be registered with the Secretary of State, the fee being $2. Chauffeurs must also be registered. Non-residents registered in other states are exempt for thirty days. Automobilists are required to use reasonable care in passing horses and to stop on signal of uplifted hand. Imprisonment penalties are provided for second and third offenses.

MITCHELL MILITARY CAR ENDS TRIP

SAN FRANCISCO, Sept. 19—The Mitchell military car, carrying a message from General Wood of New York to General Weston of this city, arrived here at 2 o'clock this afternoon, after exactly a month on the road. Driver Zirbies, Lieutenant Rosenthal and Private Parrott, the crew, reported in good condition, although days of battling with rain and mud in Wyoming, following the scorching heat of Nebraska, had left their imprint on both faces and uniforms. At Evanston, Wyo., the tourists ran into a heavy snowstorm. From Salt Lake City to the Coast no especial difficulties were encountered. Considering the inexperience of the driver and crew in this sort of work, the time made for the long trip from coast to coast was very good.

U.S. Has Vice-President At New York State Fair Races

SYRACUSE, N. Y., Sept. 18—The greatest crowd ever assembled within the track enclosure of the New York State Fair grounds saw Barney Oldfield drive some fast miles and several other pilots go well under the mile-a-minute mark. Vice-President Sherman headed the list of distinguished visitors, and was greeted as a native son by the Uticans present. Twelve hundred automobiles filled the parking spaces, and the trackside was crowded with spectators. The race meet was arranged and conducted by the Syracuse Automobile Dealers' Association, the Automobile Club of Syracuse and the Syracuse Motorcycle Club. Although no records were broken, the times were fairly fast for a mile circular track, and there were some good contests.

Shortly before the third event, the five-mile free-for-all, an accident was narrowly averted which might have proved serious. Hanna, while tuning up his Hudson runabout, came down the stretch at a fast clip, followed by Oldfield and the big Benz, going at a much higher speed. Hanna slowed down opposite the upper end of the grandstand and carelessly swung across the track squarely in front of Oldfield. The latter, with great presence of mind, turned his car out just in the nick of time. Otherwise the little Hudson would have stood a good chance of being reduced to scrap iron.

The feature of the day was Oldfield's attempt to lower Ralph De Palma's mile circular track record of 50 4-5 seconds. Twice he dashed around the track, the first time in 53 3-5 and the second in 53 2-5, but that was the best he could accomplish. Then Barney took the wheel of C. A. Benjamin's Knox stock car for the ten and twenty-five-mile races, and made some fast time. In the former he had several brushes with C. H. Bowers in the resurrected Peerless racer, which finally burst a front tire on the ninth lap. Oldfield won in 10:57 3-5, followed by two of the Maxwells that participated in the Lowell meet. The twenty-five-mile race was to have been fifty miles, but was stopped at the halfway mark with Oldfield a mile in the lead.

The motorcycle races, as usual in meets of this kind, put up the closest finishes and were on the whole the best. A. S. Noonan finished second in both the five and ten-mile events, but was disqualified for failing to appear to have the cylinder of his machine measured to find whether it complied with the rules for stock machines. The summaries:

FIVE MILES, GASOLINE STOCK CARS, $1,250 AND UNDER

Pos.	Car Entrant	Driver	Time
1	Hudson—Amos-Pierce Auto Company	Hanna	5:49 1-2
2	Maxwell—Maxwell-Briscoe Company	See	
3	Maxwell—Maxwell-Briscoe Company	Costello	

FIVE-MILE, FREE-FOR-ALL—BEST TWO IN THREE HEATS

	First Heat:		
1	Benz—Barney Oldfield	Oldfield	5:15 1-2
2	Special—C. H. Bowers	Bowers	
	Second Heat:		
1	Benz—Barney Oldfield	Oldfield	5:06 3-4
2	Special—C. H. Bowers	Bowers	

FIVE MILES—GASOLINE—AMATEUR DRIVERS

1	Thomas—James Barclay	Barclay	5:55 1-5
2	Maxwell—Maxwell-Briscoe Company	See	
3	Maxwell—Maxwell-Briscoe Company	Costello	

TEN MILES, FOR GASOLINE STOCK CARS—OPEN

1	Knox—C. A. Benjamin, Inc.	Oldfield	10:57 3-5
2	Maxwell—Maxwell-Briscoe Company	See	
3	Maxwell—Maxwell-Briscoe Company	Costello	

TO LOWER MILE RECORD ON CIRCULAR TRACK

Benz—Barney Oldfield	Oldfield	0:53 3-5
Benz—Barney Oldfield	Oldfield	0:53 2-5

TWENTY-FIVE MILES, FOR GASOLINE STOCK CARS—OPEN

1	Knox—C. A. Benjamin, Inc.	Oldfield	25:40
2	Peerless—C. H. Bowers	Bowers	
3	Maxwell—Maxwell-Briscoe Company	See	

Barney Oldfield in Knox Winner

Hudson (Hanna) Winner 5-Mile

Maxwells Neck and Neck in 10-Mile

FIRST DAY OF MUNSEY TOUR SUCCESSFULLY COMPLETED

WASHINGTON, D. C., Sept. 21—Despite the early starting hour, all Washington seemed to be abroad this morning when the Munsey reliability contest was sent away from the Munsey building. So dense was the crowd, that it reminded one forcibly of the Glidden start—minus the cannon. It was the original intention to send the first car away at 7 a. m. sharp, but an accident to the elevator at the official garage not only put one of the contesting cars—Matheson, No. 27—temporarily *hors du combat,* with a smashed fuel tank, but marooned five of the cars on the second floor. Quick work by a corps of helpers got the quintet down to the street level in short order, and an extra fuel tank was secured to take the place of the one the Matheson lost when the lift dropped. Referee Trego allowed the crew of the disabled car to check out as soon as repairs were completed, at 9:33.

The Trophy That Is Contested For

Besides the contesting and official cars, there are two non-contestants—an Autocar truck with P. J. Thacher at the wheel, and a Detroit electric driven by George M. Bacon. The truck is carrying extra confetti and passengers' baggage.

There is one lady on the run—Mrs. Frank P. Hall, wife of the owner and entrant of the Columbia, No. 15. This plucky enthusiast vows she will cover the entire 1,282 miles.

For various reasons, but 25 of the original 37 entries put in an appearance at the start this morning. It was rumored that a few of the delinquents demurred at the stringent rules, but it is probable that this was not the true reason for their failure to have their cars in Washington in time to undergo the preliminary examination by the technical committee. Accidents kept out at least two prospective entrants. The Acme was one of these. One entrant gave as a reason for his delinquency that he was "too busy." Others had sold the cars they had intended to enter. Still others advanced failure to secure 1910 models as their reason. These recalcitrants destroyed the hopes of the Munseyites that their run would out-Glidden the Glidden in importance—at least so far as the number of contesting cars was concerned.

Yesterday and Sunday technical committee chairman Frank H. Trego and his assistants, "Doc" Overpeck and Jesse L. Cassard, worked overtime at Warner's garage, examining and sealing the 25 cars. By working rapidly they were enabled to finish their task before sundown. Six of the contesting cars have been entered by private owners—Frank P. Hall's Columbia, George F. Whiting's Winton, H. Clay Waldman's Pullman, John J. Loughran's Reo, T. S. Patterson's Selden, and Frank Hardart's Elmore. The remaining 19 represent sixteen of the best-known American makers, the several factories having sent on their crack drivers to capture the honors in what is in every respect the most important endurance event held in the East this year.

The official cars number seven, as follows: Chairman, National, John Aiken, driver; Press No. 1, Stüdehaker-Garford, Robert Yerger, driver; Press No. 2, Chalmers-Detroit, Joe Matson, driver; Press No. 3, Premier, W. Leslie Walker, driver (private car); Pilot, E-M-F, William Stark, driver; Pilot, Midland, D. C. Johnson, driver; Starter, Maxwell, Harry Walls, driver.

Shining lights among the drivers are not wanting. Billy Knipper, fresh from his Lowell victory, is out for the fourth division honors in his Chalmers-Detroit; Joe Matson, the Indiana trophy winner, is at the wheel of another Chalmers-Detroit which is carrying a bunch of pressmen; John Aiken is handling the big National Six in which Chairman Trego and several Munsey writers are traveling; Bob Yerger, one of the crew of the Studebaker which landed the Philadelphia-Savannah mud-plug a couple of years ago, also has a bunch of Fourth Estate men in his Studebaker-Garford; Walter Wood, American Simplex; Billy Soules, Croxton-Keeton; Leo Shaab, Renault, and Frank Hardart, Jr., Elmore, are others who have made records on road and track, and who are out for the honors in their respective classes.

The contest is being run under class A of the A. A. A. rules for 1909, and the cars are divided as follows:

DIVISION 1 ($850 and under)—Ford, 7; Hupmobile, 29.
DIVISION 2 ($851 to $1,250)—Maxwell, 9; Reo., 26.
DIVISION 3 ($1,251 to $2,000)—Washington, 5; Pullman, 12; Crawford, 24; Washington, 31; Washington, 32; Pullman, 37.
DIVISION 4 ($2,001 to $3,000)—Chalmers-Detroit, 1; Maryland, 11; Spoerer, 14; Columbia, 15; Croxton-Keeton, 17; Corbin, 18; Winton Six, 20; Marmon, 30; Selden, 34; Elmore, 36.
DIVISION 5 ($3,001 to $4,000)—Pullman, 13; Croxton-Keeton, 16; American Simplex, 21.
DIVISION 6 ($4,001 and over)—Matheson, 27; Renault, 28.

The cars were sent away this morning in the order named, with the exception of the disabled Matheson, and this procedure will obtain throughout the entire run. To-day's running time being over nine hours (195.3 miles), the first division cars were given 100 minutes' leeway over the big fellows in the sixth division. The second division pair were accorded 80 minutes excess time; third division, 60 minutes; fourth division, 40 minutes, and fifth division, 20 minutes.

How the Cars Arrived at the Quaker City

PHILADELPHIA, Sept. 21—Of the 25 cars which started this morning on the first leg of the Munsey reliability contest, all reported, and it is believed that but one time penalty will be inflicated—a better indication of the quality of the roads covered than paragraphs of description. The one exception was a 3-point penalty on the Winton Six, due to a balky motor. With the exception of a few stretches between the capital and Baltimore and the miserable cobble-paved streets of the latter city, the going, for the distance, would be rated as excellent. Little difficulty was experienced, even by the small fellows, in maintaining their schedule; in the majority of instances they could have finished clean as regards time, even without their handicaps. Penalties for work on the road, however, were so plentiful that the committee at midnight was still wrestling with the figures.

Despite the excellent going, tire troubles were numerous; but as the rules give the contestants credit for time spent in tire repairs, no damage resulted.

Only one foreign car is in the run, Leo Shaab's Renault, which was among the first at every control, and finished right after the pacemaker at to-night's control.

The Detroit electric, one of the non-contesting cars, left Washington several hours before the contestants, and, making a very fast run, was the first car to reach Baltimore. The distance between the two cities was covered in one hour and fifty-six minutes.

Quaker City, Philadelphia and Century clubs are having "open house" to-night, and the visitors are having the time of their lives. The Quakers have put on a smoker and vaudeville show at the Hotel Walton, the official headquarters.

TABLE OF FIRST DAY'S PENALTIES

First Division—(7) Ford, 1.7; (2) Hupmobile, 2.0.
Second Division—(9) Maxwell, 0.26.
Third Division—(5) Washington, 2.0; (31) Washington, 1.0.
Fourth Division—(1) Chalmers-Detroit, 2.0; (14) Spoerer, 3.0; (15) Columbia, 1.0; (16) Croxton-Keeton, 5.0; (20) Winton, 1.1; (34) Selden, 2.0.
Sixth Division—(27) Matheson, 4.0.

Note—All other cars went perfect, except for the single time penalty imposed on (20) Winton, 3.0 points for late start.

Automobile Wheels, Rims and Tires

By Thos. J. Fay

In a discussion of the action of road shocks upon an automobile wheel, it is possible to draw a very close analogy to the action of a hammer striking a series of blows upon an anvil, and the reaction of the same. To carry out the comparison, glance at Fig. 26, which represents an anvil and a series of hammer blows upon the same. This might be any kind of an anvil and, similarly any sort of a hammer. In each and every case, the distance, which the hammer will rebound, after the anvil is struck, depends upon the part of the anvil struck. As the figure shows, if the anvil is struck fairly at the center the hammer will rebound the greatest distance, because the blow will be against the greatest section of the anvil and the motion will be arrested quicker. It is not the weight of the hammer that counts so much as it is the time (or distance) in which the motion is arrested. Out on the horn, for illustration, where the anvil is far less rigid, the rebound of the hammer is reduced very much, and transferring this same idea to a wheel renders it obvious that short spokes will act just as the center of the anvil, and very long spokes will perform just the same as the horn of the same. The energy of impact then may be much or little, merely depending upon the diameter of the wheels, just as it is in the case of the anvil, depending upon the point of contact of the hammer, in view of the rigidity of the section of the anvil.

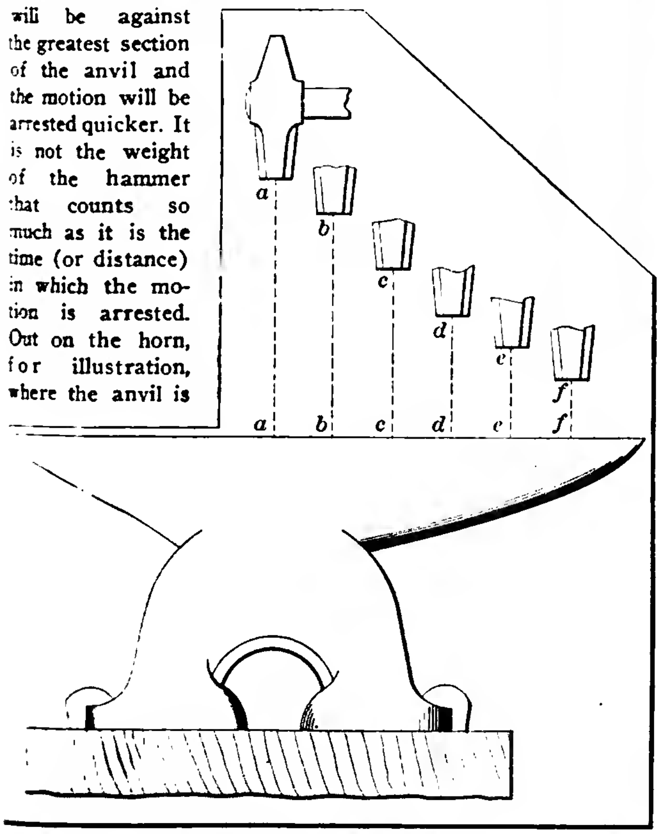


Fig. 26—Anvil and hammer blows, showing principle of arrested motion and impact

It is on this account that high wheel automobiles are enabled to make good speed on roads of no great pretense, although pneumatic tires are not taken advantage of, and even the solid tires used are of small sectional area, because it has been found that the spokes of the wheels, they being of considerable length, and limiting the rubber serve the treble purpose of lowering the cost, reducing weight and eliminating bouncing effects.

The modern tendency in pneumatic tire work is in this same direction, and it is self-evident that long spokes, if they hold resilient qualities, have the further advantage of low cost and long life.

Importance of Service Tests—These must be relied upon to tell the real story in the long run, excepting that certain selections of wood for illustration, foreshadow success, or failure, from the start. Fig. 27, which is reproduced from a photograph taken at the plant of the Pierce-Arrow Motor Car Company, at Buffalo, presents all the elements of success or failure, side by side. The billet of wood, at the left, as accepted by the makers, is sawed from second growth hickory of the variety as found native to Missouri, after the trees are felled green, cut into lengths, corded, weather seasoned, and then cut into billets, from which spoke stock is carefully selected and the ends painted to prevent checking.

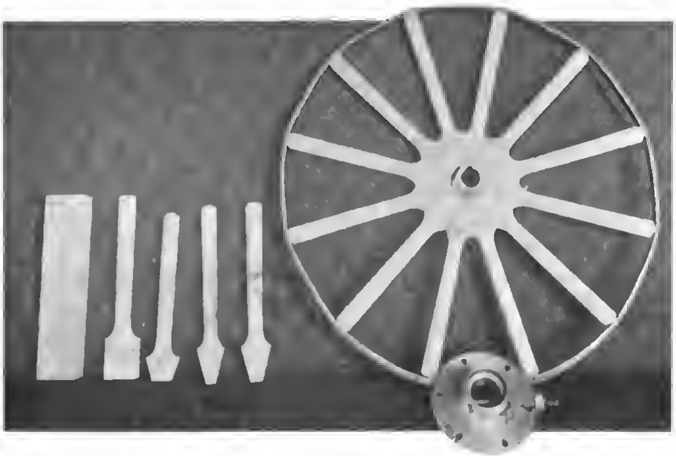


Fig. 27—Showing from left to right, billet, blocked out spoke, finished spoke, scrap, and one with a rusty streak, besides a set ready for the felloe

A roughed spoke along side of the billet, in the same figure, indicates the second operation, and when the spoke is thus blocked out, it is possible to ascertain if it will be good enough

Fig. 28—Reproduction of wood from a broken wheel, showing heart wood, slightly discolored, regular grain, and evidences of strength

Fig. 29—Depicting part of a broken wheel with more uniform grain and no discoloration whatever

Fig. 30 — A dead wood spoke which failed in service

for wheel work of the first class. If knots uncover, or if the grain crops out, even though the wood may be close, of good color, and free from blemishes in the main, it will be necessary to condemn the spoke. The next operation is to miter the spoke, which is done on a machine, so that accuracy is a matter of setting the same to give the required facing angles. The third from the right in the figure shows just such a spoke sufficiently perfect as respects quality of the wood to be used in a Pierce car, but the fourth spoke proved to be of the "bastard" variety, so-called, since the grain cropped out part way up from the miter end. The fifth spoke shown is free from all but a color imperfection. This streak might not do harm, but the wood looked somewhat soft and punky and since spokes are subjected to torsion under some conditions, this imperfection might result in a split spoke in service.

The set-up woodwork shown to the right represents a set of spokes of a wheel just after they were drawn up, and the miter joints are so close that the seams are scarcely noticeable. The glue used is of the finest grades obtainable, and by repeated tests it has been found that joints so made, if the miter angle is correct, are stronger than the cleavage section of the wood. This condition is fortunate since it permits of handling the built-up woodwork in the after operations, and allows of retaining all the bearing surface of the spokes, on the ends, against the barrel of the hub, in service.

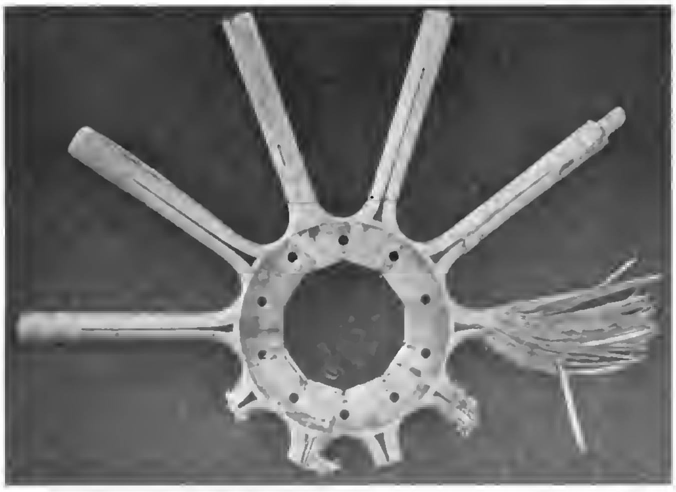


Fig. 31—Indicating the strength at the miter obtained by use of well-matched joints and plenty of good glue

What an Actual Service Test Indicates—The broken wheel, Fig. 28, shows a discolored condition of the wood, and while discoloring may not of necessity portray a condition of lowered strength, even so, the chances of attaining the best results are reduced. True, all the spokes illustrated (excepting Fig. 30) were in wheels that were in collisions or other violent wrecks, and they would not be expected to survive no matter of what material they may have been made. Fig. 29 represents just a little advance, since the wood is a little more uniform in all respects and quite free from discoloration.

Fig. 30 represents a spoke which cannot be regarded as of any value in automobile wheel making, and the Pierce wheelwright, Mr. Johnson, took it as a souvenir from a wheel that failed on small provocation, and in discussing the matter, very aptly brought out the fact that when wheels are painted it is extremely difficult to ascertain just what kind of wood may have been used. The spoke is of greater section than that customary in Pierce, and other cars of quality, and is a good illustration of the futility of size if the material is defective.

Fig. 31 depicts a wrecked wheel, which came from a car that was struck by a locomotive, and it shows to a nicety how well the glued joints will hold when they are well made. In Fig. 32 there is a chance to notice a certain amount of variation of wood even when selections are made by men of skill, although, in this example, it must be admitted that the wheel probably would have outlasted the rest of the car had it not been in a violent collision. Fig. 33 also, of a wheel that went through usage which wrecked the whole car, is a normal example of the grades of wood used in the Pierce plant, and this example affords an excellent opportunity to ascertain just how second growth hickory performs.

Fig. 32—Evidence of the changing strength of wood in the several spokes even with the very best of selection

Fig. 33—Illustrating a wheel of great strength with uniform wood as selected by the Pierce wheelwright

Modern Methods of Building Wheels—When the felloes are put on, the wheels have to be trued up and it is of the greatest importance that this operation be performed with the same precision as that attending the truing up of a flywheel. The machine used for the purpose has all the elements of accuracy and by its use the work is done expeditiously, while the personal equation is eliminated.

With the wheel trued up, after the felloes are in place, the wood work is then ready for the rim, and in the setting of the same there is ample opportunity to ruin the wheel. In the old way, the rims are put in a fire and heated up to almost a dull red heat to expand them sufficiently to slip over the felloe with ease, and when they are cooled off, by sprinkling water over the wheel, the dry wood, just as it comes from the kiln, is in a condition to lap up water at a rapid rate. The water, so absorbed, will swell the wood, and when the wheels are painted the water will be locked in, there to remain for some time, probably until the wheels are allowed to stand out in the heat of the sun for a few hours. After this the wood will distort, the miter may open up, and on the whole it is scarcely possible to make a wheel of the first class if water is allowed to contact with it after the wood is kiln-dried and before a protecting coat of paint is applied. It must be understood that it is the proper function of the paint to keep water out and not to lock it in.

In the Pierce plant, in order to avoid such difficulties and to realize a more uniform pressure when the rim is applied, a hydraulic press, as shown in Fig. 35, is used in the manner as follows:

The rim is heated to a temperature which will scorch paper when it is in contact, and in this heated state it is set into place with the wood wheel, on the platen of the press. The diameter of the rim is slightly less than the diameter over the felloe, so that, even when the rim is heated, it will have to be pressed over the felloe. The work is so carefully done that the pressure is nearly the same with all wheels, and in a number of cases which the author noted the pressure ran up from 25 to 60 tons.

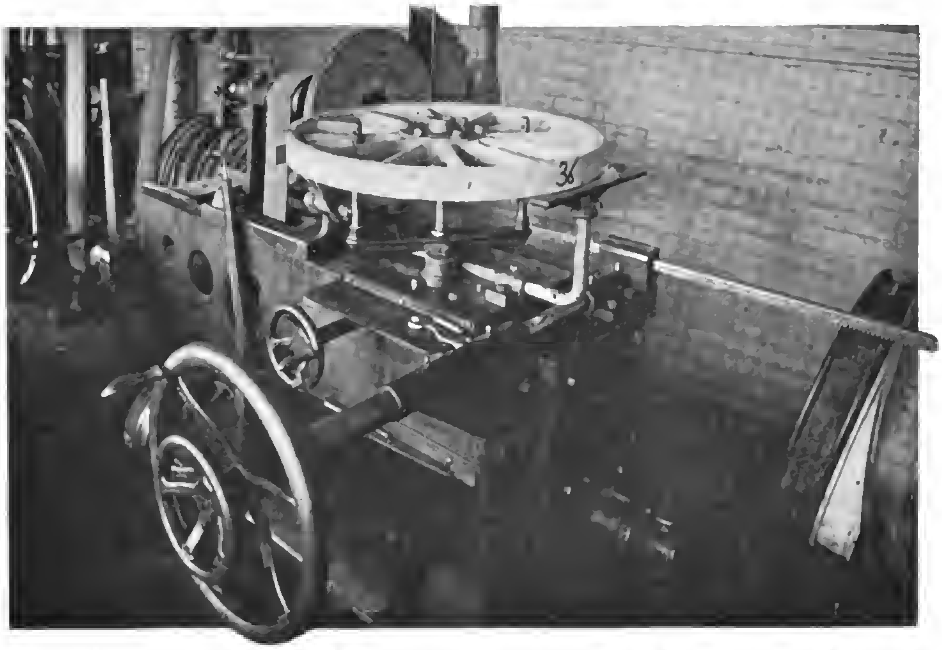


Fig. 34—How the woodwork is trued up in the Pierce-Arrow wheel department, a rapidly rotating emery wheel being used to do the work

When the rim cools, which it is allowed to do in the open air without the use of water, it contracts, and, as a result, besides the pressure of about 25 tons, there is the pressure due to contracting, so that the wheel is bound together very firmly.

In these days when demountable tires are used to a great extent, the stationary rim must be put on with more than a little care, the sectional area of the same must be adequate for the work, and that a press, as illustrated, represents the surest way, seems to be proven by the results attained.

(To be continued.)

SPRINGS OFTEN CAUSE NOISE AND TROUBLE

Springs should be examined occasionally, and while often overlooked, this seemingly trifling matter has a direct bearing upon the smooth, easy running of the car. Owing to the fact that the springs are exposed to the weather, rust is very likely to occur at this point and to this unsuspected corrosion is often due the occasional "squeak," which my garage experience tells me is not always followed up by the driver. Although many cars are provided with some means for lubricating the friction surfaces, many cars are not so well provided for and when rust makes its appearance along the joints there is a crying need for oil. This may be conveniently applied by placing the jack between spring and frame, and slightly opening the leaves or plates. The toggles and links should also have a little oil occasionally and when about this work it is well to examine the nuts of the clips. These nuts are prone to work loose.

The steering gear should always be given proper care and the levers, pins and joints should be kept free of dirt and well oiled. This is a very important matter and as neglect may result in a bad accident, injurious to both driver and car, this important mechanism should be given frequent and critical examination.

FRACTIONAL DISTILLATION IN TESTING FUEL

Specific gravity tells nothing worth knowing about automobile gasoline since the same is made up of a plurality of fractions of the distilling process by which the components of mineral oil are separated out. Specific gravity, if it is known, provided only one fraction is measured, will tell if the same is above, below, or a given standard. As it is, considering the real composition of gasoline (so called), the first thing to do is to separate the fractions from each other, and in the process ascertain the percentage of each in the whole. Having in hand the information of this character, it will then be possible to test each fraction, to ascertain as to its fuel value. The hydrometer will come in handy in the process of determining the density of the respective fractions in the distilling process. The distilling process is attended by much danger, owing to the explosive nature of the hydrocarbon liquids; care should be exercised, and the process should be conducted in conjunction with the use of good facilities for the purpose.

Fig. 35—Hydraulic press which forces the rims on to the woodwork after the rim has been expanded by heating to about 600 degrees C. A pressure of 25 tons may be exerted

ADVANTAGES OF SAND BLAST IN AUTOMOBILE PRODUCTION

REACHING after quality is a process which either increases cost or demands refinement, be it in the automobile or any other line of work. In a visit to the plant of the Pierce-Arrow, among the many methods employed, the process of sand-blasting stands out with more than ordinary prominence, due to the wide range of its application.

When this process of cleaning castings was first introduced it was looked upon as of value for the purpose of removing core-sand, scale, etc. It was a strictly foundry proposition then, and few were the shop managers who saw in it a method of locating defects in drop forgings and other parts of steel.

The process is simple, consisting of a source of compressed air, quantities of clean, sharp sand, a properly devised hopper and a hose fitted with a nozzle, as illustrated here. With this equipment, the workman is enabled to reach every part of a casting and clean it out. This is of the greatest importance in connection with cylinder castings, on account of the intricate cores and cramped spaces, some of which are quite inaccessible to tools of the conventional sort.

Workman In Garb and Mask Sanding Drop Forgings to Remove the Scale

The extension of the sand-blast to other work, however, enables the workmen to clean the forgings, eliminate scale, and expose all defects such as can be discerned, once the scale is removed and the virgin metal is open to view. A weld in an axle, for illustration, which might go unnoticed otherwise, will show up with great certainty after the sand-blast has done its work. In the Pierce-Arrow plant at Buffalo all drop forgings and in fine, every piece that goes into the car, is subjected to this process, with attending advantages, which may be summed up as follows:

(A) Core-sand is properly removed so that the water system will not be clogged up.

(B) Forgings are partly cleaned of scale and tools last longer.

(C) Poor welds are discovered and deception is coped with.

(D) Parts present a more even surface and take finish better, moreover the finish stays on more tenaciously.

How the Workman Is Protected from the Cutting Sand—As the figure shows, the workman must be protected when he is doing this class of work, and besides endeavoring to keep sand out of his internals, he wears mittens and a mask in order to prevent the flying sand from cutting through the skin.

Of a necessity, the work is conducted in a room, or rather department, somewhat isolated from the rest of the works. The flying sand with its natural hardness and propelled as it is by the high pressure of the air behind it would make short work of even the toughest skin. For this reason the sand blast at the Pierce-Arrow plant occupies the first part or front end of the so-called brazing building, a one-story structure 377 by 55 feet. Of this, a nearly square room is utilized. This is divided into two parts, one containing the large diameter fan and the sand bin or storage. Within the other half are placed the blast rooms proper, and a broad hall for material storage.

These rooms are three in number, about twelve feet square. In the center of each one is a sort of table upon which the work to be cleaned—for this is primarily a cleaning operation—is laid. The tables, of which the picture shows but a corner, are made up of a simple gas pipe framework, upon which are laid long narrow strips of wood resembling laths, but about eight feet long.

Over this, and having an equal size, is placed a hood which resembles the hood placed over a blacksmith's fire. Furthermore, the resemblance may be carried further, for the blacksmith hood is to remove the deadly fumes from the coal, while the hood in this case is to remove the floating particles of sand, which are equally dangerous to the throat and lungs of the operators. This upward draft is not relied upon solely, for the men wear, as the picture shows, a headgear, with glass covered openings for the eyes.

The compressed air is stored in a large tank in the corner of the passageway, this being both of large size and large capacity. A pressure of about 200 pounds per square inch is maintained therein at all times. In each of the three rooms a smaller tank holds air for immediate use, at a lower pressure of perhaps 125 pounds per square inch.

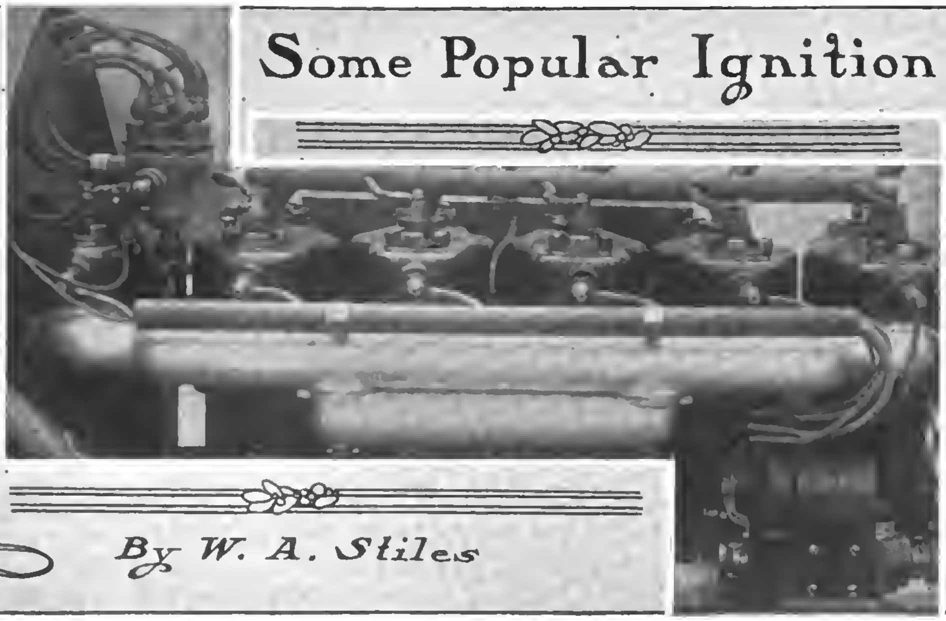
Nozzle Construction and Method of Operation—At the nozzle, there are two pipes leading in and but one leading out, the latter the nozzle proper. Of the two former, the smaller one conducts the air, which in its passage sucks the sand through the other of much larger diameter. A shut-off cock regulates the flow of air, there being no necessity for regulation of the sand, as that stops flowing as soon as the air is shut off. To go to work on a piece, it is laid on the table or bench, the workman dons his mittens and hood, brings the nozzle over to the table, turns on the air, and with the first rush of air under the high pressure, the sand is also sucked out and the work has begun. When the whole surface of a piece has been gone over to the operator's satisfaction, the air is turned off, the nozzle laid aside, and the piece removed to make room for others. Very small pieces are not laid on the table, but are held in the hand, while the blasting process is going on.

In the beginning, the blast was used, as stated previously, for cleaning castings, but by trial it was found to give to the surface of forgings a superior surface, both as to appearance, which is worth a good deal now-a-days, and as to smoothness. The latter was desirable in the paint shop, for it eliminated many hours of laborious hand work cleaning rough forgings, while the time it actually consumed was so small as to be negligible.

Thus, the paint shop savings were noticeable, so much so that this method was applied to many, if not all, of the unfinished parts which were to receive a coat of paint later. With this came the discovery that not only was the life of the painting coat lengthened on rather rough surfaces, but that smooth ones as well were benefited by its application. So, many finished parts, as, for instance, the aluminum fenders, were sent to the sand blast to receive a "roughening" treatment. The utility of the method was then not alone smoothing the surface of very rough parts, but slightly roughening the surface of highly finished ones.

Today, so much progress has the process made in these minor economies, that no American plant of prominence is without a sand blast. With the increasing number of dull finishes used this process assumes a more important place in the industry.

Some Popular Ignition Fallacies Made Clear



By W. A. Stiles

SOMETIMES amusing, and often exasperating are the experiences of the trouble man who is sent out from the factory at more or less frequent intervals and runs up against the car owner, who knows just where the trouble is, and who would have fixed it himself had he not thought it better to call in an expert. To appreciate fully the advice which is generally given him from the start of the job to its close, the trouble man should select the type of car which has its timer shaft lying horizontally along the engine base, disappearing modestly into the dark regions somewhere under the footboard. The timer is usually worn out, and must be taken off, so he will probably assume a stooping position across the frame, with head and shoulders somewhere in the vicinity of the clutch, and as he begins to skin his knuckles in getting the confounded thing off, he will listen to a rapid-fire monologue somewhat after this style:

"And after we got about fourteen miles out into the country the blankety-blank thing laid down. Yes, sir, it just quit. So I took a fine file and cut notches on each side of the vibrators to make them weaker, and when I got them back in place off she went like a top. You fellows make those tremblers too stiff altogether." (The factory man takes good care to replace those chopped-up vibrators before he leaves.) "And then you ought to have a larger whatd'yer call it on the contacts. These don't last any time; some only a couple of weeks." (He dresses them down twice a week with a file.) "It's a bum outfit anyhow; my engine gets hot now, and it didn't on my old car when I had the ——— system; the steering gear is loose and the front wheels wabble"—and so on ad infinitum.

A Single Spark Will Do the Work—These delusions, however, may be set down as individual "grouches," and the same ones are seldom encountered twice. There are, though, certain fallacies which have gained ground in the public mind, and it is of these that I shall speak. The first is an idea which is being dispelled today under accurate tests, and is no longer seriously considered by scientific and mechanical men in the automobile business; namely, that a series of sparks are better than one, because a shower of sparks ignites the gas better than a single one could do, and more quickly. When it is considered, however, that an eighth or more of the explosion stroke will occur between the first and second sparks, even with a moderately rapid vibrator, it becomes evident that the second spark, as well as all subsequent ones, take place in either a flame or a hot but dead gas. The most careful dynamometer test will show absolutely no gain of power through the use of four, six or even ten sparks for each explosion. Indeed, it would seem to be a fact that the positive synchronism of the mechanical single-spark contact maker is productive of better results, speaking in terms of horsepower, than the multiple-spark system.

The next is a point which I shall touch upon very carefully, as it is an idea based on more or less (mostly less) truth, and has many adherents among motor manufacturers today. It concerns the relation of horsepower with spark heat. There is no question but what a small white thread spark, such as might be given by a broken-down coil, will give less satisfactory results than a good, rich spark, normally full in body heat, but the most careful and impartial tests have failed to show any variation of engine power, whether a good coil was used or a high-tension magneto. Laying aside the many arguments pro and con this subject, for practical purposes it is a fact that the gas mixture either explodes or does not explode, and if the latter, the explosion will be of the same heat and pressure regardless of what set it afire. It should not be inferred from this that the mixture can not be made to explode slowly or quickly, as it is a well demonstrated fact that two sparks fired simultaneously into opposite sides of the cylinder will assist materially in rapid combustion. The variation between the poorest spark which will fire a mixture and the hottest "blaze" obtainable by the use of a geared-up magneto is in any case only the smallest fraction of a horsepower, and the motorist who imagines that his new magneto will take him up a hill on high gear that he used to take on second with his old coil, is either the victim of a delusion or has had his first system improperly timed.

Gas and Ignition Troubles Much Alike—Another point which I have mentioned is the frequent confusion of carbureter and ignition troubles. This is especially frequent on two-cycle engines, where the mixture is inherently poor, and requires excellent carburation. I cannot recall how many cases of ignition trouble I have cured by an adjustment of gas and air, but there have been a great many. I have found a very safe plan to adopt in case of trouble to be to test the spark at the plugs, and if it is all right, to get after the carbureter. This will lead to the trouble nine times out of ten.

Fixed spark ignition is a practice which has been more or less tried out in the automobile field, and is considered by some to be eminently satisfactory. To my mind, however, the trifling advantage obtained by elimination of hand adjustment is more than offset by the unquestionably greater wear and tear on the engine. It is entirely impracticable with a coil system, due to the fact that the lag of the vibrators, as well as of the coil, will retard the spark more and more as the engine speed advances, and at just the time when it should be considerably advanced, it is very much retarded. This leads to heated and warped valves, boiling out of water in the radiator, and deposits of carbon, as well as the material reduction of engine speed and power. These facts apply, although in a less degree to fixed magneto ignition, and one prominent concern manufacturing taxicabs, after trying out this system and building cabs for one year with this equipment, found it advisable to again adopt the hand control system. A very interesting discussion on this point was brought up at a meeting of the Society of Automobile Engineers last spring, and the general consensus of opinion at that time seemed to be that the advantages gained by fixed ignition were decidedly dubious.

Engine Speeds Up on Magneto?—Following along these lines of spark timing, I wish to comment on one of the most fallacious arguments I have ever heard advanced. It is the statement of the man who says: "I have just proven to my own satisfaction that the magneto gives more power out of the same gas than the coil. The way I did it was this—I let the engine run idle at a low, moderate speed on the coil, and then without touching anything else, I switched over to the magneto. The engine picked up right away, and ran at a much faster speed." The reason for this extra speed is very obvious, where the circumstances are considered. In the first place, the same advance lever operates, as a general thing, both the magneto and the timer. Now it is very seldom that the driver advances the spark as fast as it really should go. This is due to habit; he has become accustomed to carry the spark a trifle low in order that a momentary slowing of the engine shall not cause pounding. Thus it is that when the magneto is switched on, the effect produced on account of the lack of lag in magneto spark timing is to advance the spark and naturally the engine speed is increased. It is probable that the magneto would naturally increase the engine speed five to ten R.P.M. on account of the nicely synchronized spark which the magneto delivers, but the difference would probably not be appreciable.

These erroneous conclusions and assumptions without doubt have arisen from the fact that the ignition of an automobile engine is a part governed by different principles from the rest. They are, nevertheless, a very annoying factor of the ignition business, as any coil or magneto manufacturer will attest.

DEVELOPMENT OF THE SHOCK ABSORBER

By EDWARD V. HARTFORD

THE problem of designing a suitable shock-absorber for automobile springs first claimed my attention in the spring of 1899. I was in Paris at the time, and went out to Versailles to see a motor tricycle race. More interest was being taken in these than in automobiles, as they were faster. The race was won by Marcellin, beating Baras, who previously had been well established as the motor tricycle champion. When I looked at Marcellin's tricycle, a Darracq, equipped with a two-cylinder 12-horsepower Buchet motor, I noticed that the fork was entirely different from the ordinary one. Marcellin informed me that it was *la fourche Truffault* (the Truffault fork) and was a great invention. I then turned to Baras and inquired of him how Marcellin had come to beat him. He replied: "It's that Truffault fork. In my last race, which was partly over cobblestones, I used it, but as this race was over a road like a billiard table, I thought I would do better without it. However, I will never race without it again." Baras' tricycle was identical with Marcellin's, with the exception of the spring fork.

The following day I looked up M. Truffault and found him in a humble little shop located near the Porte Maillot, building the Truffault fork. He was a man of about sixty years of age, of the pure type of the inventor, creating one thing and then bending his energies on something else, not sticking to one idea until he had established it on a firm basis. From his inventions he should have been a wealthy man and long since retired from business, but instead the manual labor he was even then performing had cramped and bent his fingers. Truffault actually invented the hollow bicycle rim which first made the light safety bicycle possible. He turned his invention over to a large manufacturer of bicycles who promised him a royalty of ten francs on every one manufactured. Truffault, his mind still bent more on improvements and new inventions, failed to take the necessary legal steps to protect himself, and the manufacturer, putting his conscience behind him, became a millionaire, while the royalties which were actually Truffault's were never paid.

I had the Truffault fork applied to my own 2¼-horsepower De Dion tricycle with the most gratifying results. Truffault and I became fast friends, and worked in unison on the problem of a shock absorber for the various types of suspensions that were being used on automobiles. Truffault had a complicated idea which required a somewhat radical change in the construction of the automobile, and I suggested the simple suspension which has been used with such success to the present day.

In the fall of 1900 I went back to the United States and tried to interest some one in the invention. I bought a 6-horsepower Oldsmobile and sent it over to Truffault to experiment with, and this car was the first to be fully equipped with a set of our shock absorbers. Before this, however, I had demonstrated it with a tricycle, but could get no one to take the matter seriously. Even some of the best automobile engineers of the day could not understand why we wanted to brake the action of the spring with friction, and thought rather we should put ball bearings all around to give the spring its maximum oscillation.

One exception was Thomas A. Edison, to whom I took my tricycle at his experimental plant at Orange, N. J. There I rode up and down over a series of 150-pound castings about eight inches in height. Mr. Edison seemed very much impressed, and it certainly looked as though he intended taking it up. However, I waited for days to hear from him in vain. A little later I met the New York manager of a large automobile company, and through him obtained permission to make a demonstration at their factory. As this seemed the turning point in the career of the shock absorber, I considered the circumstances of sufficient importance to go to the expense of bringing Truffault over from France. He remained at the factory for two weeks, as it was necessary to change the very stiff springs with which the car was equipped to a more supple set. When the job was finished and the shock absorbers applied, the factory testing force gave them such a try-out as few shock absorbers have received since, and Truffault assured me that he never again cared to go through the same experience. However, the demonstration was very successful, and a short time afterward the company made me an offer of $1,000 for the patent. Naturally we declined the offer.

The automobile industry in France at that time was much further advanced than in the United States, and shortly after Truffault returned to Paris he made arrangements with the Peugeot Company to exploit the invention. The Peugeot Company put them on its own cars and sold a few sets besides. The increase in the marketing of the device was very slow, however, until the late Leon Théry became interested and decided to equip his Richard-Brasier racer with them. He won a sweeping victory in the Gordon Bennett race that year, although his car was the smallest entered, and naturally the shock absorbers received much credit. Théry was able to pass over all road obstructions without shutting off his power, while the others were obliged to slow down materially.

At once all the racing drivers rushed to Peugeot to have their cars equipped with the shock absorbers, and from this time the business went on with rapid strides. In this country we placed an initial order for 25 sets with the Garvin Machine Company, and after this had been duplicated twice we opened a small shop on Hudson street, New York, in October, 1903. By May of the following year we were running night and day to supply the demand, and conditions have hardly changed since. Numerous imitations have sprung up, but at the start we had patented every deviation of the idea and were fully protected.

Test of Pierce Water-Cooled Motor*

By J. A. Luhrman and G. W. Woodward

IN all of the tests the air valves, both main and auxiliary, in the carbureter were controlled by the throttle only. The gasoline needle valve, however, was adjusted for four different positions in the runs at 10, 15, 20, 25 and 30 horsepower at 1,000 and 1,250 r.p.m. The first setting was obtained by shutting the gasoline supply down to a minimum, and still carrying the load without back-firing. The fourth setting was with the maximum amount of gasoline possible, but sufficient for carrying the load. Between these two extremes two points were taken. By this means the range of the carbureter for the correct setting of the auxiliary air valve was determined.

It was intended when the test was started to make an analysis of the exhaust gases and also to measure the air to the carbureter, but owing to an unexpected shortening of the time allowed for the test we were unable to do this.

As we had started on quite a long series of brake tests, we finished these first and then spent what time we had remaining working on the manograph. We obtained very satisfactory results for all runs except at maximum horsepower; then the manograph became troublesome and the cards taken were not satisfactory. However, the results taken were worked up and put in the thesis, more to show what would have been done if time had permitted than for any other reason.

The runs at maximum horsepower were made with the needle valve of the carbureter set for maximum power which could be developed at that speed.

Previous to the tests, the valves of the engine were all checked over to see if they were timed correctly according to the figures given us by the makers. The valves were all timed so that they opened correctly and the closing was allowed to come where it would, as by several trials this seemed to be the best method to follow, since both adjustments could not be made on account of the cams.

A storage battery was used in all runs as the source of current for ignition, as the magneto did not seem to be able to operate reliably with a heavy load and high speed.

Method of Tests for Horsepower at 1,000 and 1,250 Revolutions—The tests were started as soon as possible after the engine was running under required conditions. On the first signal to start the test the gasoline gauge was read and the speed-counter snapped into place. The temperature of the jacket water in and out was also recorded. All readings were taken every two minutes and the speed-counter was always read exactly on the signal. The required brake-load was kept "floating" and the speed shown by the tachometer was used as a check on the reading of the continuous speed-counter.

Method of Testing for Maximum Horsepower—Five men were required for these runs, the fifth man reading the brake beam on a signal from the man taking the speed with the tachometer. The engine speed was kept constant by means of the brake, with the throttle wide open and the spark adjusted for the best results. In other respects, the runs were similar to those for varying horsepower at constant speed.

The main computations on each run were checked and compared as far as possible between the runs with the results of previous runs. Whenever a run appeared to differ to any extent from runs previously made, check runs were made, until the error was found or two similar runs checked. It was found necessary to make a number of check runs, especially at high horsepower and low settings of the needle valve of the carbureter.

Mounting of Engine—The engine was mounted upon a wooden frame and all of the necessary connections, such as water, electrical and gasoline, were made. The water supply was obtained from a tank which discharged the hot water through an overflow outlet near the top and the makeup water taken from the city mains. With this arrangement, by increasing or decreasing the amount of cold makeup water, the temperature in the supply tank could be maintained very nearly constant at any desired temperature. During the test, temperature of the jacket water was kept at a very nearly constant temperature and at such a temperature as would most nearly approximate the conditions of actual practice. The pump for circulating the water was calibrated under conditions of use so that the quantity of water circulated at any given speed could be approximately determined from the calibration curve. The water into the jacket was taken from the bottom of the supply tank and the discharge water was taken in at the top of the tank. The temperature of the cooling water "in" and "out" was ascertained by means of thermometers inserted into oil wells that were placed in the piping of the circulating system. The fuel was fed to the vaporizer by gravity. The weight of gasoline used during each run was determined accurately. The load was applied to the engine by means of a Prony brake. The flywheel was provided with a wide flange around the inside for the purpose of keeping a certain amount of water in the wheel and was kept cool by running cold water into it. The hot water was carried off by means of a scoop arrangement. The most satisfactory lubricant that was found for the brake was a rind of bacon or ham. By placing some of this lubricant between the wooden blocks of the brake so that it came in contact with the warm rim of the flywheel, the proper luhrication to give good results was obtained, for as the flywheel heated up, the grease ran more freely and so a balance was obtained, making it possible to keep the scale beam in very nearly perfect balance all the time.

All the runs were of 30 minutes' duration excepting for a few heavy loads, when at times the runs were made shorter, because of conditions at the time of the test. Readings of all data were taken in every case at two-minute intervals. A continuous counter was used to take the speed, and this was checked by means of a tachometer.

To start a run the engine was put under load and brought up to speed as shown by the tachometer, and conditions were allowed to become constant. At a signal from the timekeeper, the continuous counter was snapped into place by means of a spring and readings were taken of all values. By this method of procedure any error that might be introduced by the suction of the engine upon the fuel tank was canceled. The specific gravity of the fuel was tested for each new lot of gasoline placed in the tank. Mobile oil was used in the lubrication system and gave very good results.

During the test the engine was run without a muffler, owing to the long exhaust pipe used; it was thought that this would have practically the same effect as the muffler. The exhaust pipe, or manifold, on the side of the cylinders became very hot during a run at heavy loads, and this was cooled by means of an air blast from an electric fan which was temporarily mounted on the engine frame beside the exhaust manifold.

The temperature of the jacket water was kept as far as possible constant at 110 deg. Fahr., to obviate any changes in thermal efficiency due to the variation of the jacket water tem-

* Paper read at semi-annual meeting, Society of Automobile Engineers, Chicago, August 5-7, 1909.

perature; it was found that this temperature affected the results to quite a considerable extent.

The object of the test was to ascertain the following:

1. The fuel consumption and the economic thermal efficiency at constant speeds and varied horsepower output at various settings of the needle valve in the carbureter.

2. The fuel consumption and economic thermal efficiency at the maximum horsepower output and varied speeds with respect to the needle valve settings.

3. The mechanical efficiency and maximum compression pressures from the manograph cards.

4. To ascertain the fuel consumption for a slow no-load run.

Some Details of the Engine—The engine under test was made by the Pierce-Arrow Motor Company, of Buffalo, N. Y. It is of the vertical type, six-cylinder, water-cooled. Both the inlet and the exhaust valves are mechanically operated by means of gear-driven cams and lifting rods. The cylinders are cast in pairs and have a bore of 3 15-16 inches and a stroke of 4 3-4 inches. The water-jacket valve chambers and cylinder heads are all cast integral with the cylinder proper. The inlet valves are located on one side of the cylinder and the exhaust valves on the opposite side. The springs closing the inlet valves are weaker than those on the exhaust. All the valves are interchangeable and have cast-iron heads with 45-deg. seats and steel stems. They are operated by two sets of cams on separate camshafts, both located within the crank chamber. The push rods operating the valves are fitted at the lower ends with hardened steel rollers of large size and moving in renewable bronze guides.

The pistons, which are accurately ground, are made very light and with webs to strengthen the wrist-pin lugs. They are fitted with four piston rings.

The wrist pins are of nickel steel, case-hardened and ground, and are fastened to the wrist-pin lugs by means of taper-set screws.

The connecting rod is of the marine type, forged of steel and fitted with phosphor-bronze bushes at both ends. The wrist-pin bearing is made extra long. The crank-pin bearing is adjustable for wear.

The crankshaft is a solid forging of nickel steel and is supported on seven bearings which are provided with adjustable bronze bushes. Both the crank-pin journals and the main crankshaft journals are of liberal length and diameter, to insure cool running and long wear, and they are accurately ground.

The crankcase is cast of very tough aluminum alloy in two halves, being divided in a horizontal plane through the center of the crankshaft. All the crank bearings are entirely supported by the upper half of the casing and the lower half acts only as a dirt cover and an oil well. When the latter is removed, free access is obtained to all the crank bearings for inspection and adjustment.

The camshaft gears are located at the forward end of the engine, outside the crankcase, and are protected by a special oil-tight cover bolted to the crankcase.

The magneto spark-plugs are screwed into the side wall of the inlet valve chamber and the battery spark plugs are screwed into the top of the cylinder near the inlet valve opening.

How the Lubrication Was Effected—Lubrication is effected by means of a gear-driven oil pump located on the exhaust side of the engine. It is operated by a worm gearing on the camshaft. This pump draws the oil from the pit in the crankcase and forces it into the reservoir placed immediately above the exhaust pipe. From this reservoir a copper tube leads to each of the crank-shaft bearings. There is a removable wire gauge screen in each of these pipes to remove any sediment that may collect. The crankshaft journals and the short arms of the crank are drilled through their centers and the crankshaft is also provided with radial holes at the center of the journals so as to provide a passage for the oil from the main journal bearings to the crank-pin bearings. There is a continuous flow of oil from the reservoir to all the bearings on the crankshaft, the oil being carried from the main journals and forced to the crank-pin journals by centrifugal force. The oil that works through the outer crankshaft bearings returns to the bottom of the crankcase from where it is again pumped up into the reservoir.

In cold weather the oil in the reservoir is kept warm and its fluidity increased by its nearness to the exhaust pipe. This also admits of a heavier and more viscous oil than when it is not heated.

The shape of the oil tank is such that no matter whether the car is going up hill or down all the bearings get an equal amount of oil. The makers claim to have had very good results from this system of oiling, and from what could be observed during the test, the system worked very well.

All About the Cooling System—The cooling water is circulated by means of a water pump of the centrifugal type, which gives a large flow of water through the jackets of the cylinders. The pump is attached to the engine crankcase, being positively driven by means of a gear, meshing into the exhaust camshaft gear wheel. The supply for the pump is taken from the bottom of the radiator and delivered into the water jacket of the engine at its lowest point. From the top of the jacket the water returns to the top of the radiator.

Venturi Type of Carbureter—The mixture to this engine is supplied by what the makers term "Our special automatic carbureter." It is of the Venturi tube type. The constant level gasoline chamber is concentric with the spray nozzle. This is in communication with the main gasoline supply tank. The float is of annular design and keeps the height of gasoline at the spray nozzle constant. This height is 3-16 inch below the top of the nozzle, the opening in which is regulated by means of a needle valve. The gasoline from the supply tank passes through a fine gauze strainer, which prevents water and dirt from entering. When the engine is running slowly, the throttle valve is just open and the auxiliary inlet reed valves are on their seats. The opening formed by the throttle valve is V-shaped, so that the suction of the engine induces a high velocity at this point. All of the air is taken in at the lower inlet and, coming from the proximity of the exhaust pipe, is warm. It passes up the contracted passage around the spray nozzle at a high velocity and vaporizes the proper amount of fuel. When the engine runs faster, the more intense suction opens the light auxiliary air reed valves, and when running still faster it opens the heavy reed valve also. This, it is claimed, insures a gradual increase in the supply of air to the mixing chamber. The entire mixing chamber is surrounded by a hot water jacket. The supply pipe to the jacket has a cock in it, which can be closed in hot weather, but should be full open in cold weather to secure the best results.

Two Independent Ignition Systems—The ignition of the engine is supplied by two independent systems, as shown by the diagram, Fig. 4. One system consists of a storage battery and individual induction coils. The spark plugs for this system are on top of the cylinders. The timing by this arrangement is effected by a commutator of the roller type and is placed on a vertical shaft between the second and third cylinders. The revolving roller is operated by means of a pair of bevel gears from the inlet camshaft. The order of firing of the cylinders is 1, 5, 3, 6, 2, 4.

The other system consists of a Bosch high-tension magneto. In this magneto, a shuttle armature rotates between the poles of two pairs of strong steel magnets. The rotation of this armature in the strong magnetic field results in the induction in its winding of a strong electrical current which reaches a maximum voltage twice in one revolution, or after rotating through an angle of 180 deg. The current which is produced by turning the armature rises by short-circuiting the primary circuit through a contact breaker and breaking the circuit at a suitable moment. A spark jumps across the electrodes of the spark plug at the moment of the breaking of the primary circuit, causing the explosion in the cylinder. As the arc-like spark can only be produced when the armature is in a certain position and also the ignition has to take place at a certain period during the movement of the piston, it is necessary that the armature shall be positively driven. In the case of a six-cylinder engine, it must rotate at one and one-half times the speed of the crankshaft. The armature is wound in two parts; one is a primary winding consisting of a few turns of heavy wire and the other is a secondary consisting of many turns of fine wire. The end of the primary winding is connected to the secondary so that the latter is a direct continuation of the former. The end of the secondary winding leads to a slip-ring, on which slides a carbon brush, which is insulated from the magneto frame. From the brush, the current is conducted to a connecting bridge fitted with a central carbon brush, and through the rotating distributor piece which carries a radial contact carbon to the distributor disk. In the distributor disk are embedded metal segments, of which there are six. During the rotation of the contact carbon, the latter makes contact with the respective segments and always connects the secondary with one of the contacts. Connected to the segments are sockets which serve for the reception of the contact plugs. These plugs serve as terminals for the cables leading to the spark plugs of the individual cylinders. From the end of the secondary winding the high-tension current is led to the respective cylinders, which are fired alternately; the current produces the arc, which causes the explosion, then returns through the motor frame and the armature core and back to the beginning of the secondary winding.

Manograph and Connections—The manograph used in these tests was a Hospitalier Carpentier, made in Paris, France. The position and arrangement of the manograph and connections are as follows: The manograph was mounted on a tripod at the side of the engine and protected from vibration by being fastened by strong wire to the floor. A flexible shaft, screwed to a stud inserted in the brake wheel hub, was led to the manograph. The shaft was supported by a bracket attached to the frame on which the engine was mounted. The try-cock in the top of each cylinder was removed and the hole thus made was fitted with a special fitting, to which was connected the tube to the distributing block. One-sixteenth extra heavy copper tubing joined each cylinder to a brass distributing block. The gas distributing block is made of a bar 1 inch square and 4 inches long. The block was fitted with seven cocks and one brass union. One cock was to give atmospheric pressure and the other six were connected to the cylinders, the idea of the design of the block being to reduce the gas volume as much as possible and to have an equal distance from each of the cocks to the inlet leading from the manifold.

A 1-8-inch ground brass union was used on the top of each of the cylinders and the ends of the copper tubes were silver soldered into the unions. The other ends of the copper tubes were silver soldered into the cocks on the distributing box. An electric fan fastened to the wooden frame of the engine cradle was used to keep the exhaust pipe and the copper tubes cool.

The connection between the manograph and the distributing block was made by a short length of tubing; all bends in the tubes were made easy so as to cut down friction, and, by having the length of all the tubes the same, to have equal friction in each tube. All passages could be shut off at the block by the system of cocks used. When a cylinder was being indicated the cock on the block was opened, giving direct communication to the manograph, with a very slight increase in volume beyond that of the tubing itself.

Principle of the Manograph—A beam of light from a small arc light is reflected by means of the prism so as to fall on a concave mirror, which in turn reflects the beam on a ground glass screen. The mirror frame receives a motion from the engine which causes the beam of light to trace a horizontal path on the ground glass, while a vertical motion of the beam is produced by the action of the gas pressure on a diaphragm, which is connected to the mirror. The resultant of these two motions gives an indicator card.

Manograph Details—The flexible shaft comes up underneath the front of the manograph and terminates in a small gear. Another gear of the same size meshes with gear. The bearing for the first gear is in a brass worm gear, which may be revolved by means of an adjusting screw around the second as a center. It is thus made possible to produce a rotation of the one gear, while the other remains stationary. In this way the position of the shaft relative to the beam of light can be changed.

A small stud is fastened in gear which acts as a crank and is connected by a short link to the lever, which is pivoted to the frame near its center. The free end presses against a short pin, which in turn presses on a horizontal leg of the mirror frame. The mirror is supported on a right-angled frame which rests on three points. The point at the apex of the frame is stationary and acts as a pivot on which the frame rocks. The vertical leg of the frame rests against the pin which is in contact with the reverse side of the gas pressure diaphragm. Considering one of the pins stationary, any motion of the other pin will produce a rocking motion on the fixed pivot and the stationary pin. By means of these two motions at right angles to each other there is produced a resultant motion of the mirror frame about the fixed pivot. The mirror frame is held against the three pins by means of two strong, flat springs. The frame of the mirror and the connecting mechanism were made of hardened steel to reduce the wear and they were also of very light construction, the latter to reduce the inertia effects. The mirror is ground concave with its focus at the ground glass screen.

The gas diaphragm is a circular plate of thin steel supported at its circumference by being pressed against a ground seat by means of a brass plug. The plug is cut away, leaving a recess connecting with the tube from the distributing block. As all the joints are ground, the recess is airtight. A small hole is drilled back of the diaphragm into the recess to keep the pressure atmospheric.

This mechanism described is fastened to one end of a wooden box, the glass screen being at the other end. On one side of the box near the screen end is screwed a tube, supporting on the end inside the box a small ground-glass prism. The axis of the prism is vertical and is fitted with a small rod for adjustment if desired. On the other end of the tube is placed a framework supporting a small hand-adjusted direct-current arc light. Inside the tube, a tube of small diameter is placed, having the outer end closed by a diaphragm, through the center of which is drilled a very small hole. On the outside of this diaphragm a small shutter was arranged so as to screen the hole. The shutter was fitted with a spring so that the hole was nominally closed except when a card was being taken. The shutter was operated by a card. Adjustments were provided so that the center of the arc could be kept in the same horizontal plane and in line with the hole in the diaphragm. The plate holder was held in place by a brass spring. Direct current at 110 volts was used to supply the arc light, the power regulation being obtained by a bank of 16-candlepower lights connected in parallel with each other, but in series with the line.

Adjustment of the Manograph—In a proper setting of the manograph for a given speed there are two factors to be considered—first, the lag of the flexible shaft, and second, the lag of gas pressure in a small copper pipe. These were overcome by cutting the spark off of one cylinder and indicating the resulting cycle by means of a weak diagram (5 kilograms). The instrument was then adjusted until the maximum point of the compression line accrued at the end of the stroke, as determined by the horizontal travel of the beam of light. The expansion line retraveled as nearly as possible the compression line, as seen by the lines on the ground-glass plate. The speed was kept constant at the desired number of revolutions during the setting.

Taking of Indicator Cards—The beam of light as thrown on the ground-glass plate was photographed on stiff bromide paper inclosed in a double plate holder. A small shutter similar to that on a kodak was fitted to the diaphragm in front of the arc light and actuated by means of a card. A dark room was used which was situated in the gas-engine laboratory and provided with all conveniences. All the cards were developed immediately after being taken, so that duplicates could be made if necessary. In taking cards the manograph was adjusted as described above, then a 25-kilogram diaphragm substituted for the 5-kilogram diaphragm and a cylinder indicated and cards photographed.

Method of Obtaining M. E. P. Cards—Cards were all planimetered and the mean ordinate determined by dividing the area by the length. The mean ordinate thus obtained was scaled off by means of dividers on the calibration curve corresponding to the diaphragm used. The mean effective pressure determined by this method was reduced to pounds per square inch by multiplying by 14.22, and this mean effective pressure was found on the abscissa of the curve showing the indicated horsepower per cylinder against mean effective pressure in pounds. Going vertically upward on this sheet until the line corresponding to the speed in consideration is reached, then across the sheet horizontally, the indicated horsepower may be read directly. This series of curves was computed from the constants of the engine.

Gasoline Analysis—The gasoline used in the test was analyzed by Dr. Lundell, of the Department of Chemistry, Cornell University. The sample analyzed was selected by taking numerous samples of the gasoline from time to time out of the bottom, middle and top of the gasoline tank, then thoroughly mixing them.

The heating values as determined by a Junker calorimeter were as follows:

Higher heating value = 19,798 B. T. U. per pound.
Lower heating value = 18,700 B. T. U. per pound.

Sample Computations for Run No. 1—10 horsepower at 1,000 r.p.m.

Gasoline consumed in 30 minutes = 4,320 cubic centimeters.

Specific gravity = .705.

Since 4,320 cubic centimeters of gasoline were used and 1 cubic centimeter = .061 cubic inch, therefore, $4{,}320 \times .061 = 264$ cubic inches used.

As the hydrometer was calibrated with water at 60 deg. Fahr., and the weight of 1 cubic foot of water at 60 deg. Fahr. = 62.37 pounds, then the weight of gasoline = cubic inches × specific gravity × weight per cubic foot water ÷ 1,728 =

$$\frac{264 \times 62.37 \times .705}{1{,}728} = 6.72 \text{ pounds.}$$

B.t.u.'s supplied per hour = pounds of gasoline used × lower heating value of gasoline =

$$6.72 \times 2 \times 18{,}700 = 251{,}000.$$

Thermal equivalent of 10 horsepower.

$$\text{H. P.} \times 2{,}545 = 10.016 \times 2{,}545 = 25{,}460.$$

Thermal efficiency =

$$\frac{\text{Thermal equivalent of work}}{\text{B. T. U. supplied}} = \frac{25{,}460}{251{,}000} = 10.15 \text{ per cent.}$$

Pounds of gasoline per 1,000 revolutions of motor = pounds of gasoline used ÷ total revolutions × 1,000 =

$$\frac{6.72 \times 1{,}000}{30{,}050} = .2235 \text{ pounds.}$$

The volumetric efficiency from the card was determined by measuring the distance between the points where the compression and suction lines cross the atmospheric line, and dividing this distance by the total length of the card. The average volumetric efficiency from the cards of the six cylinders was taken.

The indicated horsepower of the engine was found by taking the sum of the indicated horsepower of each cylinder.

The pumping losses = the difference betwen the indicated horsepower from the indicator card and the basic horsepower =

$$18.75 - 10 = 8.75 \text{ horsepower.}$$

Mechanical Efficiency—The mechanical efficiency is the ratio of the direct horsepower to the indicated horsepower, and in this case =

$$\frac{10}{18.75} = 53.3 \text{ per cent.}$$

Horsepower Rating of Engine—The engine tested was rated on the A. L. A. M. horsepower rating, and according to this rating was a 36-horsepower engine.

On actual test at 1,250 r.p.m., which is below the rating, the horsepower obtained at the brake was 38.25, so that the engine was thus proved to be considerably better than the rating

Other Engine Data—Flywheel diameter = 18 3-8 inches.

Flywheel width = 5 3-4 inches.

Exhaust pipe: 13 ft. of 2-inch pipe; 6 ft. of 2 1-2-inch pipe.

Range of throttle segment, 0 — 22.

Range of spark segment, 1 — 14.

Length of brake arm, feet = 3.185.

TABLE NUMBER 1

10. H.P. at 1000 R. P. M.

	Run 1	Run 2	Run 3	Run 4
Time of run, min	30	30	30	30
Net brake scale reading	16.5	16.5	16.5	16.5
Gasoline consumed, cu. in	264·	257.5	424	401
Setting of needle valve, ° open	350	360	450	540
Sp. gr. of gasoline	.705	.705	.705	.705
B. T. U. Supplied per hour	251000	245000	404000	382000
Average D. H. P	10.016	10.029	10.023	10.01
Thermal equivalent of H. P	25460	25550	25500	25475
Thermal efficiency (D. H. P.), per cent.	10.15	10.04	6.31	6.67
Total number of revolutions	30050	30087	30070	30030
Revolutions per min	1001.6	1002.9	1002.3	1001
Lbs. of gasoline per 1,000 revolutions	.2235	.2185	.3595	.340
Temperature of jacket water in	99.88	114.81	97.37	102.6
Temperature of jacket water out	115.63	128.25	112.5	117.6
Temperature range	15.75	13.44	15.13	15
Lbs. jacket water per hour	7260	7266	7266	7254
Heat loss to water per hour	114300	97700	110000	108900
Heat loss, per cent	46.5	39.9	27.25	28.5
Volumetric Eff. from card	50.8	....	....	....
I. H. P	18.75	....	....	....
Pumping losses	8.75	....	....	....
Mechanical Eff.	53.3	....	....	....
Maximum explosion pressure	137.44 pounds per sq. inch.			

TABLE NUMBER 2

15 H. P. at 1000 R. P. M.

	Run 1	Run 2	Run 3	Run 4
Time of run, min	30	30	30	30
Net brake scale reading	24.75	24.75	24.75	24.75
Gasoline consumed, cubic inches	325	301.5	496	416.5
Setting of needle valve, ° open	350	360	450	540
Sp. gr. of gasoline	.706	.705	.706	.706
B. T. U. supplied per hour	310000	287000	472500	396500
Average D. H. P	15.02	14.93	14.99	15.05
Thermal equivalent of H. P	38200	38000	38150	38300
Thermal Eff. (D. H. P.), per cent	12.32	13.25	8.07	9.65
Total number of revoltuions	30025	29960	29980	30075
Revolutions per minute	1000.8	998.7	990.3	1002.5
Lbs. of gasoline per 1000 revolutions	.2755	.256	.4225	.354
Temperature of jacket water in	93.75	112.3	94.75	92.38
Temperature of jacket water out	111.13	128.2	108.81	107
Temperature range	17.38	15.9	14.06	14.62
Lbs. jacket water per hour	7260	7242	7248	7272
Heat loss to water per hour	126200	115100	101900	106500
Heat loss, per cent	40.7	40.1	21.5	26.81
Volumetric Eff. from card	53.42	....	....	....
I. H. P	21.40	....	....	....
Pumping losses	6.40	....	....	....
Mechanical Eff.	70%			
Maximum explosion pressure	155.97 pounds per sq. inch.			

TABLE NUMBER 3

20 H. P. at 1000 R. P. M.

	Run 1	Run 2	Run 3	Run 4
Time of run, minutes	30	30	30	30
Net brake scale reading	33	33	33	33
Gasoline consumed, cu. in	343	342	555.5	468
Setting of needle valve, ° open	350	360	450	540
Sp. gr. of gasoline	.700	.705	.700	.700
B. T. U. supplied per hour	323000	325000	525000	441000
Average D. H. P	20.02	19.83	20	19.99
Thermal equivalent of H. P	51000	50500	50900	50890
Thermal Eff. (D. H. P.), per cent	15.79	15.52	9.7	11.51
Total number of revolutions	30035	29700	30000	29975
Revolutions per minute	1001.2	990	1000	999.2
Lbs. of gasoline per 1000 revolutions	.2885	.293	.468	.395
Temperature of jacket water in	98.73	103.06	92.7	93.88
Temperature of jacket water out	111.06	119.72	108.4	109.7
Temperature range	12.83	16.66	15.7	15.82
Lbs. jacket water per hour	7260	7200	7254	7248
Heat loss to water per hour	89500	120000	111900	114700
Heat loss, per cent	27.75	36.95	21.3	26.0
Volumetric Eff. from card	68.66	....	....	....
I. H. P.	26.6	....	....	....
Pumping losses	6.6	....	....	....
Mechanical Eff.	75.2	....	....	....
Maximum explosion pressure	201.56 pounds per sq. inch.			

TABLE NUMBER 4

25 H. P. at 1000 R. P. M.

	Run 1	Run 2	Run 3	Run 4
Time of run, minutes	30	30	30	30
Net brake scale reading	41.25	41.25	41.25	41.25
Gasoline consumed, cu. in.	369	382	591	521
Setting of needle valve, ° open	350	360	450	540
Sp. grade of gasoline	.700	.702	.700	.700
B. T. U. supplied per hour	348500	361500	552500	491500
Average D. H. P.	25.01	25	25	25.04
Thermal equivalent of H. P.	63600	63595	63595	63700
Thermal Eff. (D. H. P.), per cent	18.28	17.6	11.51	12.96
Total number of revolutions	30015	30000	30000	30050
Revolutions per minute	1003.5	1000	1000	1001.6
Lbs. of gasoline per 1000 revolutions	.31	.323	.498	.438
Temperature of jacket water in	92.88	104.81	92.8	93.62
Temperature of jacket water out	111.7	123.31	109.9	111.12
Temperature range	18.82	18.50	17.1	17.50
Lbs. jacket water per hour	7262	7260	7260	7266
Heat loss to water per hour	146900	152500	135300	145200
Heat loss, per cent	39.3	37.2	22.5	25.89
Volumetric Eff. from card	81.3	....	....	....
I. H. P.	27.75	....	....	....
Pumping losses	2.75	....	....	....
Mechanical Eff.	90	....	....	....
Max. explosion pressure	246.996 pounds per sq. inch.			

TABLE NUMBER 5

30 H. P. at 1000 R. P. M.

	Run 1	Run 2	Run 8	Run 4
Time of run, minutes	15	15	15	15
Net brake scale reading	49.5	49.5	49.5	49.5
Gasoline consumed, cu. in.	209.2	465.5	616	549
Setting of needle valve, ° open	350	360	450	540
Sp. gr. of gasoline	.705	.706	.706	.706
B. T. U. supplied per hour	398000	444000	587500	523500
Average D. H. P.	29.65	30.03	30.01	30
Thermal equivalent of H. P.	75400	76500	76400	76350
Thermal Eff. (D. H. P), per cent	18.95	17.23	13.0	14.6
Total number of revolutions	14800	30050	30010	30000
Revolutions per minute	986.7	1001.6	1000.3	1000
Lbs. of gasoline per 1000 revolutions	.3595	.395	.524	.467
Temperature of jacket water in	103.22	90.8	92.94	93.2
Temperature of jacket water out	123.67	111.25	111.56	113.2
Temperature range	20.45	20.95	18.62	20
Lbs. jacket water per hour	7170	7266	7262	7260
Heat loss to water per hour	146900	152500	135300	145200
Heat loss, per cent	36.9	34.4	23.05	27.8
Volumetric Eff. from card	87.8	....	....	....
I. H. P.	32.4	....	....	....
Pumping losses	2.4	....	....	....
Mechanical Eff.	92.6	....	....	....
Max. explosion pressure	282.41 pounds per sq. inch.			

TABLE NUMBER 6

10 H. P. at 1250 R. P. M.

	Run 1	Run 2	Run 3	Run 4
Time of run, minutes	30	30	30	30
Net brake scale reading	13.25	13.25	13.25	13.25
Gasoline consumed, cu. in.	341	357.9	426.5	395.5
Setting of needle valve, ° open	350	360	450	540
Specific gravity of gasoline	.706	.717	.706	.706
B. T. U. supplied per hour	326000	346600	407500	377000
Average D. H. P.	10.03	10.00	10.04	10
Thermal equivalent of H. P.	25550	25650	25555	25450
Thermal Eff. (D. H. P.), per cent	7.85	7.4	6.27	6.75
Total number of revolutions	37525	87650	87510	37500
Revolutions per minute	1250.8	.1255	1250.3	1250
Lbs. of gasoline per 1000 revolutions	.2315	.2455	.290	.2685
Temperature of jacket water in	95	95	97.25	97.56
Temperature of jacket water out	109.7	108.6	108.81	109.56
Temperature range	14.7	13.6	11.56	12
Lbs. of jacket water per hour	8886	8910	8883	8880
Heat loss to water per hour	130800	121200	102800	106560
Heat loss, per cent	40.1	35	25.2	28.3
Volumetric Eff. from card	43.1	....	....	....
I. H. P.	23.1	....	....	....
Pumping losses	13.1	....	....	....
Mechanical Eff.	43.2	....	....	....
Max. explosion pressure	122.63 pounds per sq. inch.			

TABLE NUMBER 7

15 H. P. at 1250 R. P. M.

	Run 1	Run 2	Run 3	Run 4
Time of run, minutes	30	30	30	30
Net brake scale reading	19.75	19.75	19.75	19.75
Gasoline consumed, cu. in.	329	360	553	476
Setting of needle valve, ° open	350	360	450	540
Specific gravity of gasoline	.705	.707	.707	.707
B. T. U. Supplied per hour	313500	843500	528000	455000
Average D. H. P.	15.05	14.94	14.96	14.98
Thermal equivalent of H.P.	38300	38000	38100	38120
Thermal Eff. (D. H. P.), per cent	12.22	11.05	7.21	8.38
Total number of revolutions	37660	37400	37450	37525
Revolutions per minute	1255.3	1246.7	1248.3	1250.8
Lbs. of gasoline per 1000 revolutions	.222	.246	.377	.324
Temperature jacket water in	94.63	94.88	96.75	99.2
Temperature jacket water out	109.5	110.94	110.06	112.5
Temperature range	14.87	16.06	13.31	13.3
Lbs. of jacket water per hour	8916	8868	8874	8886
Heat loss to water per hour	132700	142500	118200	118200
Heat loss, per cent	42.3	41.45	22.4	26
Volumetric Eff. from card	59.45	....	....	....
I. H. P.	24.9	....	....	....
Pumping losses	9.9	....	....	....
Mechanical Eff.	60.2	....	....	....
Max. explosion pressure	140.9 pounds per sq. inch.			

TABLE NUMBER 8

20 H. P. at 1250 R. P. M.

	Run 1	Run 2	Run 3	Run 4
Time of run, minutes	30	30	30	30
Net brake scale reading	26.4	26.4	26.4	26.4
Gasoline consumed, cu. in.	402	417.5	568	532
Setting of needle valve, ° open	350	360	450	540
Specific gravity of gasoline	.706	.705	.706	.706
B. T. U. supplied per hour	384000	396800	541000	508000
Average D. H. P.	19.97	19.96	19.98	20.01
Thermal equivalent of H. P.	50800	50750	50800	50990
Thermal Eff. (D. P. H.), per cent	13.22	12.8	9.4	10.02
Total number of revolutions	37450	37450	37475	37520
Revolutions per minute	1248.3	1248.8	1249.2	1250.67
Lbs. of gasoline per 1000 revolutions	.274	.284	.3865	.361
Temperature jacket water in	94.56	95.47	96.25	96.69
Temperature jacket water out	109.91	110.1	109.68	110.4
Temperature range	15.35	14.63	13.43	13.71
Lbs. of jacket water per hour	8874	8874	8880	8883
Heat loss to water per hour	136300	180100	119500	122000
Heat loss, per cent	35.5	32.8	22.1	24
Volumetric Eff. from card	59.2	....	....	....
I. H. P.	30.55	....	....	....
Pumping losses	10.55	....	....	....
Mechanical Eff.	65.4	....	....	....
Max. explosion pressure	178.48 pounds per sq. inch.			

TABLE NUMBER 9

25 H. P. at 1250 R. P. M.

	Run 1	Run 2	Run 3	Run 4
Time of run, minutes	30	30	80	30
Net brake scale reading	33	83	33	33
Gasoline consumed, cu. in.	445	491.5	586	561
Setting of needle valve, ° open	350	360	450	540
Specific gravity of gasoline	.705	.707	.706	.706
B. T. U. supplied per hour	323000	469000	511000	534000
Average D. H. P.	25	24.98	24.98	25.01
Thermal equivalent of H. P.	63600	63500	63500	63650
Thermal Eff. (D. H. P.), per cent	15	13.55	12.42	11.92
Total number of revolutions	37500	37475	37450	37510
Revolutions per minute	1250	1249.2	1248.3	1250.3
Lbs. of gasoline per 1000 revolutions	.302	.335	.836	.382
Temperature jacket water in	94.6	96.25	96.76	95.25
Temperature jacket water out	109	113.6	112.18	110.375
Temperature range	14.4	17.85	15.42	15.125
Lbs. of jacket water per hour	8880	8880	8874	8898
Heat loss to water per hour	128000	154000	137000	135000
Heat loss, per cent	30.25	32.85	26.8	25.2
Volumetric Eff. from card	64.4	....	....	....
I. H. P.	32.85	....	....	....
Pumping losses	7.85	....	....	....
Mechanical Eff.	76.1	....	....	....
Max. explosion pressure	188.93 pounds per sq. inch.			

TABLE NUMBER 10

30 H. P. at 1250 R. P. M.

	Run 1	Run 2	Run 3	Run 4
Time of run, minutes	80	30	30	30
Net brake scale reading	39.6	39.6	39.6	39.6
Gasoline consumed, cu. in.	501	460	614	585
Setting of needle valve, ° open	350	360	450	540
Specific gravity of gasoline	.705	.706	.706	.706
B. T. U. supplied per hour	476000	437500	585000	556000
Average D. H. P.	30	29.65	30.03	30
Thermal equivalent of H. P.	76250	75500	76400	76350
Thermal Eff. (D. P. H.), per cent	16.01	17.25	13.1	13.75
Total number of revolutions	37500	37200	37525	37500
Revolutions per minute	1250	1240	1250.8	1250
Lbs. of gasoline per 1000 revolutions	.341	.315	.416	.898
Temperature jacket water in	92	94.37	96.75	94.06
Temperature jacket water out	107.5	113.3	112.94	110.06
Temperature range	15.5	18.66	16.19	16
Lbs. of jacket water per hour	8880	8820	8886	8880
Heat loss to water per hour	137800	164800	143900	142200
Heat loss, per cent	28.9	37.6	24.6	25.6
Volumetric Eff. from card	69.6	....	....	....
I. H. P.	34.53	....	....	....
Pumping losses	4.53	....	....	....
Mechanical Eff.	86.8	....	....	....
Max. explosion pressure	217.25 pounds per sq. inch.			

TABLE NUMBER 11

Maximum H. P.

	Run 1	Run 2	Run 3	Run 4
Time of run, minutes	15	20	20	15
Net brake scale reading	56.64	52.61	53.77	51.07
Gasoline consumed, cu. in.	154.8	249.2	414.5	258
Setting of needle valve, ° open	360	360	450	450
Specific gravity of gasoline	.705	.705	.701	.705
B. T. U. supplied per hour	294000	356500	575000	490000
Average D. H. P.	20.54	25.08	32.58	38.65
Thermal equivalent of H. P.	52300	65600	82900	98400
Thermal Eff. (D. H. P.), per cent	17.8	18.4	14.41	20.08
Total number of revolutions	8968	16172	20010	20000
Revolutions per minute	579.87	808.6	1000.5	1250
Lbs. of gasoline per 1000 revolutions	.439	.259	.523	.328
Temperature jacket water in	111.89	113.7	88.09	89.5
Temperature jacket water out	138.67	137.5	108.63	108
Temperature range	26.78	23.8	20.54	18.5
Lbs. of jacket water per hour	4608	6000	7260	8880
Heat loss to water per hour	123300	142800	149100	164200
Heat loss, per cent	41.9	40	25.95	33.5
Volumetric Eff. from card	85	87.50	77.03	94.25
I. H. P.	17.85	25.20	29.90	38.25
Maximum explosion pressure	294.66	251.08	236.61	235.88

LETTERS INTERESTING

COMPRESSION-KNOCKING

Editor THE AUTOMOBILE:

[2,023]—I have a four-cylinder 4 by 5 engine that is very noisy and is continually knocking on full throttle. The compression space is very small, less than 1-4 of the stroke. Would you consider it a change for the better to increase the compression space? If so, what proportion is considered best, according to the latest practice?

CONSTANT READER.

South Egremont, Mass.

Resolved into figures in such a form as to show approximately the compression ratio, the above is at once seen to be the cause of the trouble; that is, the compression is so much too high as to cause the knocking spoken of.

The compression figure is arrived at through a consideration of the ratio of the volume of gas drawn into the cylinder to the same gas compressed to a much smaller volume. The first volume is composed of two parts: that swept out by the piston, and that of the compression space. The latter is, also, the second quantity. In other words, the figure desired is:

$$\frac{\text{Vol. swept by piston} + \text{compression space}}{\text{Compression space.}}$$

The volume swept by the piston is the product of the area of the bore by the length of the stroke, in this case, 62.85 cubic inches. The compression space cannot be figured as closely, for the figures given are too indeterminate. Doubtless, the size of the chamber is greater than the cylinder, as to diameter. Usually this amount is 1-8 inch on each side, which would make the diameter 4 1-4 inches. Now the length of this chamber is given as less than one-quarter. of the stroke. This would be 1 1-4 inches. Taking a lower figure at random, of say, 1.2 inch, the volume of the compression space becomes 17.03 cubic inches. The ratio of compression is then

$$\frac{62.85 + 17.03}{17.03} \text{ which equals } 4.68.$$

Even if it be considered that the shape of the compression chamber is very complicated and 10 per cent be added to it to allow for this, the ratio still remains at the very high figure of 4.35. As the usual figure for this ratio is below 4 and the most usual figure as shown by the latest practice (resulting in a compression of 60 pounds cold) is nearly 3.5, this is seen to be too high.

While not the best way, this can be remedied by shortening the connecting rod, which would not change the piston displacement, but would add a portion of the cylinder bore to the compression space. As this is of a known diameter, the amount which the connecting rod is shortened will determine the ultimate compression. It may be figured thus:

$$\frac{62.85 + x}{x} = \text{the desired ratio, either 4 or 3.5.}$$

Taking the former, this becomes

$$62.85 = 4x - x = 3x,$$

from which x is evaluated as 20.95 cubic inches. Now, as the present volume, which will not be changed, is 17.03, this must be subtracted, leaving 3.92 cubic inches, which must be added to the compression space to make it give a compression ratio of 4. As this will be cylinder bore, divide by the area of that 12.57, and the result, 0.31 inch, will be the amount to shorten the connecting rod. Carrying through the same line of reasoning for the low ratio or 3.5, 0.64 inch is obtained. In view of the result to be obtained, it will be sufficient to shorten it 1-2 inch, which will reduce the compression pressure to about 65 pounds, a very good average figure, and one that will give more satisfactory results than the present ratio.

A FRIEND OF CHAIN DRIVING

Editor THE AUTOMOBILE:

[2,024]—In your August 19 issue, in answer to F. K. Green, of Louisville, Ky., in "Letters Interesting, Answered and Discussed," when speaking of cars with double chain drive, you say: "If one of the chains on a double chain driven car breaks, it is helpless and must be towed home." This is a question that I have explained to several friends. If there are not parts or tools in the kit to repair the chain, the free jackshaft can be bound to the frame or radius rod to keep it from turning. The car can then be brought home on the other chain. In such a case, however, it must be remembered that the differential works all of the time, making the gear ratio in this case half of what it would be otherwise. Nothing higher than second speed should be used as it would strain the gears of the differential. The advantages of a double chain drive are the great strength for the light weight and the lessened loss of power through friction. Thus, in case the chain is bent, any country blacksmith can straighten it. The shaft drive is the most silent drive used to-day, and for that reason many prefer it.

RICHARD S. JOHNSON.

Altadena, Cal.

This subject was covered very thoroughly in the issue of Sept. 2, which you have apparently missed. In a letter from A. Wilson Dods, and the answer to the same, the whole matter was covered. As to the point brought out above, "any country blacksmith can straighten it," this is very true, and equally as true of any part of a shaft-driven car. That is, it would be just as safe to trust the country smith with a bent shaft, if you ever happened to have one bend, which is highly improbable, as it would be to trust the parts of a nickel-steel chain to his tender mercies. If you look into the matter of relative merits of the two forms of drive you will find that silence alone would never have placed the shaft on the high pedestal which it occupies to-day. Other eminent and more valuable qualities, such as lubrication, lessened care, reduced wear, and with these, lowered cost of repairs, have had as much of a bearing on the result as exemplified in the comparative number of the two types to be made for next season, as has the matter of superior quiet, of which you speak so highly.

ENGINE HARD TO START

Editor THE AUTOMOBILE:

[2,025]—I had an experience recently with a two-cylinder opposed, engine under the seat, car three years old which I should like to have explained. At the time this car was overheating badly, so that we had to fill up with water every 20 miles or so. It was also rather low on power, so that several times we stalled the engine. Now, whenever the engine stopped in this way, it positively would not start until it had been cooled by pouring several buckets of water into the radiator with the cylinder cocks open. After being well cooled and getting a five minutes' rest, the engine would start off again quite nicely; otherwise no amount of cranking would get more than an occasional snort.

We have since cured the overheating pretty well, but if you can explain what caused that difficulty in starting, so as to be prepared for some future emergency, I will be much obliged.

C. D. P.

New York City.

It would appear as if the overheating was the cause of the hard starting. The cylinders get so hot that the pistons are upon the point of seizing, this being a continuous performance, but nothing happens until you stop, when the boiling water causes the pistons to seize momentarily. Cold water into the circulating system and a long rest, such as you describe, would cool the walls off very materially, causing a drop of perhaps 45 to 50 degrees in the time you mention. This allows the pistons to free themselves, so that the engine may be started. It is just barely possible that some flaw in the fuel supply system causes a copious supply of fuel while the engine is turning over, and, consequently (being opposed), vibrating very much, which is not in evidence when the engine and car are standing still.

To remedy the overheating, put a larger driving and a smaller driven gear on the pump drive so that the pump will be driven faster. This will circulate the water at a higher speed and thus carry away more heat, since the amount of heat carried off by the cooling water varies directly with the amount of water circulated. Thus, if the present gears happen to be each of 6 pitch and 18 teeth, changing the driver to 21 teeth and the driven gear to 15 teeth will leave the center to center distance unchanged at 3 inches, and will increase the pump speed by 40 per cent. If this is not sufficient a later change to a driver of 24 teeth and a driven gear of 12 teeth will also leave the center to center distance unchanged, but will change the speed, increasing it 100 per cent over the first arrangement and 43 per cent over the second method of gearing.

Driving the pump faster will cure your trouble unless the pipes are clogged up. In fact, it would be well to go to the trouble of examining these before making the other change, that is changing the speed of the pump by altering the gearing.

ANSWERED AND DISCUSSED

SIX-CYLINDER RADIAL ENGINE

Editor THE AUTOMOBILE:

[2,026]—Will you please advise me about a problem which has troubled me for some time. It is relative to a two-cycle engine of the differential piston type, which I am going to build. In this type of engine, why wouldn't the cylinders take gas from the mixing chambers if the inlet pipe from all chambers was a single pipe forming a circle (the six cylinders being arranged radially, so as to form a circle around the crankcase)? I want a very light weight engine, as I wish to use it in an aeroplane. As near as I can see, the mixture would be the same. I would have to use a suction valve on each chamber and a check valve between each chamber and the working cylinder.

Would aluminum be correct for an exhaust pipe? The enclosed sketch shows the arrangement, and I wish to know if the firing order would be as I have marked it, that is, 1, 2, 3, 4, 5, 6. In other words, will the radial two-cycle, six-cylinder engine fire around the circle of cylinders in regular order? Is the compression chamber as shown of the proper size?

The connecting rods are to have a pin the same size as the wrist pin, connected to a main connecting rod. What I mean by main connecting rod would be the same as any other engine, only the other five rods would have pins to connect them to the main rod bearing. Would the rods be correct if I had a very light forging driven in each end of a light steel tube and brazed? I intend making each end solid bearing, with no take up for wear, with pins 5-8-inch in diameter. Can I get good results with make and break spark, like the Locomobile?

N. F. GILLENWATERS.

Arbuckle, Cal.

In the first matter of the size of cylinders which will be correct to use, it is noted that you wish to use a 3 1-2-inch main cylinder, 5 1-2-inch differential cylinder, and a 3 1-2-inch stroke. Upon first thought it would appear as if the area of the larger or differential cylinder bore should equal that of the smaller or working cylinder, the stroke being equal in each case. This would result in equal volumes. But the volume in the larger cylinder is compressed and then delivered to the working cylinder, this compression being the one and only advantage of this type. Now, if the area of the two cylinders, or more correctly, the volume, is made equal, the one cylinder will compress the charge and deliver it to the other, where it will then be free to expand to its original volume; in fact, taking into account the volume of the connecting pipes or passages, to slightly more than its original volume. So nothing will be gained.

From this we arrive at the conclusion that the ratio of the two volumes must be such that the differential delivers to the working piston a charge of compressed gas, which, *at that pressure*, is of a volume equal to or greater than the volume of that cylinder. It is then necessary to take into account the compression pressure and the resulting volume.

Now, the compression follows closely if not exactly along the adiabatic line, for which the experimentally determined figure of 1.35 is used. That is, the relation between the volume and pressure is expressed by the equation:

$$\left(\frac{V_1}{V_2}\right)^{1.35} = \frac{P_2}{P_1}$$

which may also be put in the more convenient form

$$\frac{V_1}{V_2} = \sqrt[1.35]{\frac{P_2}{P_1}}$$

in which,

V_1 is the original volume,

V_2 is the final volume, or volume of compression,

P_1 is the original pressure, and

P_2 is the final or compression pressure.

To use this formula it will be necessary to assume the compression pressure, so let us select 60 pounds as the quantity. Then, this being gauge pressure, the absolute is 74.7. Atmospheric pressure varies at different elevations, but it will be safe to take it at 14 pounds. This will give a rough but very close average for the atmospheric pressure value. From these two, the ratio of pressure increase is:

$$\frac{P_2}{P_1} = \frac{74.7}{14} = 5.34.$$

From this and the previously given equation, the ratio of volumes is found to be 3.46. Now, as the final volume, V_2, is known, this being the volume of the final cylinder (3 1-2-inch diameter by 3 1-2-inch stroke), simple substitution and division gives for the volume of the differential cylinder 116.498 cubic inches. This will be a circular ring exactly 5 1-2 inches diameter, just as you had decided to use. The construction, as outlined, then, should give a compression of 60 pounds.

Every two-cycle cylinder fires on each one of the down strokes. Six two-cycle cylinders, then, would fire each on its own down stroke, making six per revolution, and requiring that the crank pins be spaced equally around a full circle; that is, one-sixth of 360 degrees apart, which is 60 degrees. Beyond this the order of the firing will be such as the crank is arranged to give. That is, if the pins are properly arranged, it is possible to get a firing order of 1, 2, 3, 4, 5, 6, as you wanted.

In the arrangement of the crankpins you will have the choice of either of two methods: you may have each rod end bear on the pin, as does the Adams-Farwell, shown elsewhere, or you may connect five of the rods to pins located on the sixth rod, as you

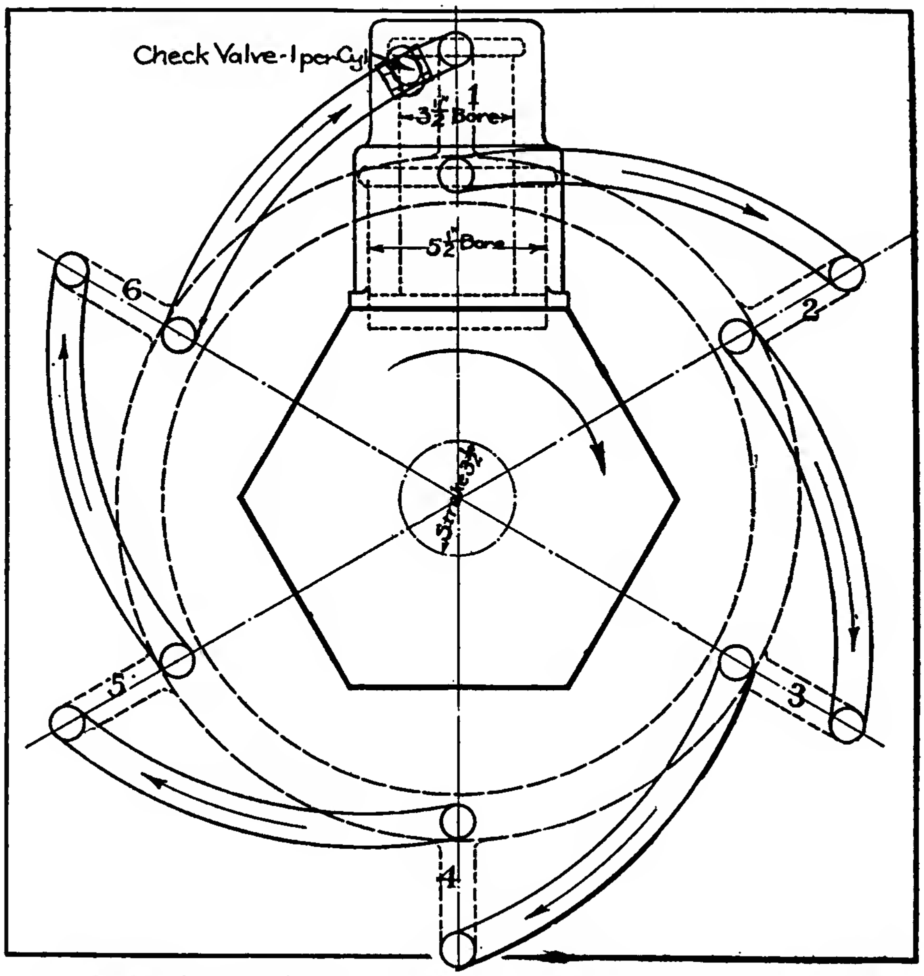
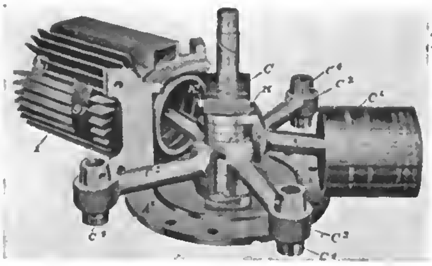
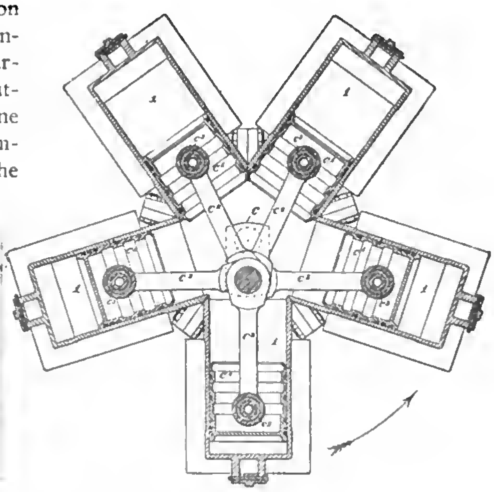


Diagram Showing Writer's Piping (Dotted) and Our Suggestion for This in Solid Lines suggested that you would do, as is done on the Esnault-Pelterie (French) seven-cylinder aeronautical motor. The Adams-Farwell crankshaft and connecting rod outfit shown belongs to a five-cylinder engine in which the cylinders revolve, but the company also makes a seven-cylinder of the





Method of Attaching Connecting Rods on Adams-Farwell Aerial Motor

same form and similar construction. In the Esnault-Pelterie you will notice that the cylinders are set in two rows, one back of the other, there being four in the front row and three in the second. This arrangement solves the crankshaft problem; this particular engine having a two-throw shaft, the front set of pistons and rods operating on one pin, and the back set of three operating on the other. In this engine the cylinders are stationary, so that it bears some resemblance to the one which you are building. A glance at the construction will show you that these cylinders being four-cycle, the firing must jump from the front set to the back.

Thus the firing order is very apparently 1, 5, 2, 6, 3, 7, 4, each cylinder in the front row firing on the part of the down stroke of that crank to which they are attached, while the three cylinders in the back row and attached to the other crank do the same thing.

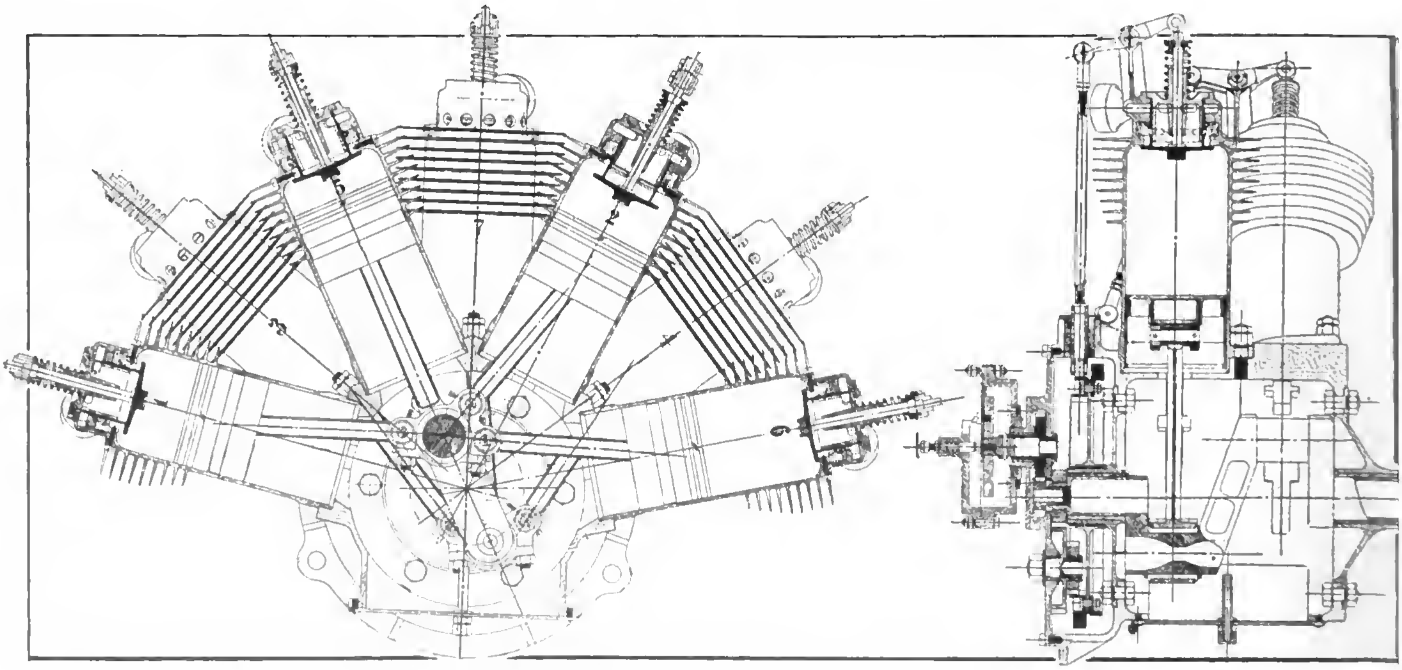
As far as make-and-break ignition is concerned, it is only fair to say that if you follow the Locomobile practice, and do as well as they do with it, your ignition system will give you no trouble. As a matter of fact, we do not know of any aeroplane engines now in use upon which this form has been tried.

The arrangement of the piping to supply mixture to the various cylinders as you have outlined it is not good, neither is it correct. If you arrange your crank so as to fire the cylinders around the circle in natural order, that is, 1, 2, 3, 4, 5, 6, the piping should consist of individual pipes from each compression cylinder to the working cylinder which fires next in order. In short, pipe from No 1 differential piston to No. 2 working piston, from No. 2 differential piston to No. 3 working piston, etc. The pipes will then take the form of portions of a circle and all will be alike, each one with one check valve in it, to account for and take care of the fact that this method furnishes gas to an ascending piston, which may drive part of the charge back, if a check valve is not used.

It is not advisable to use aluminum for exhaust pipes, or elsewhere, if it is liable to be subjected to great heat. Steel tubes may be used for connecting rods, with machined drop forgings set into the ends, pinned and brazed. This requires very careful workmanship, for if the pins be omitted the only strength the rods will have in tension will be the brazed joint. As brazing is usually a doubtful operation, this must be watched closely and carefully.

The use of a solid end bearing is, however, to be deplored since it gains nothing and is a distinct disadvantage. That is, you would not save any weight, which, we take it, is the idea. The reason why you won't save any weight is this: to get the rod on and off of the crank pin, it will be necessary to have it split and have bolts to hold the two halves together. Placing a few shims in between the halves, which shims would not weigh any more than a corresponding thickness of either rod or bearing metal, would thus add nothing. On the other hand, if you should ever try to sell these engines, the fact that the bearings were not adjustable for the inevitable wear would militate against them very much. All this is said with the mental reservation, unless you use ball bearings. From your letter which is fairly explicit, we believe that this was not the intention.

To speak of aluminum again, this can be used for inlet pipes, and when so used saves some weight, although, without a doubt, there is too much stress laid upon this weight-paring process in aeroplane engines. If the weight was not pared down so far, they would be more reliable than is the case at present.



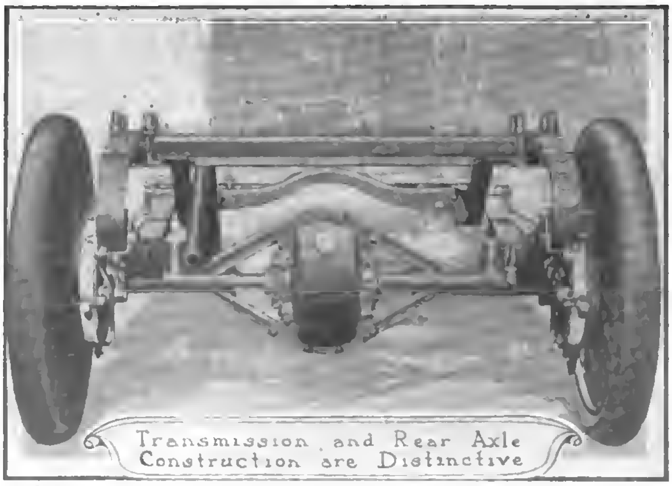
Section Through and End View of Esnault-Pelterie Aeroplane Motor, Showing Another Method of Attaching Connecting Rods

DISTINGUISHED as they are by the "white line around the radiator," as well as other very evident marks, the cars made by the F. B. Stearns Company, Cleveland, Ohio, are worthy of notice wherever they may be. This striking mark only serves to allow of ready recognition, for the sterling merit of the product of the Ohio factory would bring it attention anywhere. Coincident with the details of the models for the ensuing year, this company announces one very praiseworthy change. This is not in the nature of a mechanical alteration, but a policy. It is the abandonment of the method of speaking of the cars as yearly models. This practice, which has outlived its usefulness, for the changes now are so slight from year to year as not to change the car as a whole, at least not sufficient to warrant calling it a different model, will doubtless be followed by a number of other concerns now that a start has been made.

In the future the Stearns cars will be put through the shop the same as in the past, in groups or series of a given number. So, to give the cars a distinguishing mark, where that becomes necessary, they will be called "New Series." The present subject matter deals with the "New Series" 15-30.

This small car will have very few changes, among which may be noticed the reinforced three-quarter elliptic rear spring suspension, multiple disc clutch, and an alteration in the frame to go with the change in the springing, and bring out its best qualities. This car, which made its début last year, faces the present selling season with a most excellent record behind it. Built in toy tonneau, touring, limousine, and landaulet body types, the small member of the Stearns line met with instant success and at once established itself as fully worthy of the name and the "white line." The distinctive features at once become popular.

In general design this car follows the same structural and mechanical features of the other higher-powered models, and the same high-class material is used. While no mention is made of the fact that some of the materials are brought from abroad, it is no secret that the whole of this country and Europe is scoured to secure the best in this line. That success attends these efforts is told best by the record of the car in steady service, in road races, hill climbs, and track races, under all of which conditions it has acquitted itself with much credit.


Transmission and Rear Axle Construction are Distinctive

Motor Details Are of Unusual Interest—The motor is of 4 1-2 inch bore by 4 5-8 inch stroke, and differs from the larger Stearns engines only in the relative size of parts and the casting of the cylinders in a unit, or *en bloc,* as it is called. In this, it is one of the largest sized engines to employ this form of simplified construction, which is now being used to the exclusion of everything else in continental Europe. By means of this construction many combinations of parts are possible, which in turn allow of the elimination of still other parts. This latter feature simplifies the water, carbureter and exhaust piping and gives greater compactness, fewer pieces and more accessibility to parts. It has ball-bearing mounted crank and camshafts. All valves are of the same size and on one side; centrifugal water pump and other mechanical details of exactly the same type as on former motors.

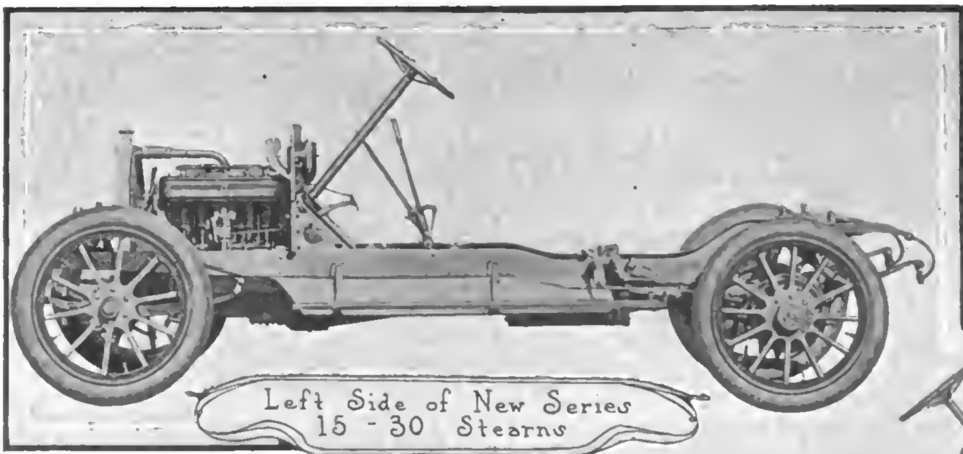
Lubrication is by the constant circulation system now in general use. The reservoir on the bottom of the crankcase supplies oil to a gear-driven pump. The pump discharges the oil on the connecting rods and is drained through screens back into the reservoir. The system is simple, but highly effective.

The carbureter is the same type which has been so successful on the 30-60 model. It consists of practically two carbureters, fed from the same float chamber and actuated by the same throttle lever. The mixing chamber is divided in such a manner that for a small opening of throttle, the small jet only is exposed to the suction of the motor and all of the gasoline used to develop up to 15 horsepower is supplied through this one nozzle. A further opening of the throttle brings into action the larger part of the carbureter with its gasoline jet, and a greater supply of fuel is available, sufficient, in fact, to produce more power than the maximum rating of the motor. Correctness of mixing proportions and economy of gasoline are assured by this arrangement. It accounts in part for the noted smooth running flexibility and power of the motor.

The ignition is by the Bosch dual system, consisting of an arrangement of high-tension magneto and single vibrator coil, whereby with a single set of spark plugs a double system of ignition is obtained. A simple switch on the dashboard permits running the motor either on the battery or magneto. Being directly in front of the driver it is an easy matter to change from one to the other.

Preference Given to Multiple Disc Form of Clutch—The clutch is of the well-known multiple disc type. Its characteristics—smoothness of operation, reliability and simplicity—which have made for the adoption of this type of clutch by the best automobile builders, are assured in this car by correct design and workmanship. The adoption of this form of clutch may possibly foreshadow the more extended use of this form in the future on other cars, coupled, as it is, with similar reports from other equally high-grade factories. One fact stands out very prominently in the clutch problem, and that is the fact that whatever else may be said for or against this kind of a clutch, all admit that there is nothing to burn out or be injured. This makes it a very good clutch for a beginner to learn on.

A propeller shaft and one universal joint transmit the power from the clutch to the transmission, which is located on the rear axle, and of the special compact type originally used.



Left Side of New Series 15 - 30 Stearns

The transmission is of the selective type and gives three speeds forward and reverse. The gears are of chrome-nickel steel properly heat-treated and of liberal dimensions. The shafts are also of this steel, all mounted on ball bearings.

The rear axle is of original design and worthy of special note. It is machined from a one-piece drop forging of nickel steel. It has an open truss-like center portion of I-beam section which spans the transmission case top and bottom, while at the same time it serves as a support for the latter. The ends of the forging are turned to mount the wheel bearings. It is bored through the center to take the drive shafts which extend from the differential gears in the transmission through the axle to jaw clutches on the outer end of the rear hub. This gives an axle which is without a joint and supports the weight of the car entirely independent of the transmission. The transmission is relieved of all strain other than that of transmitting the power of the engine to the rear wheel. The whole construction is good in that it gives absolute protection for the driving mechanism from all road shocks and strains but takes such strains on a hollow axle which for strength and reliability is only equalled by the more common solid.

A torsion tube extends from the forward end of the transmission case to a pivoted yoke. This encloses the propeller shaft and its universal joint, and serves both as a torsion and radius rod.

This form of transmission arrangement, coming, as it does, midway between the more usual mid-location and the solidly mounted transmission on the rear axle, possesses some of the advantages of both, without corresponding drawbacks. Thus, the mounting is such that road shocks do not transmit directly to the transmission case, shafts, bearings, and gears, with the consequent destructive effect upon them.

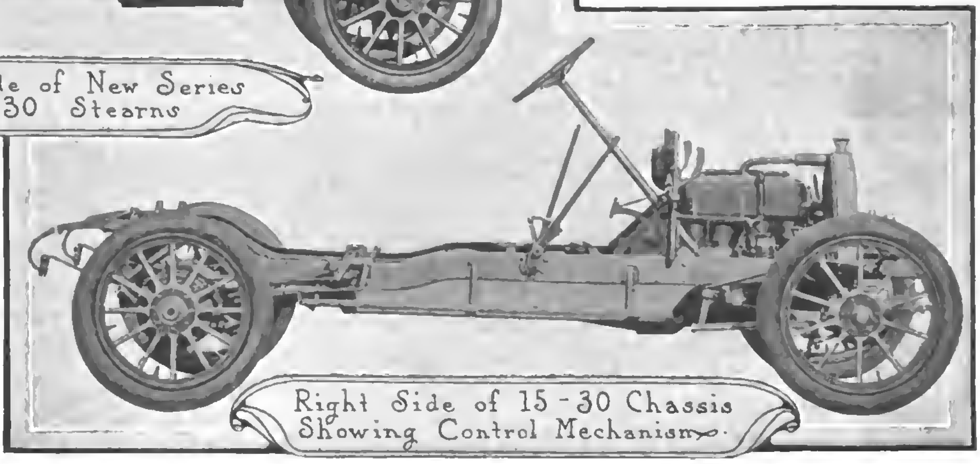
What the Frame Shows That Is Different—Coincident with the change in the rear springing the frame has been changed, the differences being intended to make the already easy riding car ride still easier. The frame is narrowed in front to permit a sharp turning angle; while maintaining the standard tread of the wheels this car will turn in a circle of 34 feet, a decided advantage in handling a car in narrow streets.

A double drop in the frame permits the mounting of a body of very graceful design with extremely low doors. The step from running board into the body is consequently very slight, and in service, where one gets in and out of the car frequently, as in shopping, this feature is particularly pleasing. A drop in the frame also lowers the center of gravity of the car, increasing its stability and one notices a greater sense of security when riding at high speed.

The spring suspension is of the semi-elliptic type in front, and of the three-quarter elliptic type in the rear. It is extremely successful and makes the car ride very easily and smoothly over rough roads.

With increased stability due to lowered center of gravity, lowered step, and easier riding, the change is seen to be worth while, involving, as it does, three good and very essential features.

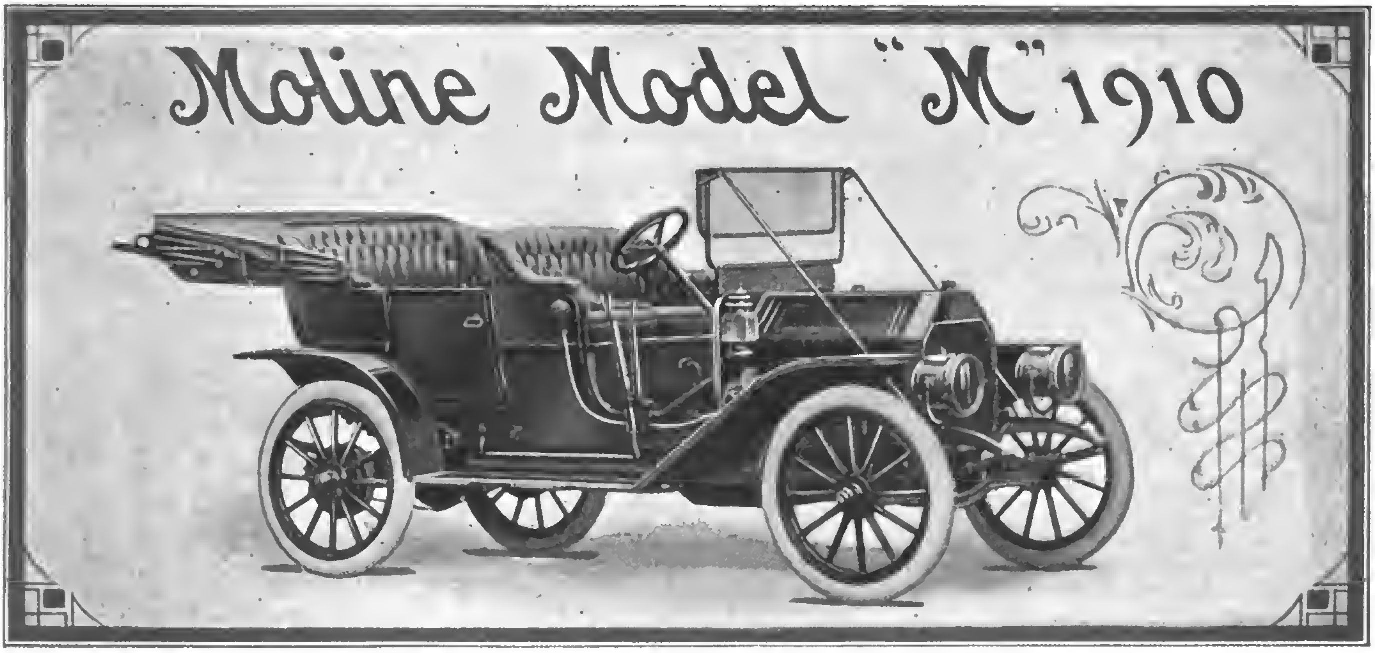
The brakes act directly on the rear hub flanges. The service or foot brake is a contracting band on the outside of the drum and is operated by a foot pedal in the usual way. The emergency brake is an internal expanding shoe, and is operated by a hand lever. Both brakes are fabric lined and easily adjusted.



Right Side of 15 - 30 Chassis Showing Control Mechanism.

The wheels, front and rear, are mounted on adjustable roller bearings. Continental detachable rims are now regularly supplied as standard equipment. These wheels are of 34-inch diameter, with 4-inch tires all around, thus making all wheels interchangeable. In case of trouble, the fronts may be changed to the rear and the rears placed in front. This is a very good point, and one well worth remembering.

Unchanged is the tread, which is standard at 56 1-2 inches, as is also the wheelbase, which remains at 116 inches. As previously stated, four body forms are built, of which the purchaser has a choice. These are the enclosed bodies, both limousine and landaulet; toy tonneau, which accommodates four; and regular touring car. The chassis price is $2,900, all bodies being extra, and the price of the same varies from $300 for a touring or toy tonneau upward to $900 for the spacious and well-appointed landaulet. While this seems a large price to pay for a small town car, the value lies concealed within the material and workmanship, which together go to make up a car that will last. It is said with truth of a high-grade car, that nine-tenths of it is concealed where the purchaser cannot see it. Repair bills show it, however.



TO enter the "$1,500 class" with a poor car would be folly for any manufacturer, but to enter the same with an unusually high-grade car, which has already scored a signal success in the Glidden tour, is to take front rank at once. Such is the case of the Moline Automobile Company, with Model M, which besides representing the utmost in value, will be featured as the leader of the Moline 1910 line. This will be made in several styles of body, on the one chassis, the bodies comprising the regular five passenger touring car, four passenger toy tonneau, a single rumble seat roadster, and finally a new type, in the beetleblack roadster. The touring car still seems to be the principal type and that is an unusually graceful body with pleasing lines, roomy spaces making for ease and comfort, the whole making up into an admirable looking car. A long wheelbase, adequate springing, and large sized wheels give easy riding qualities without which all other qualities are worthless.

Experience Back of the Power Plant—A bang-up, first-class power plant is insured by the years back of the construction. Although comparatively late comers into the automobile business, this company, in its big plant at E. Moline, Ill., has been building gas engines, both stationary and for traction engines, for a period of a dozen years prior to the entry into the automobile field. Not only were these engines good, but they were very high grade, selling for the highest price in their class, which alone speaks volumes for their construction. Bringing all this experience and the factory which goes with it, to bear upon the construction of a couple of models of automobiles, it will be strange if the latter are not far above the ordinary. Their past performances, of which the Glidden tour was but a single instance, shows that this has come true.

The motor is of 4-inch diameter and a slightly longer stroke, 4 1-2 inches. The arrangement is of the timetried Renault motor, valves all on one side. These latter are made with a 35 per cent nickel steel head, this material being used to avoid the pitting action of the heated gases, experience having proven that this was the only metal which successfully resists that action. The valves and push rods are both adjustable for wear, the adjustments being very accessible. In fact, the company makes a great point of the accessibility of all adjustments, holding the very sensible position that an adjustment which is inaccessible is about as good as no adjustment at all.

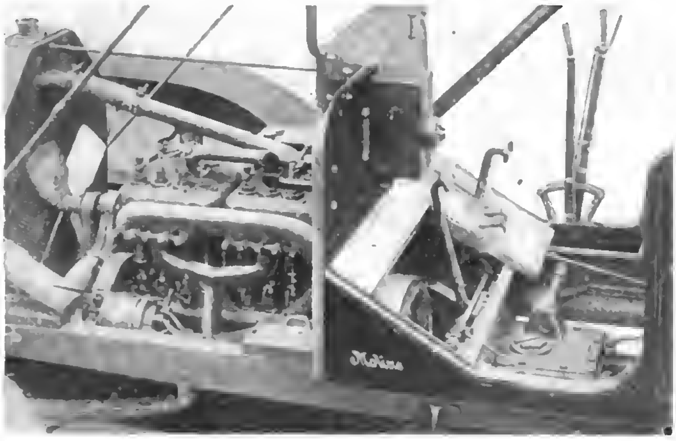
Engine bearings are a nickel alloy metal, made for this purpose. These bearings are long and of large diameter. The crankshaft is a drop forging of selected metal, properly heat treated to bring out the highest strength in the material. Lubrication of the crankshaft bearings and the interior of the case is by force feed, with an oiler located on the engine, from which a sight feed tester is conveniently placed on the dashboard. This brings it right before the driver, so that he can control all lubrication wtihout leaving the seat of the car. For this system, the Moline people claim that it is economical and cleanly, which can not be said of the indiscriminate splash system.

Ignition is cared for in a manner out of the ordinary, for not only is there a magneto system for regular running, and an alternate battery system for starting and emergency uses, but provision is also made for the fitting of a third system, should it become either desirable or necessary. The battery starting arrangement is made complete and up-to-date by the use of a push button placed on the steering wheel. In this way, the motor may be started from the seat. The makers do not specify what magneto is used but say that the best American-made magneto will be used.

Leather-Faced Cone Clutch Is Readily Accessible—The design of the clutch is such that it can be removed from the car, without disturbing anything else, or interfering with the alignment of the motor or transmission, by simply raising the floor boards. It is of the cone type, leather faced with cork inserts, and has ball bearings to take up all thrust. The working parts are completely housed and are packed in grease, which reduces wear to a minimum.

Back of the clutch, that is, in a mid-position, is the transmission. This is of the vertical type that is, the jack shaft is placed below the main shaft, the two being in line in a vertical plane. It affords three speeds and a reverse, operating on the selective plan. On high speed, the drive is direct, no double reduction being interposed to eat up power. Frictional losses are reduced to a minimum by the use of Timken roller bearings, which are used freely, every shaft being mounted upon them. The gears are made from the highest grade of nickel alloy steel, which is hardened and ground after machining to size. The gears are very accurately cut, a close inspection preventing any but perfect ones passing through and thus, entering into the makeup of the car. The aluminum gear box is provided with a large top plate, which is readily removable. This makes it an easy matter to get at any of the gears or shafts for inspection or repairs. The placing longitudinally of the car is also very good, being directly under the footboard where the driver may lift a board, open up for inspection, and go on his way, without leaving the seat.

Both axles show careful designing, the rear being of high carbon steel, which is connected to the power plant at the front by means of the propeller shaft, which contains within its length but one universal joint. The driving shaft is housed in large



Engine and Control Mechanism from the Left Side

diameter tubing, which tapers up to a still larger diameter at the rear end where the greatest strains are likely to come on it. It turns on roller bearings, with a double New Departure bearing at the rear end, just ahead of the beveled pinion to take the thrust there. In addition a torque rod is used to take the reaction of the driving effort back to the frame at a point where it possesses great stiffness. The front axle is of the I-section now in general use, practice having proved this to be the best section for all around strength and stiffness. It is carefully heat treated from a drop forging. The steering knuckles are carried on heavy knuckle bolts, which turn in bronze bushings.

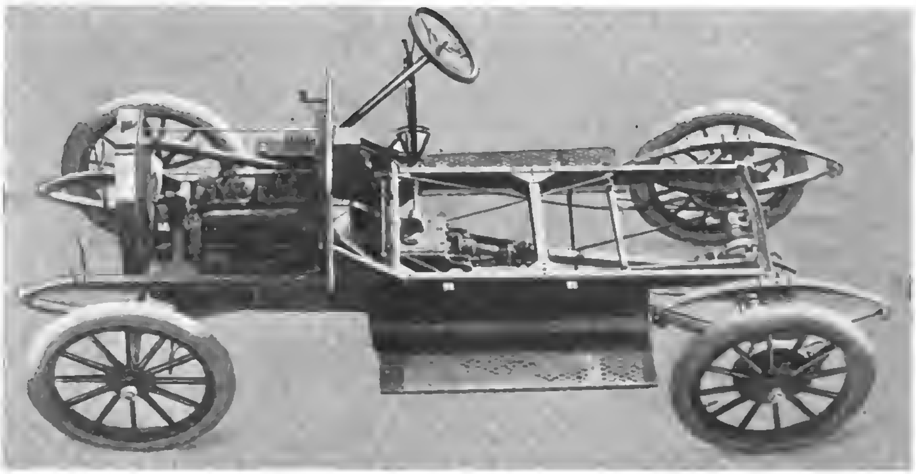
The pressed steel frame is suspended on semi-elliptic flat front springs of rather short length, stiffer springs here giving the best results. In the rear, however, scroll-ended full elliptics, 42 inches long, are used. These are suspended from above the frame so as to keep the center of gravity low. The frame at the rear is slightly upswept, while the rear cross-stiffener is arched over the differential housing, to insure clearance at all times, even with the springs compressed. The frame itself is of channel section, with the open side turned in. All cross members are of the same section, and are united to the main frame by hot-riveting, which makes them a permanent part.

All brakes are placed on the rear wheels, these consisting of one pair of external band brakes, 12-inch diameter, which are controlled by the driver through a foot pedal. The other brakes are internal expanding, and operate by means of a hand lever. The latter is interconnected with the clutch, so that its application also throws this out, and thus cuts off the application of power to the road wheels. The control is located on top of the steering post, and consists of a pair of finger levers, one for the spark and the other for the throttle. For governing the speed of the car a foot throttle is also provided. This is located on the footboard, to the left of the larger control pedals, in a position to be readily accessible to the left foot. Beyond that, in turn, is located the muffler cutout, this small foot pedal opening the muffler, so that the exhaust noise may be used as a signal to teams or other occupants of the road that an automobile is coming behind them. This form of a signal is very convenient. The gear-shifting lever is so arranged as to shift into neutral from certain speeds without a sideways movement. This in particular is useful on the high and second speeds, which are the ones most used. Simplicity of control thus obtains.

Rear Construction Displaying the Scroll Ended Springs

Low speed is obtained in the usual way—by shifting the lever sideways. The steering gear is of the worm and sector type, which is irreversible. A large diameter hand wheel makes the control of the car very easy, and gives the operator full grasp of the situation even when using but one hand to steer with.

Accessibility a Strong Feature—One of the strong points of the Moline is accessibility to operating and mechanical parts. Everything that needs attention can be readily reached and is in plain view by simply removing floor boards and hood which uncover the entire power plant, back to the universal joint, giving ample room for operator to work and make any needed adjustment or repairs for ordinary running. Adjustment of valves is very easy, as exhaust manifold does not interfere. The same is true of the magneto and carbureter. Clutch is also readily accessible. Brake adjustments are made outside of brake drums. The control of the Moline, the care, the ease of operation, and the simplicity of the entire mechanism have made it a favorite with the man who prefers to operate and care for his own machine.



Moline Model M Chassis, Showing to Advantage the Pressed Steel Frame

Cooling is effected by the natural circulation of the water, or thermo-syphon system, as it is called. The radiator is very large, giving a liberal cooling surface, which produces the lowest temperature advisable to use with a gasoline engine.

At the selling price of $1,500 the equipment includes a magneto, two gas lamps and generator for the same, two side lamps, rear or tail lamp, horn, tool box, and a complete set of tools. The latter is unusually complete since this car is intended primarily for the man who takes care of his own machine and patronizes the public garage and repair shop only when absolutely necessary. It was with the idea of proving the adaptability of the car to this class of people that the entries were made in the Glidden tour. It will be remembered by those who followed the course of the tour that these cars carried no repair parts whatever, being the only ones to undertake the long grind without extra equipment. Their success was, therefore, all the more commendable for this reason.

MINERAL GREASES VS. ANIMAL GREASES

Editor THE AUTOMOBILE:

In your valued journal of the issue of August 19 there is published an article entitled "Grease or Oil in Transmission Gears," by H. L. Towle, that contains certain conclusions to which we take serious exception. We refer especially to the last paragraph of Mr. Towle's article, in which it is stated that

"Grease compounded of animal fats have not been considered at all, since while they have their uses, they are distinctly unsuitable for gear lubrication, because of the fact that they remain hard until softened by heat—which heat must generally be engendered by the friction of the rubbing parts themselves. In addition, animal greases are not permanent. They turn rancid in time and form acids very deleterious to bearing surfaces. Where ball or roller bearings are used, grease containing any percentage of animal fats should be absolutely excluded."

Since Mr. Towle has given to mineral greases all of the virtues which properly belong to animal greases, and has, by the same token, condemned animal greases by attributing to them all of the numerous disadvantages possessed by mineral greases for lubricating purposes, it seems opportune to request the use of your editorial columns for the purpose of giving to your readers some definite facts covering the elements which enter into the two products. A brief symposium of the constituents of mineral and animal greases will therefore be given:

Mineral Greases—Under the name may be included various consistent products which are manufactured from mineral oil, horse fat, rosin, and slaked lime, and may also contain solid lubricants such as graphite, talc, etc., or mere filling materials such as barytes and chalk. These greases are poor lubricants.

Animal Greases—Under this name are included all tallow compounds, the yellow lubricating grease so extensively used for bearings of all machinery and transmissions. The main component in this compound being tallow having the highest titre and made from selected kidney beef fats, which, when perfectly compounded and thoroughly boiled to a uniform consistency, have a quality which is superior to the best mineral compounds.

A transmission will contain within itself both quick and slow speeds and heavy and light pressures; now, it will follow, that to efficiently lubricate these gears a lubricant is required that is free from impurities, always uniform in quality, and suited to all conditions, having a comparatively low melting point, so that it will readily melt between the teeth of the gears. Thus the bearing surface will be in the state of an oil-lubricated bearing. Since the friction cannot be reduced till the temperature of the bearing or bearing surfaces of the teeth has risen enough for the grease to melt, or at least to be softened so it can flow over them, it follows that other things being equal, the grease with the highest melting paint (mineral greases) will produce the highest coefficient of friction. Hence the lowest melting grease that will stay in the bearing surface will have the lowest coefficient of friction, which is only another way of saying that a grease melting—i.e., an emulsion—will give the best results wherever it can possibly be used.

It has been noted in all tests that the lime soap greases (mineral greases), the most common type to-day, do not give as good results as the oldest, though more expensive type of tallow greases. These facts have been many times demonstrated in efficiency tests, therefore mineral greases are looked upon as a very undesirable class and if kept for any length of time they oxidize and become rancid, indicated by their rapid discoloration when exposed to the air, having a great affinity for oxygen, which they readily absorb, though cheap of themselves and in reality most expensive, being inefficient and destructive.

On the other hand, a good boiled tallow grease is perfectly neutral, and will remain so for an indefinite length of time. In consistency it can be made anywhere from a soft plastic state (through which the gears do not cut a path, as the mechanical action or agitation produces an emulsion that continually feeds and clings to the surface of the gears, lubricating the points of contact thoroughly) to one of a very tough and hard body (where pressure from a compression cup acts as the feeding force) and thereby adapt themselves to any condition whether used in a transmission case or on the most critical bearing of a motor or machine.

A perfect lubricant exemplified by a high grade tallow grease will virtually eliminate the drip and waste and muss of fluid oil and the clogging, dragging effect of mineral greases, consequently absorbs less power in the transmissions, at the same time protecting the gears by cushioning the shocks of changing speed, being a lubricant which will distribute readily and not leak from the casings.

New York City. ADAM COOK'S SONS.

MARMONS MAY OR MAY NOT RACE

Editor THE AUTOMOBILE:

It has been reported in trade papers that we will never again participate in track or road races. We have never made a statement of this kind. We are not saying that we will take part in race events, and we are not saying that we will not take part.

Indianapolis. NORDYKE & MARMON COMPANY.

DETAILS OF THE SANTA MONICA RACE

Editor THE AUTOMOBILE:

Perhaps your readers would like some further information regarding the Santa Monica road race. This is the fastest stock-car race ever run in America, the winner averaging 64.45 miles an hour. One race was faster—the Savannah—by a fraction of a mile. It was faster than any Vanderbilt and far superior to the Cobe trophy, with its miserable 49.26 miles an hour.

The course is 8.4 miles in length and the total distance covered 202.4 miles. It is situated between Santa Monica and Los Angeles, running along the ocean front and through the town of Santa Monica. The drivers agreed to a man that it was the best managed as well as the speediest course in the United States.

The winning average of the Chalmers-Detroit, driven by Bert Dingley, in the light car race was 55.5 miles an hour. This is the fastest of the small car races. Dingley was given a close run for the money by Siefert, another excellent driver who piloted his Stoddard to a good second. The Buick driven by Nikrent took third.

The "Big Race" started at 8 a. m. before a crowd of 40,000 people. The Apperson won in splendid time after a well-driven race. The Chadwick with Seibel as driver took second, Stearns third and Locomobile fourth. The winning cars did not have to replace a single tire, and only two or three spares were used during the whole day. This is a plain testimonial of the quality of the course.

The fact that only a slight mention of this race was made in your magazine, although pages were given to describing the much inferior Cobe and Indiana races, moved me to give you a little more specifically the details. INVISABLE GREEN, JR.

Pasadena, Cal.

The Santa Monica race was undoubtedly fast and interesting, and our notice perhaps inadequate, but in judging its value relative to the Eastern races there are several points our correspondent has failed to take into consideration. Principal of these is the distance. The Santa Monica race called for 202.4 miles; but the last Vanderbilt was 258.1 miles, the Cobe trophy 395.6 miles, and the Savannah race 402.1 miles. No car or driver can be expected to make as good time in a 400-mile race as in one of 200 miles. But, for that matter, speed is not the only desirable quality in road racing. One of the purposes of this form of contest just as important as finding a car's greatest speed is to test its endurance. Entirely aside from quality of the racing, the Santa Monica race was little more than a local affair, whereas the other races were national in their scope.

BOSTON'S HARD-USED AUTOMOBILES

BOSTON, Sept. 20—Mayor Hibbard recently sent to the board of aldermen a communication concerning the city's automobile equipment. The city has 26 machines, 17 of which have been purchased since Mayor Hibbard took office January 1, 1908. During his administration the city has expended approximately $108,000 on automobiles. For new machines the city has paid $65,533.13, for maintenance and repairs $29,962.51, and for wages of chauffeurs $12,502.89. The police and fire department have six machines apiece, the street department three, the water and bath department two each. The building, engineering, hospital, park, public grounds and schoolhouse departments have machines, and the mayor's office has a car.

Automobiles in the service of the city apparently receive hard usage, or else the city is not sharp at trading, for machines that have been sold have brought poor prices. Three runabouts for the police department that cost $2,038 sold for only $50, a car costing $1,003.50 brought $126, another that cost $1,350 sold for $176.40, and a runabout costing $708.15 sold for $175. The mayor's car has cost $7,877.46, of which $3,360 is for the car, $3,276.76 for maintenance, and $1,240.70 for the chauffeur.

OHIO TOWNS TO HOLD ANNUAL HILL-CLIMB

UHRICHSVILLE, O., Sept. 20—The Twin City Automobile Club, of this city and Dennison, O., has decided to hold its second annual hill-climbing contest Friday, October 1. The cars are to be divided in five classes, for roadsters under and over 24 horsepower, for touring cars under and over the same limit, and for single-cylinder cars. The winner in each class will receive a silver cup. A parade of decorated cars will be held in the forenoon, for which additional prizes are offered.

THE AUTOMOBILE

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THE PROBLEM OF THE ROADS

The problem of the roads really concerns everybody, including the man who may think himself exempt for the reason that he does not drive or ride in a vehicle which travels over the highway. But even he cannot escape the effects of bad roads, with the attending greater expense to the farmer, who supplies him with the necessities of life, and who consequently must exact a greater toll for the delivery of his farm products.

Another thing which is as certain as the rising of the sun on the morrow, is that all road users will employ motor-driven vehicles in the not distant future—a future which has been greatly lessened in prospect in the last year or two, with the arrival of the moderate-priced car and its assured sturdiness and reliability.

While it would appear that the National Good Roads Convention in Cleveland this week has an automobile aspect, and the participation of the National Grange is only illustrative of the growing friendliness between the man who contributes substantially to the building of the highways and the man who uses them most assiduously, the man of the country is in reality actuated by personal interest rather than by a desire to serve in the capacity of a partial philanthropist.

This is a great country, of vast distances, and the building of its roads is a work that will have to continue for many years; but judging from the present widespread interest from coast to coast, it will soon be possible for tourists to ride in comfort through any commonwealth which pretends to keep abreast of the times.

When that time comes and our own roads are the equal if not the superior of the famous roads abroad, it will be possible for the man of moderate means to see the country as he never saw it before. If from no other point of view than a selfish interest in future possibilities, this movement should thus have universal support.

ECONOMIC VALUE OF ROADS

Every inhabitant of this country is vitally concerned in its roads. Whether a man uses the roads himself, in a carriage or automobile, has little bearing on the matter; if he does, their faults are brought home to him by his bodily discomfort. If he does not use them, he may stay at home comfortably in an easy chair, but he pays tribute to them equally with the user.

Transportation is civilization; and transportation by road is no less important than transportation by rail or by water. Every article of food or clothing, every daily necessity or luxury, must be carried to the person who is to use it, and the user must pay the expense of carriage. The price of each loaf of bread includes the cost of hauling the wheat to the railroad; and if the hauling is done over bad roads it will cost more than if it is done over good roads. The farmer of the Middle West loads a dozen hogs into his big wagon and drives over to the railroad; if the drive is over rough roads the hogs lose weight, and the New Yorker, sitting down to breakfast a week later, pays more for his pork chops.

The general public has just begun to realize the immense importance of railway transportation in its daily expense accounts. Therefore the Interstate Commerce Commission was delegated to see that this transportation was done as cheaply and efficiently as possible. The Federal Government yearly appropriates millions of dollars for the improvement of waterways, that this form of transportation also may be as cheap and efficient as possible. Yet the roads, which are at least as important as either the rivers or the railways, remain in almost the condition of a hundred years ago.

The cost of road haulage in any one article is almost infinitesimally small, which may lead the casual observer to think that it may be neglected. Railroad rates may be quoted at so many cents a ton, but the cost of a ton-mile in a farmer's "jolt wagon" is not so easy to figure out. Yet those infinitesimal fractions are always present, and it has been estimated that in the course of a year they add up to $250,000,000.

LAUDABLE SALES CONVENTIONS

A practice which is growing rapidly, all over the country, is that of calling all of the salesmen, both travelling and local representatives, together for a long and very thorough discussion of the new models, and in particular the changes about to be advanced. This is one that is worthy of commendation. It results in the widest possible discussion both pro and con, of the newer features, which cannot help but be a benefit to the purchaser in the long run. Put in another way, this discussion represents the voicing by the man who sells, of the wants of the man who buys, that is, the ultimate consumer.

MANY CHICAGO AMATEURS IN RELIABILITY RUN

CHICAGO, Sept. 19—Tables were turned by the Chicago Automobile Club on its friendly rival, the Chicago Athletic Association, last Thursday when the two organizations met in their second annual inter-club reliability team match. Captain N. H. Van Sicklen's clever pilots captured the honors, which in this case meant the huge shield which is up for perpetual competition between the two clubs. Another bit of plunder that fell to the lot of the Automobile Club men was a cup put up by F. H. Rawson, treasurer of the C. A. A., to become the permanent possession of the winning club, which in this instance was the C. A. C. There wasn't much difference between the two teams, a matter of only 23.46 points, and in a way the Cherry Circle had it on its conqueror in that it returned eleven perfect scores out of a possible thirteen, while the winning team had three down out of ten. The gross score was 180 points for the C. A. A. and 115 for the C. A. C. The loser's total was decreased, though, by the fractional penalization made necessary by the uneven sides—thirteen on one team and ten on the other.

The run, though, demonstrated that the amateurs are really better drivers than they thought, for of the twenty-three that made the 150-mile journey Thursday eighteen of them went through without mechanical trouble or being late at controls. The 18-mile an hour schedule was easy to maintain, and only two penalizations were for being late at controls. Those who got into trouble were Frank X. Mudd, T. J. Hyman and F. R. Robbins, of the Chicago Automobile Club team, and R. T. Laughlin and Charles T. Knisely, of the C. A. A. Mudd started out with a leaky radiator, which bothered him all the way, and, coupled with tire trouble made him late in getting home. Hyman was penalized for two motor stops, and Robbins was demerited for being late in checking in at the noon control, caused by stopping at Crown Point for gasoline and imagining the time he took for this would be deducted from his schedule.

On the other side of the fence, Laughlin drew the biggest penalty, brought about for work done on his car at Cedar Lake, and Captain Knisely was penalized for motor stops. Otherwise the Cherry Circle forces were in good order and went through the test like veterans.

The conditions of the match were not as strenuous as prevail in some of the reliability runs. Being open only to owners who were in no way affiliated with the motor trade, there was no demand for a technical examination of the cars, the run being more in the nature of a test of driving ability than of the cars. Therefore the demerits were handed out for motor stops, for repairs, adjustments or replacements and for being late at controls. These were just enough to make the match a sporting proposition and close, in that the chances of many being penalized were slight.

As laid out, the course took in 150 miles, mostly in Indiana, the route running into the Hoosier state through the old channels and making Cedar Lake the noon control. Cedar Lake is on the western leg of the Cobe cup circuit, and naturally that historic course was an object of interest, so it was included in the route. From the noon stop the contestants bore away from Crown Point to Valparaiso and from there came in through Hobart and Highlands. The roads were in splendid condition except for the entrance into Chicago, which was as usual in poor shape. The report of the judges was as follows:

CHICAGO AUTOMOBILE CLUB.

Car No.	Driver	Car	Score
1	N. H. Van Sicklen	Apperson	Perfect
3	Frank X. Mudd	Ford	60 points
5	Walter Egermann	Rambler	Perfect
9	Carroll Shaffer	Stevens-Duryea	Perfect
11	B. B. Ayers	Cadillac	Perfect
15	T. J. Hyman	Chalmers-Detroit	50 points
17	R. O. Evans	Apperson	Perfect
19	Godfrey Baackes	Peerless	Perfect
21	Sidney S. Gorham	Jewel	Perfect
23	F. R. Robbins	Stoddard-Dayton	5 points

CHICAGO ATHLETIC ASSOCIATION.

Car No.	Driver	Car	Score
2	C. T. Knisely	Palmer & Singer	35 points
4	S. W. Hamm	Locomobile	Perfect
6	R. T. Laughlin	White	145 points
8	W. C. Thorne	Palmer & Singer	Perfect
10	H. N. Scott	Locomobile	Perfect
12	H. C. Knisely	Premier	Perfect
14	G. F. Griffin	Peerless	Perfect
16	E. E. Vail	Stoddard-Dayton	Perfect
18	Albert Coon	Stoddard-Dayton	Perfect
20	F. W. Wentworth	Rambler	Perfect
22	Eugene Benzat	Stoddard-Dayton	Perfect
24	W. E. Davis	Mitchell	Perfect
34	C. C. Ireland	Stoddard-Dayton	Perfect

ROBERTSON AGAIN IN FAIRMOUNT

PHILADELPHIA, Sept. 20—Robertson, last year's winner of the Fairmount Park 200-mile stock chassis race, will try for the honors at the second running of that fixture, Saturday, October 9. It is not yet known just what entry he will drive, but in all probability it will be the Bergdoll Simplex. Other shining lights who will be at the wheels of the various flyers are Len Zengle, the ex-Chadwick crack, who, although now with his first love, the Pennsylvania, will drive the Chadwick entry; Willie Haupt, also an ex-Chadwickite, who will guide one of the Bergdoll Thomases; "Bill" Wallace, who hopes to land his Palmer-Singer in front, and Herbert Lytle, who is banking on his Apperson Jack Rabbit. Mulford will in all likelihood drive the Lozier entry. As two Chalmers-Detroit entries have been promised, Lorimer and Dingley are also likely to be in the line-up.

SIMPLEX VICTORY AT LOWELL SUSTAINED

LOWELL, MASS., Sept. 20—The awards as first given out in the National Stock Trophy race at Lowell were sustained by the Contest Board of the A. A. A. The Simplex, which finished first, was protested by two other contestants on the ground that it carried a special chain-oiling device. The technical committee made an investigation in the Simplex factory and discovered that the device in question will be, as was claimed at the time, a part of the Simplex stock equipment in 1910.

BRICK FACE FOR INDIANAPOLIS TRACK

INDIANAPOLIS, Sept. 20—After deliberating over the question since the recent speedway races, which ended so disastrously, the management of the Indianapolis Motor Speedway has decided to resurface the course with brick. This decision is the result of tests made on the track. The brick is expected to give a fast and durable surface and to provide a good hold for the tires in any kind of weather.

A shed for housing airships during the aviation meet next month is nearing completion. This building will be 300 feet long and 60 feet wide, and will accommodate two dirigible balloons, fully inflated, or several aeroplanes.

PACKARD WINS RACE TO EL PASO, TEX.

EL PASO, TEX., Sept. 17—C. A. Root and W. M. Jones arrived here this morning in their Packard from New York, having traveled 3,872 miles. They left New York August 22, in company with a Mitchell and Cleveland. The former dropped out in Chicago, and the latter has not been heard from for several days.

DE PALMA MAKES ANOTHER TRACK RECORD

GRAND RAPIDS, MICH., Sept. 18—At the State fair yesterday De Palma and the Fiat *Cyclone* broke the track record for 25 miles. His time was 22:59 3-5. The previous record, also held by De Palma, was 23:35.

THE STRUGGLE FOR RAW MATERIAL AND SPACE

DETROIT, Sept. 20—Preparations being made to build automobiles are on so vast a scale that the market for raw material is rapidly being depleted. Besides the many new companies that are forming, some of which are so well advanced that they have models on the road, the established concerns of magnitude are enlarging their plants, in numerous cases more than doubling the output.

In the meantime producers of raw material were not prepared for so vast a business, and would have been pressed in furnishing barely the amount of material used in 1909, for the cars that were but recently finished. Under the circumstances, the vast increase in the number of automobiles being built, has resulted in a famine of raw material, and parts makers are all working up to the limit, with plant increases going on, governed, not by the amount of business they can command, but by the amount of raw material they are able to definitely contract for.

Glancing over the situation in general, without attempting to cover the ground in anything like a thorough manner, leads to the conclusion that the makers of cars are preparing to do their own work in so far as it is possible to do so, and many of the parts establishments are tied up by contracts which practically mean that they have been annexed to makers of automobiles on a large scale.

In Buffalo, for illustration, the Pierce-Arrow Motor Car Company is adding to its splendid concrete buildings, to an extent which will probably allow of doubling the output. The E. R. Thomas Motor Company is making additions to buildings such as will almost completely draft the remaining available ground, and this work is so far advanced that the Thomas output will be easily double what it was for the last year. The Sterling Engine Company is just finishing up its last season's work, having done more marine work than ever before, and plans are maturing for a large addition to the plant, which includes a wing to the back of the main building almost, if not quite, equal in floor space to the present plant.

Cleveland Shops Are Overcrowded—What is true at Buffalo is simply duplicated at Cleveland, and one of the best indications of the rate at which cars are being built, will be found in the numerous parts shops located there. The Perfection Spring Company, for instance, added on to its plant on a basis of 200 per cent, and with this condition barely established, the company is confronted by the need of more room. In plants like the Winton Motor Carriage Company, the situation is a little less congested, due, perhaps, to specializing on a class of relatively high-priced cars, and to years of experience along this line, thus rendering it possible to foresee wants.

Great Activity Centered at Detroit—McCord Manufacturing Company, with vast resources for turning out such accessories as radiators, force feed lubricators, fans, etc., has near to completion a new building which will enable the company to build at least 50,000 more radiators this year, and, subject to ability to make deliveries, the company is threatened with more than this amount of business in addition to booked orders which will task the entire plant. The new disc fans by the way, which this company is making a specialty of, are in great demand, and they differ from the usual product in that the blades are made in dies, all at one time, and are mounted on a hub construction of pressed steel. This branch of the company's factory is working, like the rest, 23 hours out of every 24.

The Regal Motor Car Company, with 2,000 of Model 30 on the road, as the effort for 1909, is spreading all over the block of ground, where once the Regal occupied but a small space in a single building in the middle of the same block. Work on the Regal evolution, which is the 1910 revise of the 1909 Model 30, is so far advanced that there is assurance of a big increase over the 1909 output, especially since the commodious new building is now housing the car assembly work, and affords space for important detail performances as well. The Regal is one of the companies which is not suffering so much from a famine of material, due to having a foundry of its own, and the Regal car will therefore reflect a certain stability.

At the plant of the Ford Motor Company, foresight is represented by a yard full of chassis frames, motor cases by the half acre, cylinders and other parts to match, rather tending to show that Henry Ford does not intend to participate in a material famine.

At the plant of the E.M.F., the new building is advancing near to completion; it promises to house much additional work, yet, at the same time, the company is building cars all over the yard, as well as under roofs, so that the high pressure system imposed by the management scarcely takes notice of such details as roofs and floors.

The Studebaker-Flanders organization keeps the "wiseacres," in the lobby of the "Pontchartrain," working overtime, "doping" out stories of one kind and another, all of which are rose-tinted and deal in "chunks," when it comes to telling about the number of cars the company will have on the road ere snow melts, and according to them, Studebaker-Flanders methods cannot help but result in more cars this year than were turned out by all the companies combined during 1909.

During 1909, it was variously estimated that the output of all the companies was about 80,000 cars. This year, taking the square root of the mean square of "guesses," 250,000 cars will hit the mark. The average price per car will fall but just a little lower than formerly; not so much so, perhaps, as some may think, even counting 25,000 cars at $750 each, which, according to Mr. Flanders, in his interview of a day or two ago, with the writer, was the figure set by him for the quantity of cars the company would turn out.

To put out this number of cars within a single year, requires much effort at the command of men who know how to do things, and real estate activity in and around Detroit, involving the name of Studebaker-Flanders rather goes to clinch the contention that the attempt is being made.

The Studebaker-Flanders organization is loath to disclose its real estate plans. Mr. Flanders stated to the writer that newspaper statements of late were far from the truth, and, as a matter of fact, it is too early to expect anything from this source.

Brush Runabout Company, with seven new models, is probably making as good a showing as is possible for any organization. Nothing but a well organized establishment could undertake so large a task with the hope of cleaning up the shop orders on time. The trouble is that the Brush runabout is much in demand, its road performance is pronouncedly in favor of a large future, and the company is rapidly eating into all the spare room the Briscoe Manufacturing Company can afford to give up in view of a most extraordinary rush of business in its own line. Briscoe radiators are in greater demand than ever, and the booked orders are simply up to the limit of shop capacity. Briscoe has other plans in a large way.

In the Cadillac plant, everything is so standardized under the able guidance of H. M. Leland that each day's progress is definitely decided upon, at each morning's conference, and the work in the shop goes on almost uneventfully. The Cadillac is one of the companies which operates its own foundry, builds its own radiators and other parts, and is independent of outside ordering.

Anderson Carriage Company is pushing electrics in a surprising way and the big new plant is busy almost to overcrowding. This company, it will be remembered, are the builders of the well-known "Detroit Electric." This company turned out but 78 cars two years ago, while the output for the past season has increased to 525. For the ensuing year, plans now under way, will result in a production which totals 1,000 electrics. The company is now working 465 men and rapidly increasing this force.

FIRST SOUTHERN NATIONAL SHOW PROMISES GREAT SUCCESS

ATLANTA, GA., Sept. 20—Diagrams have been made out showing the arrangement of the exhibitors at the Atlanta National Automobile Show, which will open November 6. Practically every American automobile manufacturer of note and a number of foreign machines are represented. Altogether, there will be about sixty exhibitors of complete cars, and in addition many accessory concerns. The latter, represented by the Motor & Accessory Manufacturers' Association, will receive notice of their allotments of space within a few days. Several late applications were received, among which were those of the Studebaker, E. M. F. and Autocar companies. Now that the assignments of space to these late comers have been made, practically every square foot has been taken.

The Atlanta show will be the first to be held during the winter, and as most of the 1910 models have already been announced, it is probable that they will form the great majority of the exhibits. Thus the Atlantans and their visitors will have the first opportunity to see the various types for the coming year side by side and compare their merits.

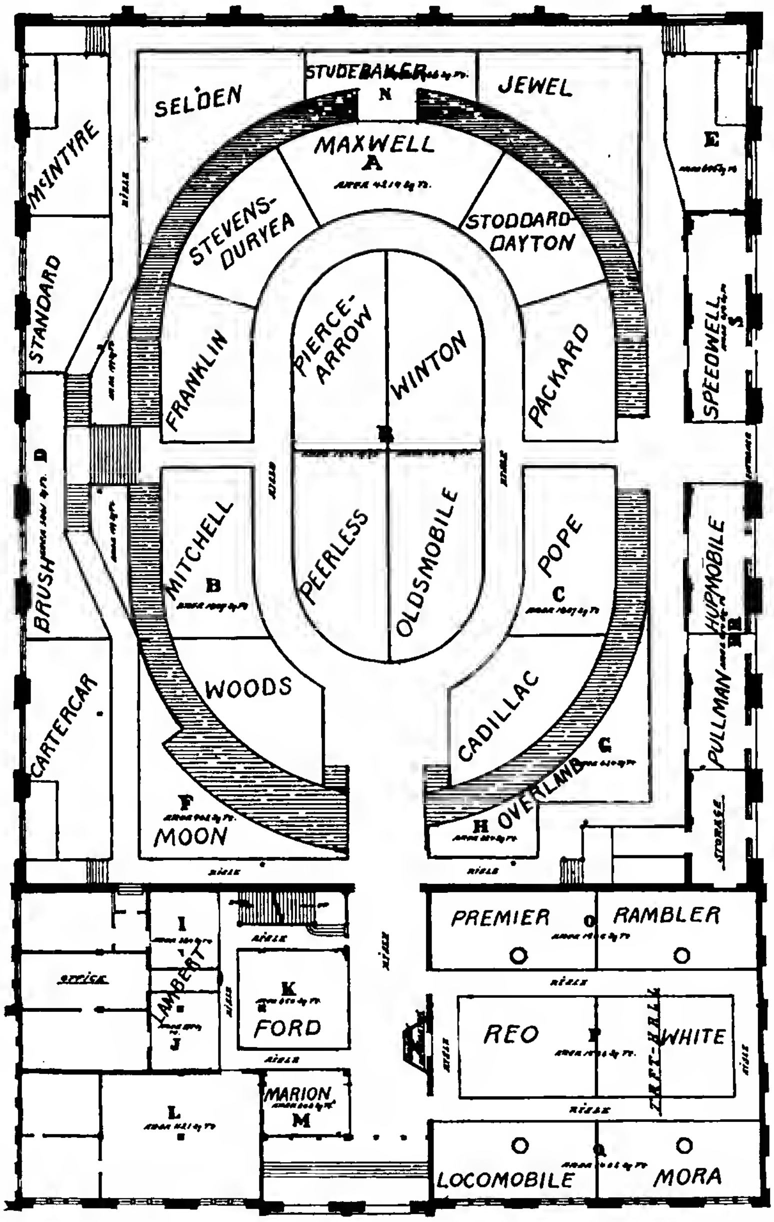
The show will not be the only attraction in Atlanta, however. During the same week will be held the opening meet on the Atlanta Speedway, which the Southerners claim will eclipse that of Indianapolis. In general, the week will be a time of festivity, in which Southern traditions of hospitality will be given full play. Merchants and capitalists of the city have raised a fund of $20,000 for the entertainment of the city's guests, and the whole region of Peachtree street will be put in gala attire.

Among the prominent firms reserving space on the main floor are many that are well known all over the country, all of the larger firms being represented. The publication of the diagrams has been a source of great surprise to those not in close touch with Southern affairs, for so representative a list is seldom seen outside of the New York and Chicago shows. The complete list of main floor exhibitors is:

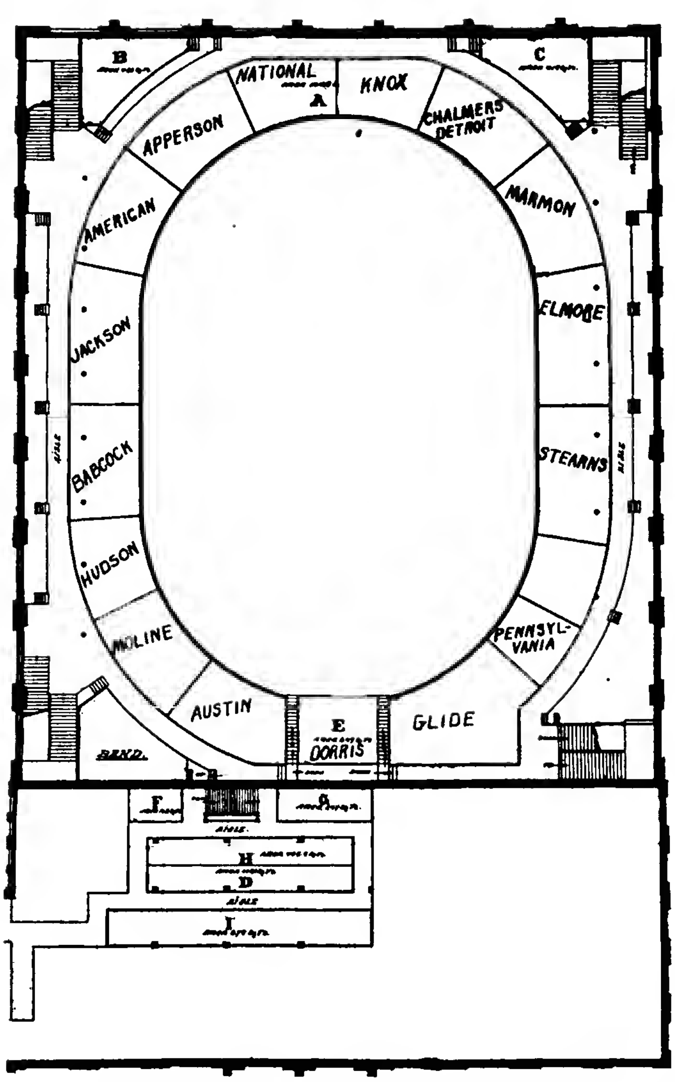
Pierce-Arrow Motor Car Company, Peerless Motor Car Company, Packard Motor Car Company, Winton Motor Carriage Company, Pope Manufacturing Company, H. H. Franklin Manufacturing Company, Stevens-Duryea Company, Cadillac Motor Car Company, Maxwell-Briscoe Motor Company, Dayton Motor Car Company, Mitchell Motor Car Company, White Company, Woods Motor Vehicle Company, Reo Motor Car Company, Locomobile Company of America, Mora Motor Car Company, Premier Motor Manufacturing Company, Thomas B. Jeffery & Co., Ford Motor Company, Marion Motor Car Company, Buckeye Manufacturing Company, Moon Motor Car Company, Overland Automobile Company, Cartercar Company, Brush Runabout Company, St. Louis Car Company, McIntyre Company, Selden Motor Vehicle Company, Croxton-Keeton Company, Studebaker Automobile Company, Speedwell Motor Car Company, York Motor Car Company, Hupp Motor Car Company.

This absolutely fills all of the first floor spaces except two, both of them rather small, and both located in somewhat out of the way places. The rest of the ground floor is taken up with the administrative offices, dressing rooms, storage spaces and other similar but small amounts of floor space which could not possibly be used as exhibition spaces.

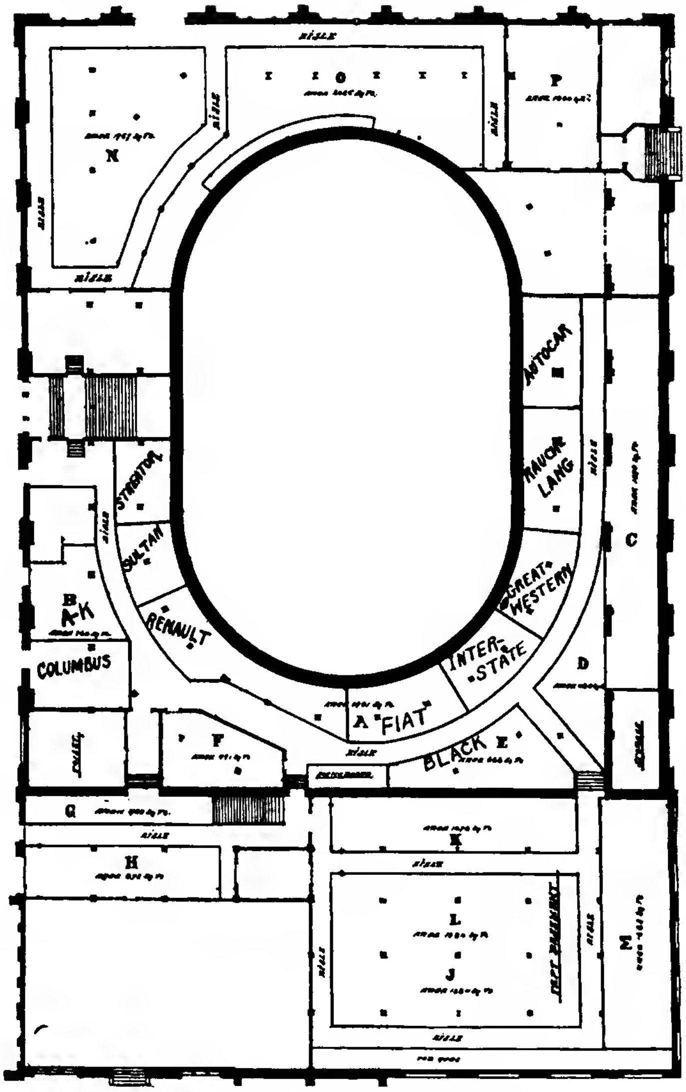
On the mezzanine floor visitors to the show will find the following exhibitors: Austin Automobile Company, American Motor Car Company, Apperson Brothers Automobile Company, Babcock Electric Carriage Company, Chalmers-Detroit Motor Company, Dorris Motor Car Company, Elmore Manufacturing Company, Bartholomew Company, Moline Automobile Company, Hudson Motor Car Company, Pennsylvania Auto Motor Company, F. B. Stearns Company, Nordyke & Marmon Company, Jackson Automobile Company, National Motor Vehicle Company, Knox Automobile Company. This leaves but five bare spots on the whole floor, which will be taken up without a doubt by the late comers. Proceeding to the basement, one finds located there the following firms: Renault Freres Selling Company, Fiat Automobile Company, Inter-State Automobile Company, Great Western Automobile Company, Rauch & Lang Carriage Company, Autocar Company, Streator Motor Car Company, Sultan Motor Company, Black Manufacturing Company, Allen-Kingston Motor Car Company, Columbus Buggy Company. This leaves only fourteen more spaces to be filled up before the curtain goes up on the greatest automobile show ever held in the sunny South. A number of manufacturers who failed to realize the National, as well as sectional, importance of the show in time for the first allotment will doubtless snap up these spaces long before the opening date.



Plan of Main Floor of the Atlanta Automobile Show



Arrangement of Mezzanine Floor, Atlanta Show



Plan of Basement, Showing Various Subdivisions

APPLY SOON FOR A. M. C. M. A. SHOW

The American Motor Car Manufacturers' Association calls attention to the fact that applications for space in the New York show, which opens in the Grand Central Palace on New Year's Eve, must be received before October 1 in order to participate in the first allotment. Last year a number of concerns were unable to secure any space at all, owing to their failure to file their applications within the appointed time, and the show committee of the A. M. C. M. A. desires this year to be free from such disappointments. In past years the first allotment has disposed of the entire 72,000 square feet of space in the Palace.

MARCH DATE SET FOR BOSTON SHOW

Boston, Sept. 21—At a meeting held recently, it was decided to hold the Boston show, this being the eighth annual for the Hub classic, in Mechanics Building on March 5 to 12, 1910. Indications now point to the greatest show ever held, while the management is planning a decorative scheme which will be equally as much of a record breaker. Manager Chester I. Campbell and an able corps of assistants claim to have planned decorations described only by such language as "the most elaborate yet, and of a grandeur never before attempted." The floor diagrams and other printed matter are now in the hands of the printer.

DEATH ENDS TRANSCONTINENTAL

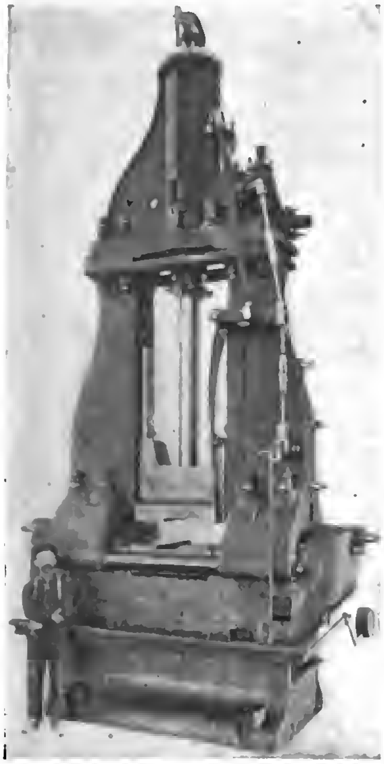
Philadelphia, Sept. 20—The transcontinental relay trip promoted by the *Press* of this city, and which started promptly at 12:30 P. M., Saturday from City Hall, came to an abrupt termination before the completion of the first relay, when the Acme, driven by Clifford R. Ely, which was to cover the first leg of the journey, met with an accident at Robesonia, ten miles beyond Reading. Henry L. Buckley, automobile editor of the *Press*, one of the two messengers, sustained a fractured skull, dying two hours later at the Reading hospital; William H. Brown, a guest of Driver Ely, is in a serious condition at the same hospital. Ely, his assistant, and another passenger, suffered slight cuts and bruises. The car was wrecked. The *Press* authorities immediately wired all along the route, calling the relay off. The cause of the accident has not yet been ascertained.

2,456 GUESSES ON PREMIER RUN

Philadelphia, Sept. 20—Owing to the fact that no less than 2,456 residents of towns along the route of the recent Premier reliability run from this city to Cape May had sent in guesses as to the number of the winning car and the time in which the 96 miles would be covered, it was impossible to announce the official figures until Wednesday. B. E. Block, of Norristown, the winner of the cup, drove his car over the course in 4:57:45, just sixteen seconds slower than the official time. But one of the guessers selected Mr. Block's car, number 29, and that was James Martin, of Waterford, who took down the biggest bit of cash hung up by the promoters. Elizabeth McCarthy, of Germantown, whose guess was but an even ten seconds shy of the official time, captured second money. Twenty prizes in all were thus distributed.

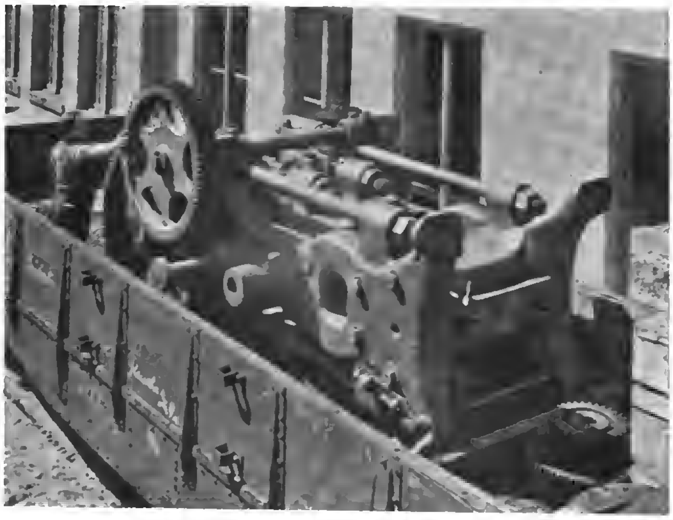
NEW RAMBLER FACTORY AND MACHINERY

KENOSHA, WIS., Sept. 20—The Thomas B. Jeffery Company has made extensive additions to its plant recently, which, when completed, will entirely change its appearance. The new buildings, owing to the abundance of land at the company's disposal, have been made only one story in height, and will give the workmen all the light and air that could be desired. They are of reinforced concrete, with saw-tooth roofs made up almost completely of glass. Some idea of the extent of these buildings may be gained from the photograph.



Rambler Steam Forging Hammer

Two of the machines to be installed in this addition to the plant are also shown in the illustrations. This new machinery is expected to facilitate and cheapen the manufacturing processes to an unusual degree. The steam drop-forging hammer, to be used in the making of crankshafts, connecting rods, front axle yokes, and other heavy forgings, weighs complete 49 tons. The hammer itself weighs 3,500 pounds, and the anvil block 35 tons. The machine will be installed on a foundation of solid concrete sixteen feet deep and fifteen feet square. Another machine which comes in the same heavy-weight class, and which in modern manufacturing methods is equally important, is the 500-ton drawing press, for making brake drums, clutch cones and other parts of drawn steel. This press weighs complete 30 tons. Such equipment follows the policy of spending money to save money.



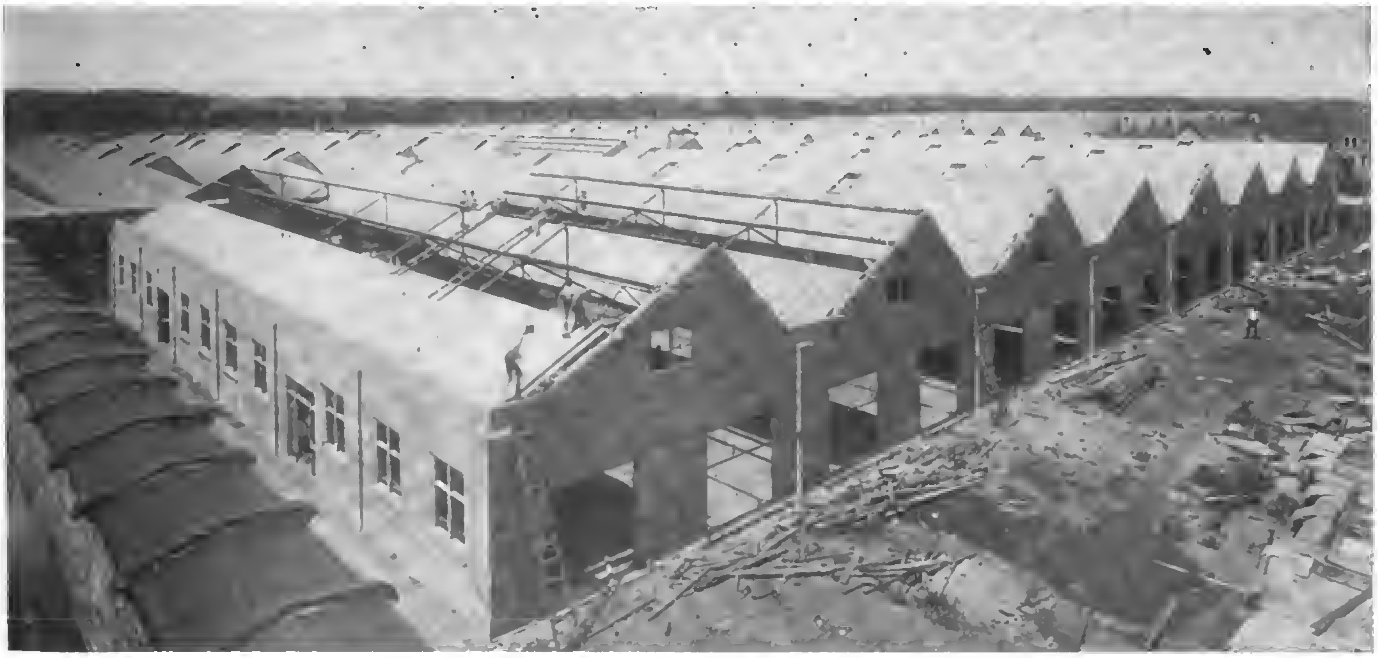
Drawing Press in Car Alongside New Rambler Factory

ENGINEERING EXHIBIT OF FULTON RELICS

The Hudson-Fulton celebration is essentially a recognition of the engineer and the explorer. To show the progress of engineering science, models of the Clermont and other early steamboats, through the courtesy of the Smithsonian Institution, are now on exhibition at the rooms of the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York. The exhibit includes the Clermont, the Phoenix, built by John Stevens, and one of John Fitch's early types. By way of contrast, the Hamburg-American line has loaned the exhibit a beautiful model of the *Deutschland*, showing one of the highest developments of steam navigation. The exhibit will be open to the public every week-day from 9 a. m. to 5 p. m.

SELLING BRANCH FOR SPARE WHEELS

ST. ANNE, ILL., Sept. 20—The Spare Motor Wheel Company, of this city, maker of Stepney spare wheels, has disposed of its entire output for the coming season to the American Stepney Spare Wheel Company, of 1773 Broadway, New York, who will in the future have entire charge of the disposition of this product. The St. Anne company has enlarged its plant and equipment, and is manufacturing clincher and other rims besides spare wheels.



Addition to Rambler Factory: This Wing for Accommodation of Laboratory and Motor Testing and Repair Departments

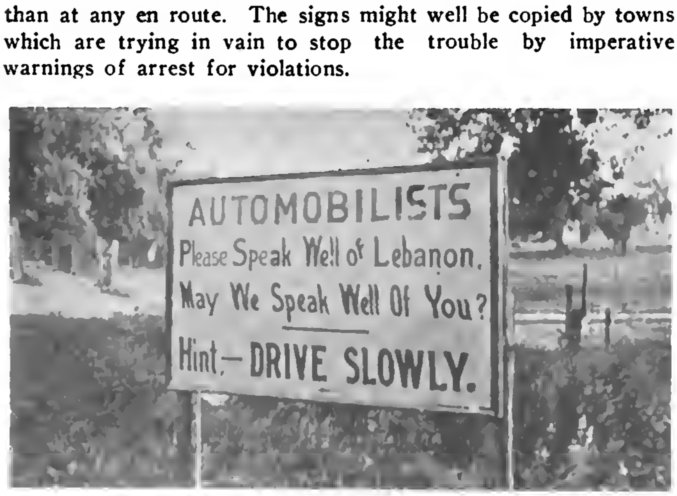
Hoblitt in Alco Asks His Way of an Ohio Farmer

A BUSINESS TOUR OF 5,000 MILES

Five thousand miles was the sum total of a business tour recently completed by F. M. Hoblitt, the pioneer automobile salesman, who is now with the American Locomotive Company. Mr. Hoblitt made his start from New York City, driving to the Alco factory at Providence, then to Boston, and from there to Albany and Buffalo, Cleveland, Chicago, Minneapolis, St. Louis, and all through the Middle West. He said he encountered only a few bad roads, the worst being in Southern Indiana, where rains had caused the Muscatatuck River to rise so that the road was flooded in places. He says: "Most of the time I found good roads and twenty-five per cent. of them were splendid, although I had a car, of course, which makes the worst roads seem fair. The country seemed prosperous everywhere, and I could see nothing but the best of prospects in a business way. I suppose it is known here now, for it is some time since I went over it, but all tourists should be told that the new State road between Albany and Buffalo, which has been so much avoided, is now practically finished all the way." Mr. Hoblitt met with the usual experiences of the road, some laughable and some annoying. In Kentucky the drivers of teams and carriages seemed particularly timid, although the horses gave little trouble. It was during the first weeks of this trip that the famous adventure of the horse-fly occurred, which was widely published in the trade papers and caused great merriment among Mr. Hoblitt's friends, who are sure to remind him of it when he returns.

HOW LEBANON, O., STOPPED SPEEDING

Columbus, O., Aug. 30—Drivers of automobiles between this city and Cincinnati are confronted by a most efficient sign placed at the city limits of Lebanon. The inscription reads: "Automobilists! Speak well of Lebanon. May we speak well of you? Drive Slowly." The result of this polite and reasonable request is that the tourists invariably reduce their speed on the city streets, and there has been less of the fast driving in that place than at any en route. The signs might well be copied by towns which are trying in vain to stop the trouble by imperative warnings of arrest for violations.



An Effective Sign for Speeders at Lebanon, O.

WHAT TIRE-TOWN MEN ARE DOING

Akron, O., Sept. 20—The Firestone Tire & Rubber Company has purchased 15 acres of land in South Akron for a new plant to take care of its increased business. The land will be used for a group of large buildings constructed and equipped after the most approved designs, which will be devoted to the manufacture of automobile tires. H. S. Firestone said, in discussing the project, that the company had been offered inducements to go to other cities, but preferred to remain in Akron on account of the facilities and supply of skilled labor to be found there. The Firestone Company entertained its branch managers and salesmen at a banquet last week, held in connection with the annual convention.

W. W. Wuchter, the new manager of the Swinehart Clincher Tire & Rubber Company, announces that the pneumatic tire to be manufactured by that company next year will differ in many respects from the standard type. Details, however, have not been announced. Two new buildings will be erected, one 40 by 100 feet, to be used by the solid tire department, and one 60 by 125 feet for pneumatic tire manufacture. Three new branches, in Boston, Buffalo, N. Y., and Philadelphia, will be established.

Knox that Won First Prize at Recent Westfield Parade

At a recent automobile parade at Westfield, Mass., the winner of the first prize in the decorative division was the Knox car, owned by H. P. Moseley, a leading lawyer of that city. The flowers used in the decorations were wistaria.

OVERLAND CAPITALIZED AT $1,500,000

Toledo, O., Sept. 20—At the annual meeting of the directors of the Overland Automobile Company in Indianapolis last week a complete reorganization of the company was effected. The capital stock has been increased to $1,500,000, this being deemed necessary on account of the rapid expansion of the company's business, and the name has been changed to the Willys-Overland Automobile Company, in recognition of the prominence of President J. N. Willys in the company. Contracts have been awarded for an addition to the Toledo plant to be 91 by 397 feet and three stories in height. This is the second addition since the Overland company took possession a few months ago. This structure will be located on the five-acre plot of ground which was recently purchased.

TAXICABS FLOURISH IN BALTIMORE

Baltimore, Sept. 20—The taxicab business is certainly flourishing in this city. The latest deal is the purchase of the Belvidere Hansom Company by the Taxicab Company of Baltimore. The latter, by this purchase, gains the right to serve all the hotels of the city, except the Rennert, and the Union Station, and during the next month will place 28 additional cars in service. The company has leased the stables at 413 North Howard street and will convert them into a garage. The Rennert Hotel is to use the taxicab service of the Harry L. Stewart Company.

President Taft in Chicago with Four Chalmers-Detroits as Guard of Honor

On the occasion of the President's recent visit to Chicago there was held an automobile parade through the parks, in which he took a prominent part. Although seated in a Thomas "Six," Mr. Taft had for an escort four Chalmers-Detroit cars, each carrying, besides the driver, a member of the police or Government secret service

Commercial Car from Spokane, Wash.—The Spokane Motor Car Company has been incorporated with a capital stock of $600,000 to manufacture an automobile truck with a four-wheel drive. The company is headed by V. E. Funkhouser, president; Edward Schulmerich, vice-president; F. M. Skiff, secretary; A. L. MacLeod, treasurer, and Thomas Bilyeu, general manager. The truck is claimed to be capable of very short turns, and can pass over considerable obstacles without disturbing the level of its platform. Models will be built of capacity from one and one-half to seven tons. The factory will be located at Spokane, and, it is said, will employ 150 men.

Stearns and Fisk Good Combination—George C. Row, of Chicago, who has just completed a trip from that city to San Francisco in his Stearns car, says that he was surprised by the remarkable performance of his Fisk tires. In crossing the Rocky Mountains he had expected considerable tire trouble, but only one puncture, the work of a sharp nail, was experienced throughout the trip. Mr. Row stated that his car, with its load, weighed 6,200 pounds, and that, although the tires showed the effects of the hard usage to which they had been subjected, they were in perfectly sound condition when the Golden Gate was reached.

New Concern to Make Trucks—The Robinson-Loomis Motor Truck Company, of Minneapolis, Minn., has been organized with a capital of $50,000 to manufacture a truck to be known as the Gopher. The plant will be located on Second avenue north and Seventh street. Besides making the new truck the company will continue to act as agents for the Reliance trucks. T. F. Robinson is the president of the new concern; F. P. Robinson, vice-president, and F. L. Loomis, secretary. Mr. Loomis was formerly sales manager of the Reliance Motor Truck Company, of Detroit and Owosso, Mich.

Firestone a "Live One"—Several New York automobilists who use Firestone tires were winners at the Sheepshead Bay track last week by playing a rather unusual tip. While looking over the list of starters one of them discovered a horse named Firestone entered in the fourth race. Though he knew nothing of horse racing or of the merits of the entries, he liked the name, and, with several of his friends, he bet on the horse. Firestone upheld the honor of his name by coming home a winner, and the users of Firestone tires left the track with $4 in their pockets for every one they had bet.

Maxwells Score at White Plains—In the races held under the auspices of the Westchester Driving Club on its half-mile track at White Plains, N. Y., recently, the two 22-horsepower Maxwells which had just returned from the Lowell meet made a clean sweep in the 10 and 15-mile events. In the former Thomas Costello and Arthur See took first and second honors, and were at no time in danger of being overtaken. The winner's time was 14:20. The 15-mile event was closely contested. Costello was first in 21:32, a Mercedes second and See third.

Reo Successful in Wilmington Service—A Reo car, purchased recently by the city of Wilmington, Del., for the use of its street and sewer department, is proving a great success. It is used by the directors in trips of inspection and has greatly facilitated the work. The Reo is the first machine to be bought by the city but more are contemplated, and the fire department is making arrangements to add two automobile fire engines to its equipment. Negotiations are already progressing with the manufacturers of these cars.

Ohio Electric Company Reorganized—The Ohio Electric Company, incorporated during the past week by H. P. Dodge and other Toledoans, with a capital of $75,000, will take over the business of the Ohio Electric Carriage Company, which was organized some months ago for the manufacture of electric vehicles. For the present the company will only assemble the various parts which are to be made under contract, but ultimately it is the intention of the company to build a factory with sufficient capacity to build the greater portion of their machines.

W. C. P. Taxis Parade at Coney—In the Mardi Gras parade at Coney Island, the climax of the season at New York's popular seashore resort, Police Inspector O'Brien and Captain Fennelly, with the executive committee of 26 men, headed the line in the yellow taxicabs of the W. C. P. Company. The cabs were artistically decorated and drew much favorable comment through their fresh and clean appearance, in spite of the fact that most of them have been in hard service since June 1.

Franklin Crosses Mont Cenis—George T. Odell and party, of Salt Lake City, Utah, have just returned from a 9000-mile European tour in a six-cylinder Franklin. They crossed Mont Cenis on the new road at an altitude of between 7000 and 8000 feet. There was considerable snow met with, but the 30-mile run between Mondane and Sousa was made in an hour and a half. Another achievement was the climbing of Mount Vesuvius to a point beyond that reached by the tramway.

Driggs-Seabury Drops Ordnance—The Driggs-Seabury Ordnance Corporation will discontinue the manufacture of ordnance as soon as contracts on hand are filled, according to reports. The company henceforth will devote all its time to the manufacture of automobile parts. Since that branch was taken up some time ago orders have been coming in rapidly and at present there is enough work on hand to keep the factory busy for several months.

Hoosiers Want a Truck Factory—At a meeting of Ft. Wayne, Ind., capitalists recently it was voted to finance the transfer of the Coppock Motor Car Company, of Decatur, Ind., to that city. A thorough investigation gave very favorable results and it was decided that the establishment of the factory in Ft. Wayne would be beneficial to the interests of the city. It is planned to raise $100,000 capital to finance the company.

Hartford Company Elects Officers—At the recent meeting of the directors of the Hartford Auto Parts Company, of Hartford, Conn., W. H. Caldwell was elected president and treasurer, F. H. Bogart, vice-president and manager, and F. L. Martin, secretary. Messrs. Caldwell and Bogart, and T. H. Brady, J. J. Amgulatis, John Boyle and E. W. Putnam were elected directors.

Connecticut Authorities in Earnest—That the Connecticut secretary of state means business, and will not tolerate the reckless operation of automobiles, is made plain by the revocation of a license announced in the case of the driver of G. A. Schwartz of Chicago, who maintains a summer home in Suffield. The driver in question struck a pedestrian a few days ago.

Whitney Parts in Demand—The Whitney Manufacturing Company, of Hartford, Conn., plans an immediate addition to its present four-story structure in order to accommodate its increasing business. A temporary addition will be built to enable the company to keep pace with its orders during the winter, and in the spring a permanent concrete addition will be built.

Philadelphia Supply-Men Picnic—The annual Labor Day picnic of the employees of the big Philadelphia accessories establishment of James L. Gibney &

Brother was held this year at Hamilton's Farm, near Chester. The Benedicts slaughtered their unmarried fellow-workers at baseball by the score of 35 to 15.

New Six from an Illinois Town—C. E. Lipman, of Beloit, Wis., a manufacturer of automobile parts, is interesting the capitalists of Rockford, Ill., in his plans for a six-cylinder, 36-horsepower car, which it is proposed to name the "Rocoit." If the plans are carried out, production will begin about January 1. The car will sell for less than $2000.

Clever Thermoid Advertising—Automobile dealers have been periodically receiving ingenious folding post-cards from the Thermoid Rubber Company, of Trenton, N. J., extolling the virtues of Thermoid brake lining. "Good Reasons," "All in a Nutshell," "Think It Over!" and "The Stamp of Approval" are some of the titles.

New Maker of Blomstrom Cars—The Lion Motor Company, which was recently organized in Detroit, with a capital of $300,000, is to move to Adrian, Mich. The company is to manufacture the Blomstrom and Gyroscope cars, designed by Charles E. Blomstrom, of Detroit, and expects to have its machine on the market by the first of the year.

IN AND ABOUT THE AGENCIES

Elmore, New York City—Peter Fogarty and George Post has secured the Elmore agency formerly held by A. E. Ranney & Company, and will open an office on West Fifty-fourth street, near the A. C. A. club house. Mr. Fogarty held the Northern agency until that company was merged into the E. M. F., and has since been connected with the Marmon interests. Mr. Post was formerly connected with the American Panhard branch. The new firm will be known as the Elmore Motor Car Company of New York.

Studebaker, Philadelphia—The Philadelphia branch of the Studebaker Brothers Company is to give up its present quarters at 330 North Broad street to move into the 80 by 200-foot, three-story building at Pennsylvania avenue, Eighteenth and Noble streets. Manager F. V. Stratton expects to get into the new quarters in two weeks.

Oldsmobile, Baltimore—A modern building, embracing garage, sales and repair shop facilities, will soon be erected for the Baltimore headquarters of the Oldsmobile. E. L. Leinbach, the manager, is now making arrangements for the shipment of 1910 cars, and reports that his prospects for the coming season are even brighter than they were at the beginning of the present highly successful one.

Reo, Hupmobile and Oakland, Baltimore—The "Little Joe" Weisenfeld Company will occupy the building at 14 North Howard street as an auto exchange for the Reo, Hupmobile and Oakland cars. The building has four floors, and is 35 by 105 feet. It was leased by the company last week.

Kline-Kar, Philadelphia—The B. C. K. Motor Car Company, of York, Pa., which is making the Kline-Kar, has installed a branch office in the establishment of Frink & Company, the well known carriage makers, at 203 North Broad street.

Haynes, Atlanta, Ga.—The Corker Motor Car Company has been appointed agent for the Haynes in Georgia, Florida, Alabama, Tennessee and North and South Carolina. This company also holds the local agency for the Matheson.

Rambler, Brooklyn, N. Y.—Thomas B. Jeffery & Co. have made arrangements with the Kenny Motor Car Company to act as Rambler distributors in Brooklyn. A garage will be erected at Sterling Place and Bedford avenue.

Lozier, Hartford, Conn.—Brown, Thompson & Co., of Hartford, Conn., have been appointed agents for the Lozier car for the State of Connecticut, with the exception of the counties of Fairfield and New Haven.

Alco and Pullman, Philadelphia—W. C. Longstreth has secured the agency for the Alco in the Quaker City and adjacent territory, and last week announced in addition the acquisition of the Pullman sales agency.

Maxwell and Bailey, Cincinnati—The Chas. Behlen Sons Company, a prominent carriage maker of this city, located at Fifteenth and Vine streets, has taken the selling agency for the Maxwell and Bailey electric.

Pierce-Arrow, Louisville, Ky.—A company has been formed under the name of the R. H. Semple Company to handle the Pierce line in this city. The present location is at 309 West Main street.

Luco "Night Pilot," New York—This device will be sold through the Luco Night Pilot Company, 1777 Broadway.

PERSONAL TRADE MENTION

A. S. Holden, at present assistant sales manager of the F. B. Stearns Company, will assume, about October 1, the position of Western Manager, with headquarters at San Francisco. His territory will extend from Salt Lake City to the coast and from the Mexican to the Canadian boundary.

Asa Goddard, formerly president of the Worcester, Mass., Automobile Club, and later secretary of the Cleveland Automobile Club, has taken the position of general sales agent of the Kelly-Springfield Road Roller Company, of Springfield, Ohio, for which he has been fitted by his extensive experience in road-building.

James C. Howell, of Cornwall-on-the-Hudson, N. Y., has been appointed assistant manager of the Warner Instrument Company, of Beloit, Wis., to succeed Alfred S. Koto, resigned. Mr. Howell is a graduate of Columbia and has specialized in patent law.

H. J. Snider, who recently entered the employ of the H. H. Franklin Manufacturing Company as assistant to one of the office department managers, has been promoted to the management of the Albany, N. Y., branch of the company.

W. A. Rutz, formerly traveling representative of the New Departure Company, Bristol, Conn., has accepted a similar position with the Gilbert Manufacturing Company and the F. E. Bowers Company of New Haven, Conn.

Albert C. Galbraith has accepted a position with the Continental Caoutchouc Company, of New York, and will travel from the Philadelphia branch, covering Pennsylvania. He formerly represented the Diamond Rubber Company in the New England territory.

Thomas W. Simpson, formerly of the York Motor Car Company, of York, Pa., has joined the salesforce of "Little Joe" Weisenfeld, the Baltimore representative of the Reo, Oakland and Hupmobile cars.

David W. Pell, formerly superintendent of the Electric Vehicle Company in Hartford, Conn., has been made general manager of the recently organized Pell Motor Car Company, of Oswego, N. Y.

L. L. Dunlap, formerly factory manager of the Oakland Motor Car Company, Pontiac, Mich., was appointed general manager at the director's meeting this week to succeed the late E. M. Murphy.

Hobart M. Adams has been appointed general sales manager of the Royal Motor Car Company, of Cleveland. Mr. Adams formerly managed the Cleveland branch of the White Company.

Herman Eckhardt, Jr., after a year's absence, has returned to the employ of the Columbus Buggy Company, of Columbus, Ohio, as sales manager of its electric and gasoline cars.

E. B. Lausier has been appointed assistant sales manager of the Timken-Detroit Axle Company, of Detroit, and of the Timken Roller Bearing Co., Canton, O.

Factory and Offices of the Fal Motor Company, at Chicago

Ajax Cup for Runabouts in "Star" Tour

DE LISSER TROPHY FOR WESTERN TOUR

Kansas City, Mo., Sept. 18—Horace De Lisser, president of the Ajax-Grieb Rubber Company, has offered a handsome trophy, to be known as the Ajax Cup, for the reliability tour which starts at this city Monday. This cup will be awarded to that contestant in the runabout division, either dealer's or owner's class, who crosses the finish line with the best score. The tour, which will last five days, and cover a distance of 675 miles, will take in Junction City, Kan.; Lincoln, Neb.; Omaha, and St. Joseph, Mo.

DOUBLE SUIT OVER MOSLER PLUGS

An injunction suit has been filed against A. R. Mosler & Company by the Lehman Manufacturing Company to restrain the former from manufacturing spark plugs claimed to infringe on patents granted to J. H. Lehman October 20, 1903. The Mosler Company says that its plugs do not infringe, and intends to fight the case in the courts. On the other hand, the Mosler Company has begun a suit against the Auto Supply Company for infringement on the Canfield patent, granted October 18, 1898, covering a spark plug with a recess around the electrode for the purpose of preventing soot from gathering on the insulation. This patent, with two others, is now the property of the Mosler Company, which claims that a majority of the spark plugs now in use are infringements.

YORK-PULLMAN DIRECTORS MEET

York, Pa., Sept. 18—The annual meeting of the board of directors of the York Motor Car Company, maker of the Pullman cars, was held this week. A dividend of 7 per cent. was declared. T. C. O'Connor was elected president, O. Stevenson was re-elected secretary and treasurer and George S. Schmidt was made a member of the board of directors and counsel for the company. A considerable amount of the year's earnings was set aside as surplus.

NEW YORK TRADESMEN'S GAMES

The inhabitants of New York's automobile row turned out last Saturday for an outing at Lange's Grove, New Dorp, S. I., and donned running pants and jerseys in place of the conventional duster and goggles. The outing took the form of a track meet, and there was some spirited competition. Although the events were open only to members of the organization, sufficient entries were received to make them unusually interesting. W. Flynn, of the Diamond Rubber Company, outscored all the other contestants, winning the 100-yard dash, the hop, step and jump.

FIRST NEWS OF EVERITT "THIRTY"

Detroit, Sept. 20—William E. Metzger, B. F. Everitt and William Kelly, who recently disposed of their holdings in the E.-M.-F. Company to Studebaker interests, are sponsors for a new car that will shortly make its appearance. Details have been kept under cover, but it is known that the car, which is a Kelly creation, will have a four-cylinder motor developing 30 horsepower. It will be built in two styles, listing at $1,250 and $1,400. A factory has been secured, and following the incorporation of the new company, which will be effected shortly, the manufacture of cars for the 1910 trade will be undertaken. It is reported that they have purchased the Meier trunk factory on the line of the Grand Trunk Railroad, and will proceed to build a large addition, such as to permit of the building of 5,000 cars, both runabouts and touring cars. for the coming year.

DETROIT'S LATEST WARREN-DETROIT

Detroit, Sept. 20—The Warren Motor Car Company is the latest to loom above the local horizon, where the incorporation of an automobile manufacturing concern is almost a weekly occurrence. The company is capitalized at $100,000, and the cars put out will be of the light runabout and touring type. The new machine will be known as the Warren-Detroit, and will be on the market early in 1910.

The incorporators include Postmaster Homer Warren, C. R. Wilson, of the Wilson Body Company; Harry N. Snyder, R. J. Brennan, W. H. Radford, formerly assistant engineer of the Hudson Motor Car Company; Henry C. Walters and J. Bayerline, formerly purchasing agent for the Hudson Motor Car Company.

GRAMM-LOGAN INCREASES CAPITAL

Bowling Green, O., Sept. 18—The first fiscal year of the Gramm-Logan Motor Car Company, which ended this week, was very satisfactory to the stockholders. The directors declared a cash dividend and laid by a surplus fund in addition. A. L. White was elected president, B. A. Gramm was re-elected vice-president and general manager, and F. E. Lamb and J. B. Wilson were elected secretary and treasurer, respectively. It was unanimously agreed to increase the capitalization of the company from $100,000 to $300,000.

REO EMPLOYEES GET BONUS

Lansing, Mich., Sept. 20—The Reo Motor Car Company has presented its employees who have been with the company for a year a check for an amount equaling 5 per cent. of their year's wages. The wage dividend amounted to about $10,000—$3,000 more than last year at the same rate.

TAXICABS AND TRANSIT

Peoria, Ill.—The Palace Boarding & Livery Stable of Peoria, Ill., has decided to enter the automobile taxicab business, and has placed an order with the Sultan Motor Company, of New York, for a number of Sultan machines.

Great Western at High Bridge, Ky.

C. A. Kenney, the owner of the Great Western car shown, has driven it 3,450 miles in the past two months. The "Towers," at High Bridge, Ky., were originally intended to support a suspension bridge, but after they had been built the project was abandoned.

NEW AGENCIES ESTABLISHED

Alco and Stoddard-Dayton: Providence, R. I.—Park Square Automobile Station, 17 Snow street.

American and Maxwell: Seattle, Wash.—Polson Implement Company, 926 First avenue South.

RECENT INCORPORATIONS

Fleis Equipment Company, Brooklyn, N. Y.—Incorporated by Charles E. Miller, B. W. D. Woodward, George Bender, W. A. Towner, Jr., and John P. Miller, with a capital of $100,000, to manufacture airships, aeroplanes and balloons.

Automobile Sales & Supply Company, San Antonio, Tex.—Capital $20,000. To manufacture and deal in automobile supplies, accessories and motors cars. Incorporators: Sidney H. Weis, E. A. Kalkhurst, Roy Campbell.

Cataract Motor Company, Paterson, N. J.—Incorporated by Louis A. Piaget, W. H. Sherman, F. W. Freeman, H. J. Westerhoff and G. E. Hannah, with a capital of $350,000, to manufacture motor vehicles, engines, etc.

Pell Motor Car Company, Oswego, N. Y.—Incorporated by Chauncey C. Place, Albert N. Radcliffe and David W. Pell, all of Oswego, with a capital of $150,000, to manufacture automobiles, parts, etc.

Bergen and West Side Motor Car Company, Jersey City, N. J.—Incorporated by Charles E. Collard, Martha L. Collard and Beverly D. Sparks, with a capital of $100,000, to manufacture automobiles.

E. R. Thomas Motor Branch Company, Chicago—Capital $100,000. To do a general automobile and garage business. Incorpoartors: J. Weisenbach, J. J. Cermak, J. S. McClellan.

Marquette Motor Vehicle Company, Chicago—Capital $20,000. To manufacture automobiles, motors and vehicles. Incorporators: Isaac L. Marks, David J. Marks, Isaac B. Lipson.

Allen Taxicab Company, New York—Capital $1,000,000. To operate automobiles, taxicabs and other vehicles. Incorporators: Harry N. Allen, William Halpin, Arthur W. Osborn.

Motor Service Company, Jersey City, N. J.—H. L. Lechner, Doering Bellinger and W. G. Jones, incorporated with a capital of $100,000 to manufacture vehicles of all kinds.

Badger Auto Company, Oshkosh, Wis.—Capital $50,000. To manufacture automobiles. Incorporators: M. L. Cottrill, L. J. Monahan, J. D. Termaat, E. H. Fahrney.

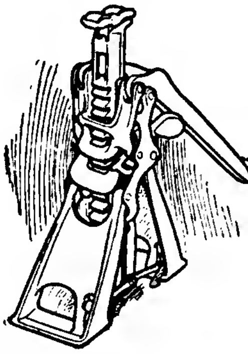
Information for Auto Users

S. & W. Auto Crank—This is a device intended to avoid the necessity of leaving the seat in order to crank the motor. It has no resemblance to the ordinary starting device, as it merely replaces the crank in front of the machine. It consists of a countershaft running along the motor, connected at the front end to the crankshaft by means of a sprocket, chain and ratchet device, and at the rear end to a crank suitably mounted on the dash. The ratchet on the crankshaft disconnects the countershaft and gearing as soon as the motor starts, so that there is no extra machinery in motion when the car is running. The device is claimed to be much simpler than any of the compressed air or coil spring starters, and

OPERATION OF S. & W. CRANK

has the additional merit of being absolutely positive; it will start the motor any time that the ordinary crank will start it. As there is a considerable gear reduction in the sprockets, the dash crank is very easy to turn. There is also no possibility of a back kick. The makers are Stryker & Woessner, Huron, Ohio.

Spitzli Ratchet Auto Jack—No one has yet invented a way of dispensing with jacks, or of avoiding the occasions which necessitate their use; meanwhile, the best that can be done is to make the jack as compact and easily operated as possible. This has been the aim of the Spitzli Manufacturing Company, of Utica, N. Y., in designing its ratchet jack. It is compact in form and light in weight, and at the same time capable of handling heavy loads. The principle on which it is built enables the user to get a tremendous leverage. The jack works with either the hand or foot, and is instantly adjustable to the height of the axle. With every downward stroke of the handle the load is lifted half an inch, the special toggles then catch hold in such a way that it is impossible for the load to slip back. The action is easily reversible, so that the same downward stroke will lower the vehicle. The jack has a folding base, which expands to an unusual width, making it very steady in action. The jack fits under and out of the way of brace rods and trusses, and is especially desirable for use with overhanging tonneau or taxicab bodies. As an instance of its compactness and light weight, the



SPITZLI JACK IS VERY COMPACT

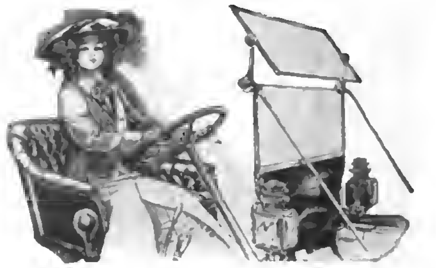
maker of the jack states that the No. 12 size, which is tested to lift automobiles up to 4000 pounds in weight, and is guaranteed against breakage or failure in operation, weighs only about 5½ pounds, and when folded occupies a space in the toolbox approximately 10½ by 3 by 3 inches.

Luco Swinging Lamp Bracket—The Luco "Night Pilot," brought out by the Luco Manufacturing Company, of Dalton, Mass., is an improvement on former designs of headlight brackets intended to swing the lamps when the car makes a turn. The principal difference is that only one of the lamps, that on the driver's side of the car, is movable, and it is operated directly from the steering gear instead of from the front wheels. One lamp thus remains pointing straight ahead, lighting up the side of the turn in the car's immediate vicinity, while the other points down the road which the car is about to take. When not in use the bracket is

NIGHT PILOT LAMP BRACKET IN USE

firmly locked. It is supported on ball bearings, and the few working parts are so constructed that they cannot rattle, whether in operation or not. The device operates very easily, and the additional effort necessary to move it, in addition to the steering, is not noticeable. It can be attached in 20 minutes, without drilling or otherwise weakening the construction, and is unobtrusive in appearance. The moveable fork of the "Night Pilot" simply replaces the fixed one with a few simple connections; the same headlights are, of course, used, so that the total expense is but the cost of the device itself and a few minutes' labor.

Troy Automatic Windshield — The Sextette, as it is called by the maker, the Troy Carriage Sunshade Company, of Troy, Ohio, is capable of assuming six different positions, each of which will be found advantageous under certain combinations of circumstances. The first position, of course, is with both halves in line and vertical, as in the original form of windshield. The next is with the upper half folded down flat against the lower. Then come the special positions which lend the "Troy" its particular value. The upper glass is carried on hinged supports on either side at about the middle of its height. It can be tilted back on these supports to an angle of about 30 degrees from the vertical, so as to deflect the air currents upward, while at the same time the lower edge swings forward, leaving an open slit through which the driver can clearly see the road, no matter how wet the glass itself becomes. In warm weather, or when the bottom of the car heats up, this position can be reversed, the upper edge swinging forward and the lower edge back, so that the air is deflected into the car, striking about the knees of the front seat passengers. For drivers who believe that it distorts the vision to look through a slanting glass, the same effect can be secured with the upper glass vertical, parallel to the lower, but six inches to the rear of it. Or, finally, the upper glass can be tilted back



SEXTETTE WIND SHIELD PARTLY DOWN

with its lower edge still touching the other glass. In this position the upper glass is in line with the slanting stay-rods, giving it a very neat appearance. All positions are acquired automatically without set screws; the upper glass locks positively in position, and all parts are held together by a stiff spring so that they cannot rattle.

Osgood Automatic Lubricator—It is no longer necessary to argue for or against the use of a force-feed lubricator; their use is taken for granted. Among the newcomers in this line is the J. L. Osgood Lubricator Company, Buffalo, N. Y., with an oiler which has a number of new features. Some of these are the entire elimination of the usual bleeder test, absence of needle or throttle valves, the use of very simple pumps and the attachment of the same to the cover, so that the removal of the cover screws and the drive shaft allows of removing the whole lubricator bodily. Another worthy feature is the use of white celluloid discs for the regulating knobs.

THE AUTOMOBILE

MUNSEYITES COMPLETE RELIABILITY

WASHINGTON, D. C., Sept. 29—Back into Washington this afternoon came the survivors of what was known as the "Frank A. Munsey Reliability Contest," these autos having made the journey from the "Capital City" to Boston and return, a distance of 1,282.2 miles, accomplished in seven running days, and mostly in weather that resulted in precarious highways except where the road construction had been of the most up-to-date kind. The route embraced the most important cities of the Atlantic States traversed, night stops including Philadelphia, Boston and New York City.

Of course, it is impossible at this moment to give a list of the winners, for these will not be announced until after Technicists Trego, Overpeck and Cassard complete their minute observations, which are likely to occupy a day or more. It is the intention of the management of the tour, and all contestants have been fully warned of it, to make this examination more than usually thorough.

It was natural that with the event promoted by one particular string of newspapers, it did not receive any vast attention from other sources; hence, the participants found that the Washington *Times*, Boston *Journal*, Baltimore *News* and Philadelphia *Times* were the only papers which gave front-page stories. In consequence, there were disappointments at the comparatively limited amount of publicity forthcoming, which, in one instance, caused a couple of withdrawals. Nevertheless, a commensurate amount of space was utilized in telling the story of the run, and the successful ones will have opportunity of exploiting their prowess.

The decidedly unfavorable weather conditions added most substantially to the difficulties of the task, which duplicated, in some degree, the strenuousness of this year's Glidden tour. The announcement of the complete score and penalizations will be forthcoming at the earliest possible moment.

When the contesting cars in the run checked in at Philadelphia at the close of the sixth day's running, Referee Trego announced that the standing of the cars would not be announced until after the final examination in Washington at the conclusion of the tour. Twenty-one cars still remain in the tour, the withdrawals since the departure from Boston being the two Croxton-Keetons. While it is expected several of the cars will have perfect road scores, the chances are all against any car having a perfect mechanical score when the technical committee finishes with the examination and measurement of the contesting machines. For severe road conditions no tours in the famous Glidden tour to Pittsburg compares with the Munsey contest. Rain has been the portion of the Munseyites for nearly a week and they were heartily glad to see the sun shine just after crossing the Staten Island ferry in the morning. This put new life into the tourists and they thoroughly enjoyed the run from New York to Philadelphia by way of Atlantic City.

Connecticut Supplied Some Excellent Highway, Near Birdgeport

After two ferry trips and a short jaunt across Staten Island, the tourists proceeded along the Eastern coast of New Jersey, nearly due south over the excellent though low roads of that State. Passing through the Amboys, many of the smaller but important towns were touched, including Lakewood, Tom's River, the county seat of Ocean county, Barnegat, Egg Harbor City, and so on into Atlantic City. Spending but a few hours in Philadelphia's playground, they turned northwest, and started out for the city itself, 57.4 miles away.

SECOND DAY: PHILADELPHIA TO MILFORD

132.6 MILES

MILFORD, PA., Sept. 22—To-day's run was a veritable "joy-ride." Although the sun shone but a few minutes throughout the day and rain constantly threatened, it was not until all hands were within a few miles of this place that oilskins and rubber coats had to be resorted to. The roads—mile after mile of them oiled—were in ideal shape for fast work, but the committee, for some unknown reason, reduced the limit of the big cars to 18 miles an hour and the others accordingly. The result was that at each control there were long waits. Indeed, so heavily did time hang on its hands that the committee ordered an unofficial half-hour stop at Rittersville, where the Lehigh Valley Motor Club surprised the tourists with lunch and beverages.

At Allentown the first break was made in the line-up by the enforced

Referee F. H. Trego

withdrawal of Selden No. 34, by Owner-Driver Patterson, due to the receipt of a telegram requiring his immediate presence in Philadelphia to look after the details of a lawsuit. In the same city a serious accident occurred to Mrs. Hall, wife of the owner of Columbia No. 15. At a slippery right-angled turn at the foot of a hilly street the car skidded into the curb, dishing a wheel, splitting the car body and throwing Mrs. Hall against Observer G. B. Emerson, breaking her collar-bone. The observer was uninjured and came on to Milford in Croxton-Keeton No. 16, having been informed by Owner Hall that the car was withdrawn. Later the latter changed his mind, and, securing a new wheel, ordered Driver Jacobi to proceed, he staying in Allentown with Mrs. Hall. Jacobi was in a quandary as to passengers, but finally lived up to the rules by paying $5 apiece to two outsiders to occupy the tonneau as far as Milford. He arrived here about midnight at a cost of 354 demerits for lateness and 28.7 for work and cost of material.

Corbin No. 18 met with a peculiar mishap. In some manner a small nut dropped into the differential and stripped the gears. Driver Goss managed to reach Allentown, where he wired to New York for new parts. By fast work he managed to complete repairs at 9.30 and pushed on to this place, arriving shortly after 1 o'clock in the morning.

Driver Behrens, of Maryland No. 11, saved a penalty to-day by quick thinking. On a long rise near the Delaware Water Gap his motor began to slow down owing to a short fuel supply. Quickly reversing his car to expedite the flow of gasoline from his nearly depleted tank, he backed slowly up the hill and managed to keep his engine going till a good Samaritan among the contestants let him have a spare five-gallon can he was carrying for emergencies.

The excellent roads and the easy schedule were responsible for the comparatively few penalties inflicted on the second day. Two cars, however, were eliminated from the clean-score list—Pullman No. 37 in the third division, which was punished .8 for work on axle bearing and differential, 2.0 for work on clutch, .1 for examining plug, .6 for work on same and .1 for cost, a total of 3.6; and the American Simplex in the fifth division, which suffered to the extent of .1 for starting motor. No. 7 Ford added .3 to its first day's total—.2 for starting motor and .1 for adjusting carbureter. Washington No. 5 received an additional .1 for tightening fender bolt. "Billy" Knipper's Chalmers-Detroit No. 1 added 1.5 to its first day's total—1.2 for work on a broken fender, .1 for cost of material, .1 for oiling and .1 for starting motor, the latter due to a too-quick shut-down to avoid a collision with the chairman's car, which he had been following like a shadow all day. The heaviest sufferer of the day was Croxton-Keeton No. 16, whose 4.3 demerits were made up of 4.1 for work on universal joint and .2 for cost of material (the latter a double penalty for not carrying same in the car). In addition to the 1,000 points penalty for withdrawal, Selden No. 34 had a few tenths handed to it for work and cost of material, but just what they were was not announced.

Committeeman Overpeck

THIRD DAY: MILFORD TO ALBANY

158.5 MILES

ALBANY, N. Y., Sept. 23—The close of the third day of the run saw but an even half-dozen cars figuring in the clean-score class. Maryland No. 11 was ditched near New Baltimore as a result of a locked steering gear. The latter had been strained at Kingston, when Driver Behrens sent his car up a high curb to avoid an accident. While nearing New Baltimore a left turn of the hairpin variety was encountered and when the gear locked

Lining Up on Jerome Avenue, in New York City, for the Procession to the Waldorf-Astoria

Massachusetts State Highway Encountered Before It Had Received the Finishing Touches of the Roadsmaker

the Maryland went into the fence, tearing down half a dozen panels and coming up standing sidewise on the steep incline. It was remarkable that no one was hurt. The angle at which the car stood when finally stopped was so acute that the exertion of but a few pounds would have sent it bottom-side up. Jesse L. Cassard, Jr., of Baltimore, a member of the technical committee, who was a passenger on the car, was projected 20 feet down the hill, but came off unscathed, apart from the loss of nerve natural to such a mishap. He will train it to Boston to-morrow. The car suffered a badly bent axle and additional injury to its steering gear, but it was reported to-night that the crew hoped to get the car out and fixed up in time to get to Boston a day behind the run.

Washington No. 5 was also disabled. The drive shaft kept slipping out at the universal joint until, when Athens was reached, the crew decided to stop at a blacksmith shop and make a part which was necessary to a permanent repair. Observer Howard L. Cole left the car and came on to this place, but it is reported that the Washington will continue as soon as repairs are completed.

Twelve miles out of Newburg Driver McBurney, of Matheson No. 27, was threatened with a shotgun by an irate farmer, some of whose poultry was immolated by an early car. He looked as if he meant business, too, but McBurney, after he got close to him, threw on his high and bounded away, all hands meanwhile ducking to avoid the shot which they thought was surely coming.

The rain, which began yesterday, continued intermittently throughout the day until Catskill was reached, when the tourists ran ahead of the storm, which was apparently headed in the same direction, for in some sections the roads were inordinately dusty. From oilskins and tire chains all the morning to dusters in the afternoon, the transition was so sudden as to excite remark, and the appearance of cars and passengers as a result of the combination was harrowing.

Coming up the Hudson from Newburg, a forage pack train of 73 mules in charge of a squad of United States cavalry was encountered. The mules seemed to object strenuously to the presence of the cars, and several of them gave indication of registering their objections in the manner common to their kind. But the kind-hearted sergeant in charge solved the problem of the passage of the cars past the long line of animated stubbornness by detailing one of his men to convoy each car to the front.

"Billy" Knipper, driver of Chalmers-Detroit No. 1, in which THE AUTOMOBILE man had a seat, showed the effects of his recent Southwestern pathfinding experiences by the clever manner in which he avoided a mix-up with a female bovine with a crumpled horn. As the blue car came along, Bossy, which was one of a "flock," lowered her head and made a rush. "Billy" saw a bull-fight down in Mexico, and, waiting till the proper moment, dodged his car around the astonished cow in a manner which would have made an expert matador turn green with envy. At that, the crumpled horn came near hooking the rear wheel.

Referee Trego received last night from Charles J. Glidden a telegram congratulating him and the other officials on the success of the run up to date and expressing his regrets at his inability to form one of the party.

The only foreign car in the run, the Renault "20-30," is giving an excellent account of itself. Driver Leo Shaab lands his car among the leaders at every control, and withal drives so carefully that he is among the very, very few who have not as yet been compelled to get busy on tires.

The little 18-20 Autocar truck, as usual, was on hand early this evening with the extra baggage. Driver Thacher reports an utter absence of trouble up to date.

To-day, for the first, time began to figure prominently in the penalizations. As a starter, the committee figured up a total of 382.7 for the Columbia No. 15, which accumulated that high total as a result of its Allentown accident. Of this amount 354 points were for late arrival, the remainder being made up of 25.7 for work and 3.0 for cost of material. The little Hupmobile No. 29 added .4 for work in adjusting carbureter. Reo No. 26 left the clean-score class by reason of 4 points penalty for as many minutes' lateness in reporting at Albany.

Pullman No. 12, in addition to 30 points for late arrival at Albany, was penalized 36.7 for work on fanshaft and .6 for cost of material—a total of 67.3 for the day. Crawford No. 24 was another to leave the clean-score class on the third day, its observer's card showing work on lamp bracket to the extent of .3 and .1 for starting motor. Washington No. 31 accumulated 31.2 demerits during the day—31 for late arrival here and .2 for starting motor. The 2.2 collected by its sister, Washington No. 32, were 2 for late arrival here, .1 for starting motor and .1 for work on springs.

Croxton-Keeton No. 16 had spark-plug trouble during the day, which cost it 1.1 points penalty—.9 for work and .2 for cost of material. Matheson No. 27 also gathered 1.1 demerits for the day by reason of work on mud-pan to the extent of .8; labor

An Incident Near Baltimore, Where One Car Demolished a Bit of Fence

on fender, .2, and cost, .1. Pullman No. 37, which failed to report here this evening, was withdrawn, the car being shipped to New York from Saugerties by boat. It is understood that the cause of the withdrawal was trouble with the rear axle.

FOURTH DAY: ALBANY TO BOSTON

194.2 MILES

BOSTON, Sept. 26—The fourth leg of the run was a veritable mud plug. Eleven hours of rain, which increased in severity the nearer the Hub was approached, made the going anything but comfortable to the tourists, although, fortunately, the roads were excellent, being especially good between Springfield and Boston. None of the six clean-score cars suffered penalization, and despite the downpour the drivers were so careful that no less than 17 of the 23 cars still in the run scored clean for the most hazardous day thus far.

Jacob's Ladder, that succession of bumps over the backbone of the Berkshires, came near proving the undoing of several of the clean-scorers. During a furious downpour they were blocked by one of the Washingtons, which slipped into the ditch and partly blocked the road. At one time there were a dozen cars endeavoring either to slip around the obstruction or quietly clinging to their places on the slippery mountain, confident that in the event of lateness at controls a wise referee would absolve them from punishment. Several of them stalled motors endeavoring to get around, the ditch being of such depth that it required the services of man-power to get the wheels on comparatively solid ground again. Even these were let off scatheless.

So heavy was the rain and so muddy the clothes and hands of drivers, observers and passengers, who all helped the ditched car on to terra firma, that the observers' cards were in many instances undecipherable. Referee Trego and his assistants had their own troubles calculating the penalties, but by questioning the observers they managed to get the facts.

Washington No. 31 rolled up 358.1 demerits for the day, due to a skid into a telegraph pole at a right-angled turn in Westfield, outside of Worcester. The resultant bent axle had to be taken out, put in the fire at a nearby blacksmith shop and straightened before the car could proceed.

Unlucky Maryland No. 11 added 118.6 to its already large total, due to a bent axle following a skid. The car did not get away from Coxsackie, where it was ditched, until 4 o'clock Saturday afternoon, and Driver Behrens, who had had no sleep for 36 hours, kept right on, reporting at Albany at 5.19 and at Boston at 6.15 A. M. Sunday, after an all-night drive over the length of Massachusetts.

Columbia No. 15 suffered from a broken connecting rod, which delayed the car over eight hours and rolled up a penalty of 567.3 points for the day. The E-M-F pilot car lost a wheel and was held up for many hours, throwing all the confetti work on its confrere, the Midland. The irrepressible and ubiquitous Spooner, on whom all the photographic work has fallen since the Lazarnick representative abandoned the run at Philadelphia, was compelled to stop work absolutely, owing to the weather, and Joe Matson, relieved of the necessity of stopping frequently, drove "Mike the Tramp" through from Albany to Boston in 9 hours 40 minutes.

Various contestants reported four different runaways, but no fatalities. One farmer, whose motor shied at Chalmers No. 1, is minus a wagon and 80 quarts of milk. Although his horse disappeared rapidly over the landscape, he was fair enough to acknowledge to the tourists that "it hain't your fault; that 'ere skittish mare hain't no good nohow."

When the tourists arrived at Boston, Mr. Glidden took the officials in tow and dined them at the Somerset, and later at the impromptu smoker held by the Bay State Automobile Club for the entertainment of the visitors spoke entertainingly of his ballooning experiences. Saturday afternoon the Munsey people acted as hosts at a shore dinner at the Relay House at Bass Point, Nahant. On the way a stop was made at Fort Warren, where the tourists were greatly entertained by the explanations of coast defense tactics as very lucidly explained by two very pleasant officers. On the trip from the fort to Bass Point the small steamer which was chartered for the trip was shaken up so severely that not a few of the tourists began to feel qualms before the tiny craft pulled into the wharf, and as a result about a fourth of the party returned to the Hub by trolley, afraid lest they might lose the good dinner their hosts had provided.

Despite the storm, penalties were not so numerous as on any of the preceding days. In the third division Washington No. 5 was given .6 demerits—.5 for work on the propeller shaft and .1 for starting motor. The 358.1 rolled up by its sister car, No. 31, was mostly for the delay occasioned by a bent axle—340 points—the remainder being made up of 18 points for work and .1 for starting motor. Of the Maryland's total of 118.6, 1 was due to lateness in checking in, 117.5 for work on a bent axle and .1 for starting motor. Columbia No. 15, which now has nearly a thousand demerits chalked up against it, accumulated over half of that large total on the fourth day's run, the 567.3 bad marks being made up of 493 points for lateness at the Boston checking station and 74.3 for work on a broken connecting rod. Matheson's 1.3 was for work on one of the springs, the cost penalty to be added when the run reaches Washington, the price catalogue having been left at the capital.

FIFTH DAY: WILLIMANTIC, CT., TO NEW YORK

NEW YORK, Sept. 27—Twenty-one of the 23 cars remaining in the contest reported here before dark this evening. When the run pulled up at the Waldorf-Astoria the participants were met with an invitation from Frank Munsey to a banquet in the Astor room at 7 o'clock sharp. As a result there were no penalties posted for the day, the officials declaring after the symposium that they were too exhausted to work on mere details. The banquet was one of the pleasantest entertainment features of the tour. After coffee and cigars, Mr. Munsey opened the speechmaking by disclaiming all credit for promoting what has proved such a successful tour, giving the honors to his lieutenants in the various cities in which the Munsey papers are located. He appointed Robert H. Davis toastmaster, the latter introducing the various speakers in a series of sallies replete with a dry humor which was particularly taking. Chairman Trego told the many non-participants present just what a reliability contest means and how it is conducted. Frank Presbrey, who was introduced as the author of the famous Kansas big corn story, was introduced as "the greatest liar of the century," and proceeded to make good, finishing up by congratulating the promoters on evolving a scheme which gathered together such a fine-looking body of men.

At 8.05 o'clock the Philadelphia *Evening Times*, containing an account of the day's run, was distributed to the banqueters, which brought forth much sarcasm from Toastmaster Davis anent Quaker City slowness. Editor Taft, of the Philadelphia paper, successfully defended his town against the aspersions of the discomfited Gothamite and publicly introduced Drivers Aiken, Matson and Knipper to Mr. Munsey.

E. D. Shaw, editor of the Washington *Times*, called attention to the fact that in 1893 Mr. Munsey had written of the future of the automobile in a vein which, in the light of present-day conditions, stamped him as a prophet. Arthur Newmyer, also of the Washington *Times*, and chief checker of the run, told of the numerous entertainments furnished the tourists en route. Colonel McLane, of Canada, a personal friend of Mr. Munsey, told how the latter "got his nerve" by fast driving during a recent tour in France.

Mr. Munsey wanted it particularly understood that the idea in promoting the present tour was not so much for its advertising value as for its virtue as a journalistic "stunt." He promised a repetition of the run next year and finished by complimenting the participants on their endurance and good humor in the face of elemental conditions that were little short of disheartening.

TABLE OF PENALTIES

No.	Car	1st Day	2d Day	3d Day	4th Day	5th Day	6th Day	7th Day
	First Division							
7	Ford	1.7	.3	0	0	—	—	—
29	Hupmobile	.2	0	.4	0	—	—	—
	Second Division							
9	Maxwell	0	0	0	0	—	—	—
26	Reo	0	0	4.	0	—	—	—
	Third Division							
5	Washington	.2	.1	*	.6	—	—	—
12	Pullman	0	0	67.3	0	—	—	—
24	Crawford	0	0	.4	0	—	—	—
31	Washington	.1	.1	31.2	358.1	—	—	—
32	Washington	0	0	2.2	*	—	—	—
37	Pullman	0	5.4	1000.	Withdrawn			
	Fourth Division							
1	Chalmers-Detroit	.2	1.5	0	0	—	—	—
11	Maryland	0	0	*	118.6	—	—	—
13	Pullman	0	0	0	0	—	—	—
14	Spoerer	.3	0	0	0	—	—	—
15	Columbia	.1	382.7	0	567.3	—	—	—
16	Croxton-Keeton	.5	4.3	1.1	0	—	—	—
18	Corbin	0	*	0	0	—	—	—
20	Winton Six	4.1	0	0	0	—	—	—
30	Marmon	0	0	0	0	—	—	—
34	Selden	.2	1000.	Withdrawn				
36	Elmore	0	0	0	0	—	—	—
	Fifth Division							
17	Croxton-Keeton	0	0	0	0	—	—	—
21	American Simplex	0	.1	0	0	—	—	—
	Sixth Division							
27	Matheson	.4	0	1.1	1.3	—	—	—
28	Renault	0	0	0	0	—	—	—

*Not yet computed.

Even in Massachusetts, this Being Near Warren, the Contestants Had Rough Going

The "S" Turn Near Laurel, Long Island, that Presented Some Difficulties Even to Experienced Drivers.

CHEVROLET DRIVES 70 M. P. H. IN LONG ISLAND DERBY

RIVERHEAD, L. I., Sept. 29—The Long Island Stock Chassis Derby is now history, marred by one fatality and noted for its exceptional demonstration of speed. Louis Chevrolet in his victory in class 4 with the 30-horsepower Buick, traveled at a speed which was close to 70 miles per hour, this being the greatest sustained flight ever accomplished in an American road race.

The event for big cars was taken by Ralph DePalma, a driver of established reputation, whose Fiat outlasted its opponent and covered the 227.5 miles at a pace of 63.35 miles per hour. It was during this session of the race that Herb Lytle, a driver of long experience besprinkled with numerous close calls, skidded and overturned at a bend in the road, seriously injuring himself, while his mechanic died as a result of the unfortunate affair, very shortly after the accident happened.

Unquestioned interest existed in class 5—$851 to $1,250—which resulted in a double victory for the new Maxwell Q. The winning car went the 91 miles in 53.9 M.P.H., with the second Maxwell not far behind.

Despite the ideal fall weather, the attendance was small, though there was splendid racing. Fifty per cent. of the profit was to have been divided among the winning drivers, who were represented by George Robertson. Unfortunately, there will be a deficit instead of a profit, and, of course, all that the drivers will get will be the cups won in their respective classes.

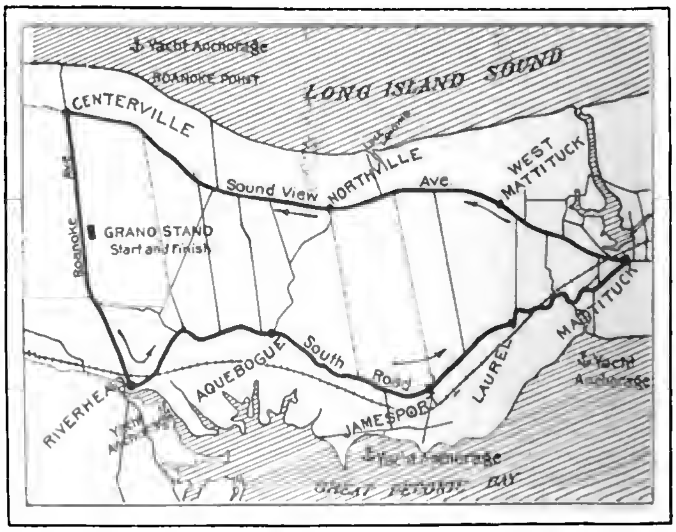
The timing was taken care of by A. P. Warner's time-recording instrument, presided over by the inventor himself, assisted by the members of the New York Timers' Club.

Suffolk County, which adjoins Nassau County, scene of the Vanderbilt Cup races, wanted an automobile contest, and so indefatigable Senator Morgan was prevailed upon to assume the burden of its conduct. A 22¾-mile triangular course was laid out with two 9-mile stretches, and the grand stand located a couple of miles from Riverhead, which had been the storm center of the miniature Vanderbilt. Proceeding thence easterly along the shore of Great Peconic Bay to Mattituck, a sharp turn and a westerly road led along the shore of Long Island Sound to Centerville. From there a three-mile straightaway led past the grand stand, located midway between Riverhead and Centerville.

Five classes, arranged according to price and not piston displacement, were provided for, the sum total of starters being 15, divided as follows:

	Car	Driver
$4,001 and over......	Rainier	Disbrow
	Mercedes	Armstrong
	Fiat	DePalma
$3,001 to $4,000.......	Rainier	Lund
	American	Hughes
$2,001 to $3,000.......	Palmer & Singer.......	Lescault
$1,251 to $2,000.......	Sharp Arrow...........	Sharp
	Chalmers-Detroit	Droge
	Buick	Chevrolet
	Buick	Burman
$851 to $1,250.......	Maxwell	See
	Buick	Finch
	Maxwell	Doorley
	Maxwell	Costello
	Overland	Riess

It was a scantily covered stand that saw the start at 9 o'clock, though the parking place contained several hundred cars. Around



Map of Long Island Derby Course—22.75 Miles the course the spectators numbered thousands, to watch the passing of the speed craft without expense.

Lund's Rainier was protested in the matter of price in Class 2, and while the case will go to the A.A.A. contest board, the car was transferred to Class 1, and its time taken for both 10 and 8 laps.

It was anticipated that the big Mercedes, once the property of W. K. Vanderbilt, Jr., and now owned by candy-maker Loft, would supply the most plentiful speed, which it did with an opening round in 19:01, a race approaching 65 miles per hour. De Palma's Fiat did the circuit in 22:12. Anxiously Lytle was waited for, but came not, and the meager report finally arrived that the Apperson had met with disaster and turned over near Mattituck. Disheartening news ultimately came that both Lytle and Bates were badly injured, the latter fatally. A skid from the partially-crowned road at a bend while traveling at top speed, was the only explanation of the accident which included colliding with a telephone pole. Physicians were quickly summoned but Bates was beyond aid, though an examination of Lytle resulted in the report that his recovery was almost certain.

During its second round the big Mercedes had an innings of tire troubles which made frequent replacement necessary and gave the lead temporarily to Disbrow's Rainier. In the third lap, the German-built car came back with 18:49, which made a lead of over a minute on De Palma's Fiat. In the next whirl, the Italian closed up some of the gap, the two being only 23 seconds apart. In the fifth lap the Mercedes had engine difficulty which caused the passing by the Fiat.

News of the Apperson catastrophe reached the grand stand just as the ailing Mercedes drew alongside its pit. Mrs. George W. Loft had been much upset by the information, and making her way to the car directed that it be withdrawn at once. Barring unusual trouble, this left the Fiat apparently a sure-enough winner, for the others were a long ways behind.

While the big cars were going the greatest distance, the smaller classes were having some interesting fights. In Class 4 the Buick of Chevrolet evolved as the startling winner at a pace which averaged 70 miles per hour. Burman, with another Buick, figured as the runner-up, though only 10 seconds behind.

In Class 2, Lescault's Palmer & Singer proved a winner practically unopposed, its opponent, the American driven by Hughes failing to make much of a fight, owing to cooling difficulties.

The only contestant in Class 3, W. H. Sharp's Arrow, driven by its maker, supplied an average of 63.6 miles per hour, which was an exceptionally good performance.

In Class 5, the littlest fellows of the race, the two Maxwells. captured the first two places, Arthur See's Model Q going the route in 53.9 miles per hour. J. Finch's Buick ran third.

SUMMARY OF RESULTS IN LONG ISLAND STOCK CHASSIS DERBY, RIVERHEAD, L. I., SEPT 29, 1909

No.	Car	H.P.	Driver	1	2	3	4	5	6	7	8	9	Finish
	CLASS 1—$4,001 AND OVER—10 LAPS—227.5 MILES												
3	**Fiat**	45	Ralph De Palma	22:12	46:00	67:12	89:26	110:49	132:39	153:35	176:10	197:16	218:35.6 avge.. 62.35 m.p.h.
8	**Rainier**	45	C. H. Lund	31:06	55:45	77:45	99:48	133:26	156:06	179:16	206:50	Still running.	
1	**Rainler**	50	L. A. Disbrow	22:42	44:35	66:35	108:26	132:24	158:33	191:17	Still running.		
2	**Mercedes**	90	G. M. Armstrong	19:01	45:48	64:37	89:03	128:28	Withdrawn.				
4	**Apperson**	50	H. H. Lytle	Met with accident.									
	CLASS 2—$3,001 TO $4,000—8 LAPS—182 MILES												
7	**Palmer & Singer**	6-60	F. Lescault	21:21	41:26	63:42	85:09	106:36	133:18	157:03	179:04	Avge., 61 m.p.h.	
5	**American**	50	H. Hughes	33:27	62:41	90:55	138:24	182:41	215:14	Still running.			
	CLASS 3—$2,001 TO $3,000—6 LAPS—136.5 MILES												
9	**Sharp Arrow**	40	W. H. Sharp	21:24	42:33	63:29	84:29	105:36	129:02	Average, 63.6 m.p.h.			
	CLASS 4—$1,251 TO $2,000—6 LAPS—113.75 MILES												
11	**Buick**	30	Louis Chevrolet	19:43	39:46	60:55	78:35	97:36	Average, 70 m.p.h.				
12	**Bulck**	30	Robert Burman	19:56	39:49	59:59	83:32	106:02	Average, 64.14 m.p.h.				
10	**Chalmers-Detroit**	30	H. F. Droge	30:03	60:01	89:41	119:18						
	CLASS 5—$851 TO $1,250—4 LAPS—91 MILES												
15	**Maxwell**	22	Arthur See	25:49	51:12	76:15	101:22	Average, 53.9 m.p.h.					
18	**Maxwell**	22	Thomas Costello	26:23	52:06	78:07	104:13	Average, 52.38 m.p.h.					
16	**Bulck**	18	J. Finch	27:36	54:31	81:27	135:23	Average, 40.32 m.p.h.					
17	**Maxwell**	22	M. Doorley	27:10	53:25	Dropped out.							
19	**Overland**	28	E. L. Riess	31:52	133:59	Withdrawn.							

SOME NEW BOOKS FOR AUTOMOBILISTS

"Italian Highways and Byways from a Motor Car"—This pleasantly rambling narrative of a rambling automobile tour through Italy comes from the pen of Francis Miltoun, whose work may often be found in these pages. Although the tour and its itinerary form the framework of the story, let it not be imagined that the author has bound himself to a dry recital of incidents and route book details. Far from it; he philosophizes at length, and most enjoyably, on the inner nature of the Italian, his liking for red wine, macaroni and *ravioli,* his roads, inns, and bath tubs. Of the conventional traveler's diary, nothing at all; Mr. Miltoun would far rather discover one new castle than "do" a hundred listed in Baedecker, and he pokes mild fun at the hurried and "conducted" tourist, be he English, German, or American. Also he delights in unearthing bits of medieval history, tales of a robber baron or a stolen bride, which give a romantic charm to each new-found castle.

The book itself is worthy of its contents; strikingly printed on rough-edged, cream-tinted paper, it is illustrated with a multitude of drawings and water colors by Blanche McManus. There are no less than eight full-page colored plates, and any number of full pages in half-tone, besides maps and plans. L. C. Page & Co., of Boston, the publishers, have good reason to be proud of their part of the work.

"Heures du Grand Nord"—The name of Georges Dupuy is familiar to every reader of THE AUTOMOBILE, and the word that he has written a book on his experiences in the United States makes one look forward to more of his delightfully original comment on us and our ways, that happy mingling of good-natured criticism and whole-hearted approbation, which really enables us "to see ourselves as others see us." Unlike the average European who spends a week in this country, and then, returning home, writes a volume of "impressions" or "thoughts" ridiculous in their immaturity and ignorance, M. Dupuy is thoroughly familiar with his subject. He has spent much time among us, is acquainted with our manners and customs, and. if not always approving, at least is sympathetic.

The subject-matter of the volume, to be more explicit, is taken from M. Dupuy's experiences in Canada and Alaska, especially in the gold mining regions. His little stories are related with a naiveté of style, a simple and unaffected realism, which would do credit to many a more famous author. Incidentally, M. Dupuy takes a fling at our roads. One of them he mistook for a drainage canal. The volume contains 280 pages of witty and entertaining anecdote, illustrated moreover with two full-page drawings by Blanche McManus. The publisher is the Société d'Imprimerie, 71, rue de Rennes, Paris.

Some Forest Giants That Are Kin to the California Redwoods

TO the automobilist, the Island of Vancouver offers the most fascinating of all countries for his favorite recreation. There are three basic necessities in automobiling, without which the sport cannot be enjoyed to its fullest. These may be set down in order of importance as follows: good roads, good weather, and beautiful scenery. The question of accommodations is also one of importance, but considering the ability of the average motor car in the way of carrying capacity, it is not of such vital importance as the first three named.

Vancouver Island has the best roads on the American continent. They may possibly be surpassed in mere highway excellence, as roadbeds, in the Old World, but they more than make up for any possible lacking in this respect by the magnificence, variety, and beauty of the scenery along and around them. They are natural boulevards, and the equability of the climate renders the keeping of them in perfect repair a matter of comparatively little labor. New roads are being opened up in a number of different directions, penetrating hitherto untouched cloistered spaces of exquisite loveliness, and it is nothing more than truth to say, that Vancouver Island has in its various highways and grandeur of scenery, the very Mecca of motor car enthusiasts. The roads through the island, starting from Victoria, are almost numberless in extent and variety. The Ocean Beach drive, taking the sightseer to the docks along Dallas road, through the famous Beacon Hill park, and along the beach to Oak bay, and from there back to Victoria by way of Oak bay and Rockland avenue, is a run unequaled in North America. A view of the Olympic range across the Straits of Juan de Fuca, as seen from the crest of Beacon Hill park, is one that, once seen, will never be forgotten. The blue vastness of the straits, dotted here and there by sails, or streaked with the smoke from passing smokestacks, backed by the towering steeps of snow-clad mountains, is a picture of which there is no double in the world. The Orchard drive is another incomparably beautiful drive, taking the traveler through a section of country that is fast being turned into splendid fruit farms. Here and there, the sea and glimpses of mountains add variety to the journey, while the golden blaze of Scotch broom, garlanding the hills, seem like so many wreathes of sunshine, clustering thickly in their yellow splendor.

To Douglas mountain and Cordova bay is another splendid drive, as is also the famous run to Esquimalt, where the navy dry docks are located, and close by the fortifications of Fort Macauley. To North Saanich, Saanichton, and Sidney, is another splendid drive, taking the visitor through a magnificent stretch of agricultural country, with the sea close at hand. To Albert Head by way of the Gorge road, Colwood, Happy Valley, and Metchosin, is another favorite run from Victoria, and here fruit farms and forests, ocean and valley, make a panorama of never-ending beauty. To Goldstream is another magnificent drive. Shawnigan lake, Duncan, Cowichan lake and bay, Maple bay, and other places can be reached on perfect automobile roads, with many excellent hotels and stopping places all along the route. The city of Nanaimo, with its herring and salmon fisheries, its coal and mining industries, is another point of interest very much frequented by the automobiling travelers, and all along and through these latter points, fishing, shooting and sea bathing, can be enjoyed. For a more extended trip, the run to Alberni, by way of Nanaimo, will take the automobile traveler into a country whose beauties far surpass in reality the world famous Alpine scenery of Switzerland. Sproat Lake has been termed the "Lake Lucerne of Vancouver Island," being similar to that lake in shape, but far outstripping it in natural beauty. Grand Central lake, also in the neighborhood of Alberni, is another magnificent sheet of water, and both these lakes are in the close vicinity of some of the most wonderful timber in the world. All through the Alberni district the fishing is superb, and the roads are the finest.

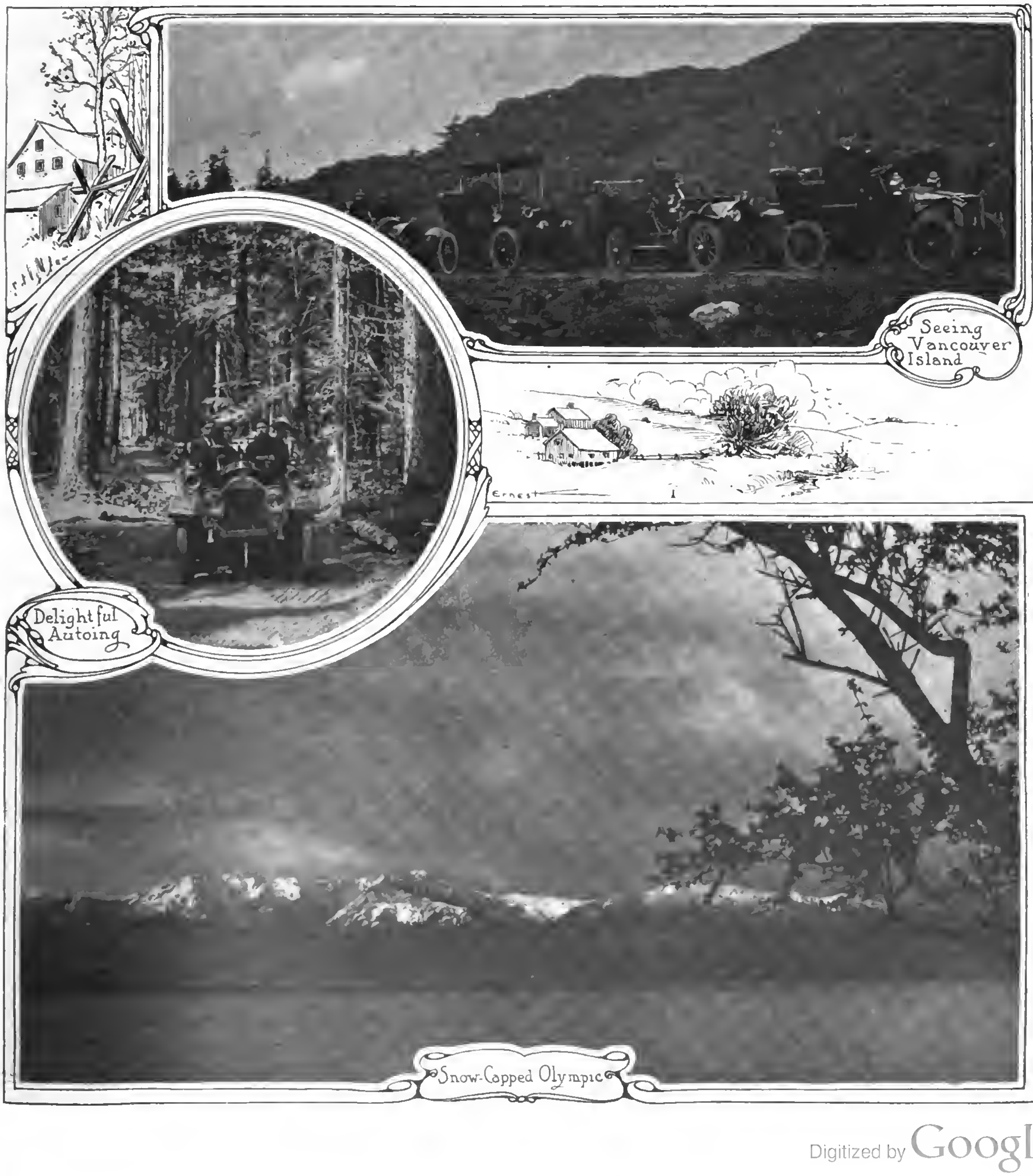
Weather and Scenery All That Can Be Desired

One of the particularly attractive features to automobiling in Vancouver Island is the serenity of the weather. From June 1 to October, the traveler can be almost assured of clear skies and sunshine, while at the same time the nights are cool and pleasant. All through these different districts, also, the traveler will come across the Indian reservations, containing the remainder of the tribes who once dominated the island, and the picturesqueness of their surroundings, and the interest of their condition, now almost semi-civilized, make up one of the unique features of a tour. To attempt to describe the scenic grandeur of Vancouver Island, would require the brush of a Doré, and the pen of a Shakespeare. No possible combination of modern talents, and even genius, can give it its dues. A constant change from seashore to forest, from mountain lake to rushing river, from sparkling streams to deepest depths of woodland silences, from stony wastes to flower crowned summits, all make a kaleidoscopic splendor, which must be seen to be even faintly appreciated. The shining colors of the cock pheasant may be seen strutting proudly through some of the lowland meadows, while the grey reticence of a grouse's wings occasionally flash through the road-side spaces in the timber recesses. Deer crash through the fir and cedar underbrush, while streams and lakes are alive with leaping trout.

The traveler coming from the United States can bring his own car across, provided it has been used by him in the States, without duty, and he will find himself most richly repaid by a trip around and through the island. The scenery of Vancouver Island, in its sublimity and endless surprises, cannot be equalled, much less excelled, anywhere. It may be true that some particular points in Europe may hold more of historic interest, but for nature undefiled, in its sternest and in its most alluring moods, there is nothing comparable from a scenic standpoint to the wonders found here. The traveler-autoist will be able to purchase supplies and all necessary conveniences for a trip, whether long or short, in the various towns and districts of the island, and he will find good accommodations at very reasonable prices, wherever he chooses to travel. There are some portions of the island, of course, where it is absolutely impossible to penetrate with an automobile. Impossible, indeed, to penetrate save on foot, and there are portions of the island now, where neither the mocassined foot of the Indian, nor the hobnailed heel of the trapper or prospector, has ever been set.

It is this very wildness, this essence of the primitive, this pristine glory, which even yet halos those portions of the country accessible to an automobile, which constitute one of the chief charms of a trip through the island. Here may be seen deep fiords, through which the early voyagers sailed. Here still may be seen the carved prows of aboriginal canoes, cutting the water to the strokes of the Indian's paddle. Here the deer and bear roam, the wolf and panther couch and forage, and here the roar of wild fowl wings makes thunder in the Spring dawns and sunsets. This is indeed a land to be visited of all men, by those who can afford the time and expense of an auto trip. The roads, the weather, the accommodations, are all that could be desired. The scenery, something practically indescribable in its extent, variety, and beauty. It is the automobile enthusiasts' greatest opportunity; the threshold of the Pacific, the last and greatest West that has unfolded itself to the world.

With the number of people attracted to the Alaska-Yukon-Pacific exposition, abbreviated A-Y-P, at Seattle, and many of them



Seeing Vancouver Island

Delightful Autoing

Snow-Capped Olympic

automobilists, who have taken their cars along, this description of the natural beauties and beautiful drives on Vancouver Island will come with peculiar appropriateness. To get to the Island from Seattle is not a very long ride on the boats, and even to one disliking the water trip, the 85-mile ride on Elliott Bay and Admiralty Inlet, with the views of the Northwest corner of our great and glorious country, is well worth while.

To make the trip, there is a sail of ten miles on the bay before the Inlet is reached, after which the remaining 75 miles is in a course due northwest to Victoria. This takes a person past Whidbey's, Smith's, and the San Juan Islands on the right or to the northeast, while of the other side, numerous peninsulas of equal natural grandeur are passed by. These latter include the little known Pöint No Point, Port Madison, Port Ludlow, and others, as well as the better known, Port Townsend.

This trip brings one to Victoria, from where Esquimault, previously mentioned as the terminus of a famous drive, and as the location of the Naval dry docks, is but a short ten miles. For those preferring the water, continuing on to the left, but with the direction changed to due west, brings one through the Straight of Juan De Fuca, ultimately to the ocean. Bearing instead to the right and still northwest, after skirting the San Juan group of islands, brings one through the Straight of Georgia to the same end, the blue waters of the Pacific.

AERO SCHOOL FOR YOUNG GERMANS

Berlin, Sept. 10—Germany's first aeronautic school will come into existence October 1, at Friedrichshafen, the working place of Count Zeppelin. Eight pupils will be accepted for the first year, and must sign for a two-year course. All applicants must be under eighteen years of age.

Close to Nature's Heart

Real Road in Wilds

On way to Nanaimo

St. Louis Secures 1910 Good Roads Convention

CLEVELAND, Sept. 24—Seven cities sought more or less assiduously the distinction of being the gathering place for the "Third Annual Good Roads Convention" to be conducted by the American Automobile Association and essentially aided by the National Grange, the American Roadmakers' Association, and the several organizations of automobile manufacturers.

St. Louis won out, and so in the fall of 1910 the good roads workers will participate in a highways fest which the Mound Cityites assert will establish a standard that will require considerable effort to surpass in future events of like character. An inning of talk by men of experience and some demonstrating of up-to-date methods of construction are considered to be just what are needed to show the Missourians how badly they are in the rearguard of commonwealths. Sam D. Capen, of the Automobile Club of St. Louis, had much to do with the selection of St. Louis, his material including an effective orator in Mr. Cannon, an invitation from the Business Men's League, a letter from Mayor Kriesmann, and a telegram from Governor Hadley. That this formidable array of material was effective is best shown in the final result, St. Louis winning out.

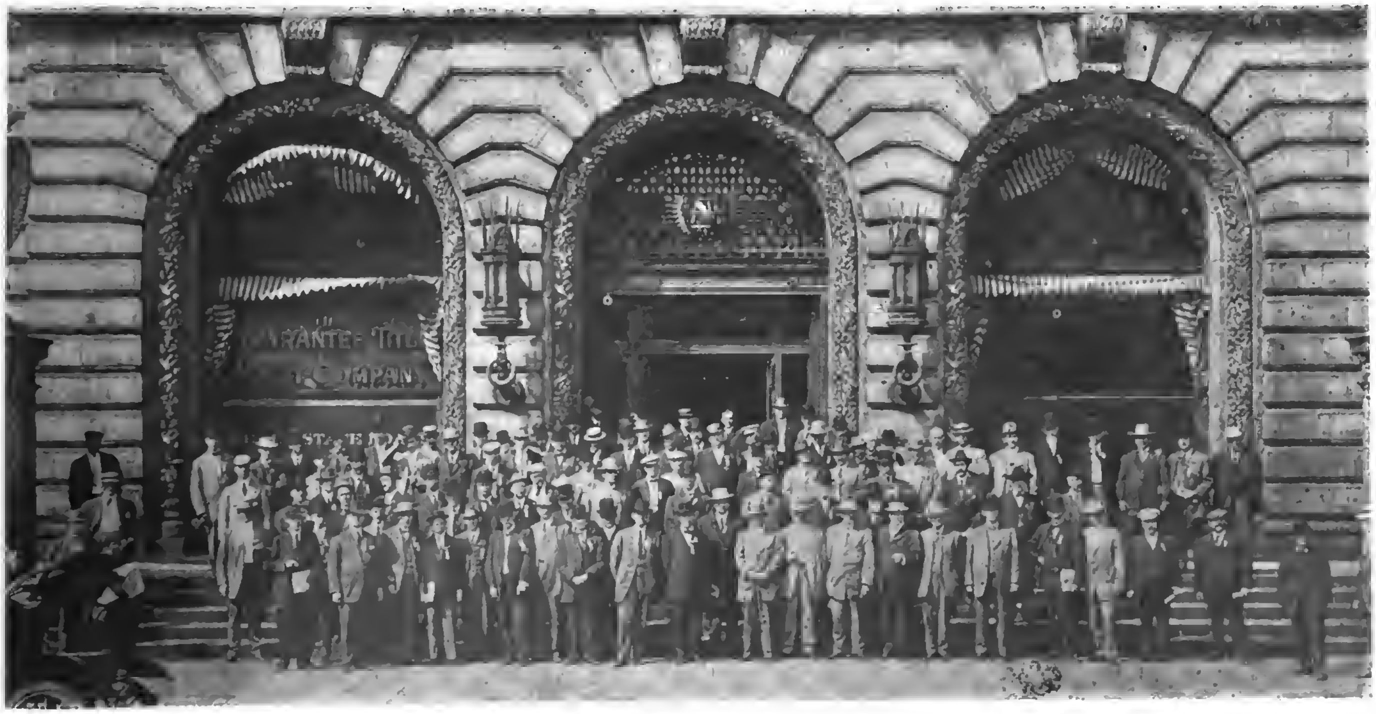
Forty-one States had representatives in the Cleveland convention, which, while less in numbers than the Buffalo gathering, expressed more forcibly the keynote of progress in roads construction. It so happened that Cuyahoga county had in process of building some 165 miles of pavement of a considerable variety, which meant that delegates had an opportunity of learning first-hand of their relative worth and cost. Vitrified brick predominates, even in the country districts, owing, undoubtedly, to the presence of material in plenty for brick-making, in the immediate neighborhood, so as to be quickly available. This point carried weight.

In the report of the committee on resolutions were contained two timely matters, one referring to the need of greater caution in the use of the highways, and the other to the proper marking of all roads and post offices. The following is the resolution which referred to the use of the roads:

RESOLVED, That it is the unanimous sentiment of the representatives of the National Grange, the American Road Makers' Association and the American Automobile Association, in National Convention assembled, that the enormous increase of travel upon the public highways requires that drivers or operators of vehicles shall observe with added care the rights of all users of the roads; and automobilists particularly, because of the greater possible speed of motor cars, are requested to exercise extreme caution and kindly consideration in aiding the general public to become accustomed to this method of transportation. Furthermore, the many law-abiding automobilists are asked to aid in the enforcement of just regulations and assist in the apprehension of the comparatively few offenders who are deaf to persuasion and persistent in disregarding the rights of their fellow occupants of the roads.

The indifferent marking of the roads and the invariable failure to include the name of the town on its post office sign, brought forth the following:

RESOLVED, That this convention calls upon township, county and State officials, where empowered, to see that all roads are properly marked; and, furthermore, where such authority does not exist, to obtain same at the earliest possible moment, in order that this most important work may be carried out with uniformity. Incidental to this plan should come the placing of the name of each village, town or city on its Post Office, for modern travel now embraces a growing use of the public highways, and as a sequence the enlarging of attendant conveniences.



Assembled Group of Delegates to the Second Annual National Good Roads Convention at Cleveland

Secretary James T. Drought and the Wisconsin Delegation

Of course the convention tendered its unanimous thanks to the Cleveland Automobile Club for its aid in making the convention a success, and the plan of Delegate Johnson, of Oklahoma, furthering the good roads cause in that State, was given the stamp of approval. Again was the Currier good roads bill, now pending in Congress and backed by the National Grange, given unqualified endorsement.

In preparation for the 1910 convention, a committee was selected composed of the following or their successors as designated by the organizations which they represent:

Geo. C. Diehl, Buffalo, N. Y., Chairman A. A. A. Good Roads Board.

N. J. Bachelder, Concord, N. H., Master of the National Grange.

Logan Waller Page, Director United States Office of Public Roads, Washington, D. C.

James H. MacDonald, Hartford, Conn., President American Road Makers' Association.

S. D. Waldon, Detroit, Mich., President National Association of Automobile Manufacturers.

Coker F. Clarkson, New York, Association of Licensed Automobile Manufacturers.

Alfred Reeves, New York, General Manager American Motor Car Manufacturers' Association.

Chas. Thaddeus Terry, New York, Chairman Legislative Board, American Automobile Association.

Ralph W. Smith, President Colorado State Automobile Association.

Sam D. Capen, President Automobile Club of St. Louis.

Jas. T. Drought, Milwaukee, Secretary Wisconsin State Auto Association.

Louis R. Speare, Boston, Mass., President American Automobile Association.

Fred'k H. Elliott, New York, Secretary American Automobile Association.

The committee was given power to add to its own members, to the extent of five, the representatives of any other bodies which might be interested in the good roads movement.

The inclement weather of the concluding day made necessary an abandonment of the boat-ride on Lake Erie, and the theatrical entertainment in the evening wound up the convention, though many had been obliged to turn homeward on the afternoon trains. The next time it would appear the best plan to have the entertaining festivities more or less intermingled with the business session.

ROAD SITUATION IN U. S. COMPARED WITH FOREIGN COUNTRIES*

By LOGAN WALLER PAGE, Director U. S. Office of Public Roads.

THE present road situation in the United States may be briefly summed up as follows: In mileage, we have the most tremendous system of roads which any country has ever possessed since the world began. According to a careful road census, the length of all of our roads amounts to 2,155,000 miles. The most liberal estimate of our annual expenditure on these roads, both in money and labor, was a fraction over $79,000,000 in 1904, or about $1.05 per capita. At the same rate, this would be an expenditure of about $90,000,000 a year at the present time. England, with only 150,000 miles of road, spends about $80,000,000 a year, or about fourteen times as much per mile.

According to our road census, we have less than 40,000 miles of stone surfaced road, or about 2 per cent. of the total mileage; we have 108,000 miles of gravel roads or about 5 per cent. of the total mileage. Small as our annual expenditure for roads has been, it has aggregated, during the 30-year period from 1870 to 1900 a total of upwards of $1,800,000. We may, therefore, say that road building in the United States is, considering area, population, and wealth, at the same point at which it stood thirty years ago, and the seventeen hundred and odd million dollars have produced few appreciable results.

When we turn to the subject of road administration in the United States, we find that about half of the states are operating under practically the same road laws as prevailed in England when America was a colony. This system of road administration provides for the payment of road taxes partly in labor, and localizes the work to an extreme degree, by placing in authority the district or township road overseers, or road supervisors, no requirement being made to insure skill or knowledge of road building on the part of these petty officials. With few exceptions no system of accounting is in force so that an intelligent idea may be obtained as to the disposition of the road tax, and no definite lines of authority are established such as would guarantee the wise and equitable conduct of the work.

This is the system which prevailed in all the states until less than twenty years ago. It is, therefore, easily understood why, at the present time, the concrete results in the matter of road building are so few, are confined to a comparatively recent period, and are located in those States which have broken away from the inadequate and ineffective system which I have just described. It can also be understood why, at the present time, road work in those States which have clung to the old methods and the old system is conducted in a wasteful, intermittent and wholly ineffective manner, productive of no good results.

Road administration has either been placed on a sound and practical basis, or steps taken in that direction in about half of the States of the Union, comprising the New England States, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia, Ohio, Michigan, Illinois, Wisconsin, Minnesota, Missouri, Kansas, California and Washington. These States have adopted in principle or practice, or both, the system of centralizing under a State highway department the conduct of all or part of the road work of the State, thereby securing uniformity in methods, economy in administration, and skill in supervision. In some of the State highway departments the work is educational and investigative, with a view to ultimately giving these departments administrative powers. Some of the States, notably Kansas, Missouri and West Virginia, have provided for skilled supervision in the counties, through the appointment of county highway engineers. In most of these States appropriations have been made from the State treasuries, or the aid of the State convict force has been given toward carrying on road work throughout the various counties.

It is not possible in a short paper to enter into a discussion of the various systems of State aid in effect in this country. Suffice it to say that the principle of State aid and supervision constitutes the germ of the only road administration which has proven successful in other countries.

This movement is gaining headway at a very rapid rate, and when we consider that it has been little more than a decade and a half since its inception, the fact that half of the States have adopted it in principle and have actually expended from State treasuries considerably over $56,000,000, we may well feel encouraged for the future of road building in this country.

Effectiveness of French System

The striking feature of the French road system is the skilled supervision in every grade of road work and in every unit of the administrative organization. The basis of the system is the school of roads and bridges, one of the finest technical schools in the world, maintained at the expense of the national government. In this school are trained the highway engineers to whom are entrusted the building and maintenance of the roads of France. The course of study lasts three years and the instruction is free.

At the head of the administrative organization is an Inspector-General of bridges and highways, under whom are chief engineers

*Read at the Second Annual National Good Roads Convention, Cleveland, Sept. 23, 1909.

in charge of the road work of single departments and communes. Single arrondissements are under the direction of ordinary engineers and under engineers, the latter being equivalent in rank to non-commissioned officers in the army. The sub-divisions are under the direction of principal conductors and ordinary conductors. Next in line come the foremen of construction gangs, the clerks employed at headquarters, and finally the cantonniers or patrolmen, each having from four to seven kilometers of highway under his immediate supervision.

This great administrative machine working in complete harmony with definite lines of responsibility clearly established, accomplishes results with the precision and regularity of a great clock ticking off the seconds of time. Probably the most important unit in this great army of workers is the cantonnier or patrolman who has charge of a single section of the road. He keeps the ditches open, carefully fills holes and ruts with broken stone, removes dust and deposits of sand and earth after heavy rains, trims the trees and bushes, and when ordinary work is impossible he breaks stone and transports it to points where it is likely to be needed. He brings all matters requiring attention to the notice of his chief. Each cantonnier carries a little book in which the chief cantonnier notes his instructions and checks up the work accomplished. The conductors go over the line at regular intervals and direct the chief cantonniers, and all reports are transmitted to the central authorities, so that any day or any hour the exact condition of every foot of road throughout France may be ascertained. Every year the conductors prepare estimates of necessary expense for the next year, under three heads, namely, Maintenance, Heavy Repairs and New Work, and the parliamentary appropriations are based upon these careful calculations.

There are in France at the present time 23,656 miles of national routes which cost $303,975,000 to build. There are 316,898 miles of local highways built at a cost of $308,800,000, of which the State furnished $81,060,000 and the interested localities $227,740,000. The roads of France are classified into five classes: National routes, traversing the various departments and connecting important centers of population; department routes connecting the important centers of a single department and bisecting the national routes; highways of grand communication, little less important than the previous class; highways of public interest traversing a single canton and connecting remote villages and groups of houses with the more important roads.

How Work Is Done in England

There are at the present time 149,759 miles of road in England, on which the annual expenditure for the year 1905 to 1906 amounted to $78,059,000. It is, therefore, evident that the annual expenditure per mile of road amounts to about $520. In view of the fact that most of the principal roads of England have already been constructed, this large annual expenditure would appear to be devoted in a large measure to maintenance. It would seem that a system which required an annual outlay of $520 per mile for the entire mileage must be ineffective and costly. The explanation of this is found perhaps in the fact that in England the maintenance of the public highways devolves entirely on local authorities, these numbering about 1,900. Jurisdiction over the roads is vested in, first, the county boroughs; second, the county councils; third, the urban district councils; fourth, the rural district councils. The county boroughs are certain large towns which hold charters from the Crown entitling them to the privilege of self-government. In these the maintenance of the highways devolves entirely upon the borough or town council. In counties the maintenance of highways devolves upon urban councils in the urban districts and rural councils in the rural districts. The only exception to the control of the urban and rural district councils is in the case of main roads which are highways between great towns, and the maintenance of these roads devolves upon the county councils.

Revenues are provided by district taxes except for the main roads, for the maintenance of which the county levy is made. The national government aids in the maintenance of the highways by a contribution proportioned to the sum raised by the imperial taxation levied in the different areas.

As to skilled supervision, it may be said that no qualifications are required by law to be possessed by the men in charge of road building and maintenance, but it is the general practice in the important districts to appoint experienced highway engineers for this work. The English system lacks strong central control in each county, there being four different classes of government units, namely, the county boroughs, the urban districts, the rural districts and rural parishes. While the county council exercises some control over the rural districts and the rural parishes, they exercise none over the other two units.

Germany Has the State Plan

Germany is a federation of states, and it follows that road administration is conducted separately by each State of the Empire. The imperial government exercises very little control over the highways, and does not in any way contribute to the expense of their construction and maintenance. The kingdom of Saxony may be taken as a representative State of the German Empire. In Saxony the highways are divided into state roads, country roads and private ways. The state roads comprise those which have been built by the State and are maintained by the State. The county roads are generally termed "communicating roads," and are built and maintained at the expense of the parishes through whose territory they lead.

Richardson, New York; MacDonald, Connecticut; Bonifield, Ohio

A striking feature of the Saxon road system is the practice of planting fruit trees along the roads, the fruit yielding a considerable revenue. About $40,000 a year is obtained from the fruit grown along State roads, while the amount obtained from the country roads represents a much larger sum.

The State roads are cared for by a commission of engineers. The kingdom is divided into seventeen road districts, in each of which there is a road inspector. Under these inspectors are road masters, who are employed constantly throughout the year. Each road master has about thirty-seven miles of road under his direction and a road force of about fifteen men, each man caring for two and a half miles of road.

In the case of the minor roads the direct responsibility is borne by the authorities of the county. They levy the cost of maintenance and collect the revenues. The communities engage the road employees for the continued care of the highways. The technical supervision, however, is exercised by the road masters of the State force. Strict provisions are made requiring skill and special knowledge before road officials are appointed.

Switzerland Has a Local Supervision

The road system of Switzerland is local in character, the various cantons having jurisdiction over the roads within their respective borders. The roads are classified into State roads, built and maintained at the expense of the respective cantons; community roads, built and maintained by the communities, and side, or auxiliary roads, connecting main lines of State or community roads.

Each canton has at the head of its road system an engineer with capable assistants. In the canton of St. Gall, which may be taken as representative, there are under the control of the engineers five inspectors, or road masters, who are assigned to certain districts in the canton. The engineers and their assistants must have an academic education, and possess a diploma from the Polytechnic Institute, while the road masters are required to have a good technical education.

Summing Up the Various Plans

It is apparent from the foregoing that while the units of administration in European countries range all the way from the localism of England to the highly centralized system of France, through varying degrees, skilled supervision is provided by all of the systems, as well as an ample cash revenue sufficient to enable the engineers to carry out adequately their plans for improvement and maintenance. England is the most striking example of extreme localization, and it is a significant fact that England is also the most striking example of lack of uniformity in road work and of excessive expenditure in proportion to mileage. It is also significant that the most perfect road system, conceded to be such by all authorities on highway construction, is that France admittedly has the most highly centralized of all road systems. France, with a total mileage of about 2 1-3 times that of England, expends about the same amount annually for maintenance. Certainly the inference must be plain that centralizing makes for economy and efficiency in the administration of the public roads.

I desire to comment particularly upon what I consider to be the most important point which should engage the attention of American road builders and legislators at the present time, and that is road maintenance. In the years that have past by far the largest portion of our annual expenditures has been for maintenance of our unimproved roads; a maintenance which may justly be considered a mockery, for it has been a maintenance of the roads in almost their primitive condition. Now that we are actually building roads which compare with the best in Europe, it is of the greatest importance that we make provision for safeguarding and maintaining these roads built at so great an expense.

In a careful study of the highway laws which have been enacted within the past fifteen years, I find almost no provision for the maintenance of the roads, although large sums are authorized for construction. The erroneous impression generally prevails that when a so-called permanent road is constructed it is there for all time, and the expense has practically all been met. I have investigated the cost of maintaining roads in the leading European countries, and the figures may almost be said to be a revelation. In 1901 England and Wales maintained 26,589 miles of main roads at a cost of $370.34 per mile. In 1907 England and Wales maintained 27,566 miles of main roads at a cost of $446.74 per mile, or, in six years, the cost of maintenance has increased $76.10 per mile—an increase of over 20 per cent. In France the increase in cost of maintenance of the national roads has been about 5 per cent in the same period. The cost of maintaining main and suburban roads in England and Wales in 1905 and 1906 was $440.47 per mile. In France the cost of maintaining all roads during 1904 was $243.33 per mile. While these last figures are not strictly comparable, one being for 1904 and the other for 1905, yet the mere fact of one year's difference in time fails to explain the difference of $197.14 per mile in cost of maintenance—the natural inference being in favor of superiority of the France system.

In Germany in 1906 the average cost of road maintenance was $214.13 per mile. In Belgium the annual cost of maintaining the provincial roads is $277 per mile.

These figures express most forcibly two facts: First, that even the best of improved highways are not self-sustaining; second, that the cost of maintenance varies tremendously with the degree of centralization of the administrative organization which has the roads in charge. France with its most highly centralized organization is maintaining her roads at about 54 per cent of what it costs England and Wales with a very local and loosely centralized organization. Furthermore, the alarming increase in the cost of maintenance has been far more rapid in the countries with local and poorly organized systems of highway administration. We have just seen that while the rate of increase in maintenance from 1901 to 1907 in England and Wales was over 20 per cent, it was only about 5 per cent during the corresponding period in France. In England the maintenance is often intermittent and varies: in France the maintenance is continuous and highly specialized.

Many of our States have spent and are spending large sums of money on their highways with but little thought or provision for maintenance. This, if the experience of European countries is of any value, must prove disastrous in two ways: First, granting that the roads constructed at so great cost will not be allowed to go entirely to ruin, the cost of maintenance will be higher the more local and loosely centralized the organization for maintenance; and second, systems of intermittent maintenance are sure to increase in cost from year to year as they have in Europe. It is high time that our legislatures take note of these facts and provide ways and means so that our roads once constructed can be maintained efficiently and economically and not allowed to go to ruin, and that exorbitant sums need not be expended on fruitless efforts to maintain them unsystematically and in an unscientific manner.

It must also be evident from a study of expenditures in Europe that our road revenues are entirely inadequate. While $80,000,000 seems a large sum, it is only about $38 per mile to meet all new construction, bridge building and every class of maintenance.

We need, and must have, more money for roads, definite provision for maintenance, a system of continuous repair and a centralized, skilled supervision.

INFLUENCE OF AUTO ON "BACK TO THE FARM MOVEMENT"

By HAYDON EAMES, General Manager Studebaker Automobile Company.

J. J. HILL'S address before the meeting of the Bankers' Association of Chicago, is most refreshing, and gives the ordinary business man considerably more confidence in the mental grasp of those who control our financial affairs.

There is one point, however, in regard to which Mr. Hill seems to be misinformed: the favorable influence of the automobile upon the very conditions which he would like to bring about—increase of agricultural as compared with urban population.

It looks as though the vast affairs with which he is concerned have compelled him to view the farmer collectively rather than individually, and he seems to be correspondingly unfamiliar with the change the last six or seven years, and the advent of the automobile, has made in the details of the farmer's life. Nor does he seem to recognize the large part which the automobile has, and can be made to play in justifying the extension of his own railroads and in the preliminary work of opening up new territory with that ultimate object in view.

We wonder if he recognizes the extent to which the individual farmer is beginning to specialize in the apparatus which he employs on his farm. No small number of agricultural implements now used by the farmer have their functions so combined with those of other implements which have heretofore been of general application, as to supersede the latter, and, consequently, materially specialize the type of apparatus and vehicles which he uses for other purposes. The advent of the automobile, while not directly responsible for it, has tended to facilitate this process.

At one time there were a dozen uses for a certain kind of wagon which might be described to-day as an unspecialized type. To-day a number of agricultural implements accomplish in themselves a part of the services which were heretofore accomplished by such wagons; and, with one exception, the remainder of the services performed by that wagon is now found to be better performed by a more specialized type; that exception is the transportation of the farmer and his people from one point to another. The new specialized type is not convenient for this purpose, and the farmer resorts to the automobile. He goes to town every day perhaps, and spends very little time in doing so, instead of every week at the expense of an entire day and service of "a team."

The automobile makes the quarter-section farmers near neighbors and develops a sense of community in agricultural districts which was utterly impossible with the former methods of transportation. It makes the farmer's life and surroundings much more liberal, and, under many conditions, far more attractive even to the young people than the life of the city.

As an example of the part the automobile is playing, and can be made to play, in the affairs with which he is concerned, it may be interesting for Mr. Hill to know that at the time the Belgian steel operators were migrating to the Baltic provinces of Russia in great numbers, the resulting reduction in the population of some parts of Belgium was such that underwriters of certain extensions of the Belgian railways seriously considered availing themselves of the use of the automobile to protect themselves against what would have been a decidedly unprofitable execution of that part of their obligations which called for the extension of the railway in the partially deserted districts.

The broad principle underlying this is, of course, equally applicable to any sparsely populated territory, irrespective of the cause of that sparseness. We venture the opinion that if the dissection of the census of 1920 is such as to reveal it, it will be found that the migration during the preceding decade will have been from the city to the country, at least in a large part of the United States. We are not so sure that the census of 1910 might not already reveal a tendency of this kind, provided the concentration of immigration in cities does not entirely obscure the question.

Mr. Hill should recognize the automobile not as a disadvantage to the agriculturist, but as one of the most potent factors cooperating with his own splendid efforts and accomplishments toward agricultural development.

In spite of this somewhat minor criticism, we cannot but feel that it will be a good thing if Mr. Hill's address were published in pamphlet form as a text-book in the schools.

Iowa's Gumbo Was Found Deep and Sticky

Many Impromptu Receptions Held En Route

BAY STATERS IN A DOUBLE TRANSCONTINENTAL TOUR

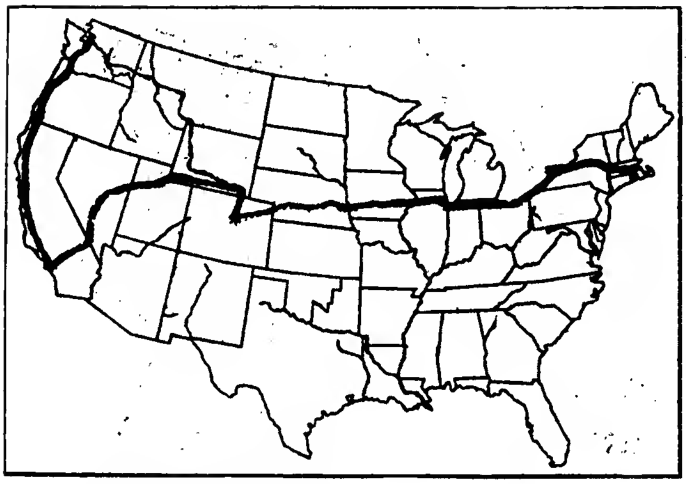
SEATTLE, WASH., Sept. 20—From Lowell, Massachusetts, to Seattle, Oregon, is a far cry by train, but it is still farther by automobile, and especially so if the route selected wanders over most of the boundless West before reaching its destination. It is not always the volition of the tourist which impels a roundabout course, but more often because of the absence of roads and of bridges, with a result that can be imagined only in part. Over 5,100 miles of all kinds of country can be traversed in journeying from the Bay State to the shores of Puget Sound when the itinerary includes a run of 3,700 across these wide United States, and another important item of 1,400 miles from Los Angeles to the North. This is the westbound outline of a transcontinental tour recently completed at this point by Ira H. Morse, Mrs. Morse, and a mechanic, Omer Deschenaux, all of Lowell, Mass., in a Pope-Hartford runabout, with full traveling equipment.

For two and a half months they and their car were constant companions in making this long run from ocean to ocean, and nearly all of that time was spent upon the roads, for the intention at the start was to make the trip for pleasure entirely, and not for a record. Since the eighteenth of May they have been experiencing every conceivable kind of roads, some of them not worthy of the name, interspersed now and then by some fine highway traveling. No one who has ever made a long tour can fail to appreciate the difficulties which they encountered, but those were all expected, and were far overbalanced by the pleasures, the interesting points seen, and the jolly good time "in communion with nature in her visible forms." For instance, can there be anything more pleasing to the average person than to camp out, with a good tent, a flowing stream from which fresh fish can easily be obtained, and perhaps not another person within a score of miles to break in upon the scene?

Early in the spring Mr. and Mrs. Morse decided that they would like to try desert driving and real mountain climbing in a tour to the Pacific Coast, and forthwith made their plans. Both had been over the ground in trains, and knew somewhat of the conditions which would confront them, and even went so far as to plan a return trip, thereby going better than the average transcontinentalists—those who ship their cars back home. The affair was purely a private venture, and not in the slightest manner connected with factory or agency. The car is a regular stock Model M runabout, with a four-cylinder motor of 35 horsepower. The rear was arranged to carry baggage. the tent, supplies of food and fuel, and so for the chauffeur a small seat was placed on the left running board—really the most comfortable place to ride on any car. A complete camping outfit was obtained, with blankets, cooking utensils, and boxed supplies; and for use, if needed, were added firearms, fishing tackle, block and tackle, heavy hickory sticks for prying, and a spade. The machine had previously been driven on long trips into the wildest portions of Maine and Canada, and in all had traveled over fully 18,000 miles of all kinds of roads. All the members of the trio are skilful drivers.

Bridge-Building on the Prairies of Colorado

Wyoming Roads Were Often Steep and Rough



Transcontinental Route of I. H. Morse and Party

Thus prepared for one of the longest continuous automobile trips ever made, the party left the City Hall garage, in Lowell. on the morning of May 18, and immediately headed west. The route chosen was the usual one, crossing to the valley of the Hudson, and passing through Albany, Syracuse, Buffalo, and Cleveland, reaching Chicago on May 27. In nine days the car covered 1105 miles, despite the fact that heavy downpours necessitated a longer stop than usual at Valparaiso, Ind. Three days later they were in Marshalltown, Ia., when Mr. Morse wrote in his log book, "Since Chicago the traveling has been very slow. The hard showers at night have made these black gumbo swamps, for which Iowa is notorious, hub deep, and the mud sticks to the car like glue, probably 200 pounds not being an exaggerated estimate of the amount collected. The car is acting to perfection, not a skip in the motor, and with power enough to plow through black mud for 100 miles yesterday. We were in some bad washouts, too, and in one case there was a long steep hill which had been washed for its entire length. The sand was about three feet deep, it seemed, and ours was the first vehicle of any kind to go over it since the rains." Iowa was crossed by June 2, for on that day Mr. Morse and his compaions reached Council Bluffs, and the uppermost thought in his mind is well shown by the following expression: "If one wants to find out what the car is made of, it is only necessary to come out here and buck these gumbo swamps when it is raining. Our car is a great one. People here say that we have 500 miles of fine roads to Denver, and we hope to make it in three days. We will try the route via Kearney."

Could Not Take Glidden Tour Route

This, however, proved to be by far too sanguine a view of what was in store for them, and the tale is impressively told by the following extract, dated Denver, June 14: "When I wrote last I thought that I had been running over some pretty hard roads, and with tough experiences, but they have been beaten since. For 70 miles the bridges have been washed away, and after trying the short southern route to Denver—the way the Glidden tour expects to come—we had to give it up, retracting part of our course to reach that of the longer northern trails. These led, via Cheyenne, 120 miles longer than we had counted upon. One day there were seven streams to ford where the bridges had been washed away. In two cases where the water was four feet deep, old floating bridge timbers were used to make a new bridge on which to cross."

From Denver it had been the plan to take a southerly course, through Colorado Springs, Pueblo, Trinidad and Raton, entering New Mexico, and visiting Las Vegas, Albuquerque, and thence turning westward through Arizona, touching at Canon Diablo, Flagstaff, Williams, and the Needles. The last named is just across the line in the Golden State. Then there would be the Great Desert confronting the tourists, and Mr. Morse was rather dubious about crossing it, but he hoped to get through and then to Daggett, San Bernardino, and Los Angeles. But planning on paper is far different from the realization of those on the road. South from Denver the route was well-nigh impassable on account of rains, and there was absolutely no use attempting the trip. It was necessary to return to the mile-high city, and then go north to Fort Collins, Col. The middle route over the mountains was taken through Laramie and Evanston, Mont., and through some wonderfully beautiful scenery. Salt Lake City, Utah, and the towns of Ely, Tonopah, Goldfield, and Bull Frog, in Nevada, were those on this route, but the difficulties in reaching them are little suggested by that simple line-up of peculiar nomenclature. Los Angeles was reached on July 1, and a delegation of the automobile club met the real tourists at the outskirts of the city. The newspapers were much interested in the party, both as they approached the city and on their arrival, so that quite a hearty reception was accorded them and their Pope-Hartford. The odometer then registered 3,700 miles, but the strenuous grind had had no evident effect upon the machine, and it was simply filled with gasoline and oil in preparation for the run up the coast.

Quicksand Will Readily Engulf an Auto

More quotations from Mr. Morse give descriptions of the run from Denver to the Pacific. He writes: "We have had experiences varying from an exciting brush with prairie wolves to digging the car out of quicksand. The lack of bridges is the serious drawback to the use of the auto in the West, for beyond Colorado there is no pretense of constructing them. It is a case of ford. If the car becomes enmired the walk for horses may be a good many miles. Once when we had pulled ourselves out of two streams within a ten-mile run, we were informed that there were a dozen more in the next 30, so it was impossible to make more than about 40 miles a day. Last night we were caught in the quicksands and the car went in up to the body. The more we tried to dig the deeper it sank, so I walked 17 miles to town, secured four mules and went back. The car was so deep that the mules could hardly get it loose, but by prying up a wheel we were able to get it started. We were rather surprised and very much gratified to find that, in spite of the great heat and extra amount of work, that our engine did not get hot, and only once did we add to the radiator supply from our tank during the day. In Nevada we saw many cars, and there was really a nest of Pope-Hartfords there, all doing good work. I never saw so many Pope cars among so few people as at Ely, Tonopah, and Goldfield."

Several days were spent in visiting around Los Angeles, and then began the ride to the North, along the coast, toward San Francisco and Seattle, a jaunt of 1400 miles. Frisco was reached on July 20, having found fair roads for 200 miles, and then excellent for 300, in the run from Los Angeles. Another start was made on July 23 toward Portland, Ore., over bad rocky roads, with some very steep ascents, but the car was equal to all requirements, and reached Portland on August 1. Seattle, the westward destination, was reached on August 4, with the party in the best of spirits and highly enthusiastic over the journey, declaring that those who ride in trains miss about 75 per cent. of the beauties of the land. In addition, the open-air living is bound to benefit everyone, especially when a good camping outfit is carried.

A short stay in this city was planned, in order to see the Alaska-Yukon-Pacific Exposition, and to take some side trips to points of general interest, and then the return journey to the Atlantic began. A different route as far as Cheyenne was considered for the return, going directly eastward instead of toward the south. Spokane, Wash., Livingston, Mont., and the northwestern part of Wyoming formed the important directions on the outline. Montpelier, Ida, Granger, Rock Springs, Rawlins, and Cheyenne were on the map in that direction, with a run down to Denver as another. From that city the same route used in coming out was considered best for the return.

Detachable Wire Wheels Must Prove Worth

By Rolland C. Laurie

Wire Wheels Proved Worth at the Mont Ventoux Climb

NOW that interest is being aroused in the detachable wire wheel following various excellent articles on the question, it perhaps would be of interest to learn how the general public regards the detachable wire wheel from a practical buying point of view. The writer is connected as sales manager with a company manufacturing light automobiles, embodying in its design a detachable wire wheel, giving an option on a detachable artillery wheel. This wheel is built upon somewhat similar lines to the Rudge-Whitworth, with the attaching, of course, free from anything complicated in design because of the low price of the car.

The company experimented extensively with this wire wheel, had no cause for complaint and no breakages to report, and it was adopted only after serious consideration of the merits of a wheel of this type.

Now we come to the particular point: the placing of this before the public; and it is interesting to hear the various opinions of private purchasers and agents. The public generally seems to regard the wire wheel with distrust. First, a great many jump at the conclusion that the wire wheel lacks lateral strength, as Mr. Mackle pointed out in his article. This point has been disproved time after time in actual practice, and we can believe that a conservative nation like the British do not take up a design such as this unless really tangible advantages are clearly shown.

In a personal letter to the writer from S. F. Edge, the well-known British motorist, Mr. Edge says: "I have been using these wire wheels for over five years and nothing would induce me to return to the old artillery pattern." Such testimony coming from an authority is invaluable, but the extraordinary point is, taking the general public and averaging the majority of opinions, after they have been persuaded into thoroughly believing the truth of the superiority of the wire wheel, they come back to the appearance question and say that they do not like the looks of it. This is a point which I should like to emphasize. Throughout this year a great many callers have expressed the same opinion, and yet, when on a visit to England, I noticed that the wire wheel hardly struck one as being anything out of the common in design, so prevalent was the usage of it. Indeed, for appearance, taking the same car first with artillery and then with wire wheels, there is not the slightest doubt that once the eye has become accustomed to the appearance, the general aspect of the wire wheel is far more pleasing.

Daily, agents call upon the writer and say that they have full belief in the advantages which are claimed for the wire wheel, but that they fear to exploit a machine so fitted before the public because of the heavy "missionary work" involved. The public is slow, as a general rule, to grasp the significance of any step in the right direction in design, even if it does not bear upon the mere question of appearance. It took years for the magneto to be recognized as an improvement, but, in the end, the magneto won out, and is now universal.

When we have a great many leading foreign cars fitted with wire wheels, and proving the advantages thereof, there is no reason why wire wheels should be looked upon with suspicion. As for a detachable wheel, the advantages speak for themselves. The only criticism is, that instead of the usual British practice of carrying the same in a slot in the running board quite exposed to public view, it would be preferable to have some kind of a case designed to contain the whole wheel, as this would look somewhat neater. Obviously some kind of a looking pawl, such as a Rudge-Whitworth, is the best form of attachment for such a wheel, but this is somewhat costly to manufacture, and can only be included in the higher priced car. The attachment for the detachable wire wheel which has been on the market for nearly a year, and to which I indirectly refer from a practical standpoint, is merely effected by a central pinned bolt which passes through a drilled hole in the hub shell.

From a selling standpoint, until the public become educated to the wire wheel through the medium of advertisement, the road for the pioneer in this respect will be a stony one. Having had experience in the matter, I can speak from a practical standpoint. It is extraordinary to note the attitude of a buyer when he views this wheel. I have had the wire wheel termed a "bicycle wheel" by a would-be buyer, and the only recourse of my company was to place on the road demonstrating cars fitted with the alternative, artillery wheels; and, generally speaking, the public vote for this wheel every time, in spite of the fact that even *they* are willing to admit the superiority of the wire wheel from a point of view of correct design.

Generally a private buyer fears to be driving a car fitted with anything out of the ordinary in design which may stamp it as "cheap," and this can be easily accounted for from the fact that some of the earlier forms of light automobiles were fitted with inefficient and badly designed wire wheels which gave trouble and earned a bad reputation. Of course, I am only speaking from an experience of this wheel in conjunction with a light runabout. It is yet to be experimented with by any well-known manufacturer, as this might make some difference if applied to heavy touring cars, for here one reaches a different class of buyers, the greater number of whom have probably seen this wheel abroad and therefore already know its merits.

But for the manufacturer of light automobiles of the runabout type I may say from experience that the work of introducing such an improvement is uphill in the extreme, because of the lack of cosmopolitan element among purchasers of this type of car. The majority with whom I have come in contact have never even heard of the success of the wire wheel in England. All they have to judge from are the examples of the old type of wire wheel, which undoubtedly was imperfect in design and again was not the detachable variety. Certainly the public appreciate quick detachable wheels, and the advantages thereof; that I have found from experience; but until this matter has been experimented with by a manufacturer of touring cars, the maker of runabouts has no chance, because of public prejudice.

Cannot Pawn Automobiles—The French Government pawnshops have declined to make any further advances on automobiles, for it has discovered a peculiar action of certain owners. Parisians who pass two or three months of the year at places where automobiles have little use have found that to pawn them is a cheap way of having them well cared for during the summer.

STANDARDIZATION GATHERS FORCE IN BODY WORK

ADVANTAGE is realized at no inconvenience when account is taken of general practice in body work as well as in mechanical designing. There may be no apparent direct gain in following in the path blazoned by a previous worker in the same vineyard, but experience is always a cashable asset, and things done are natural models to go by.

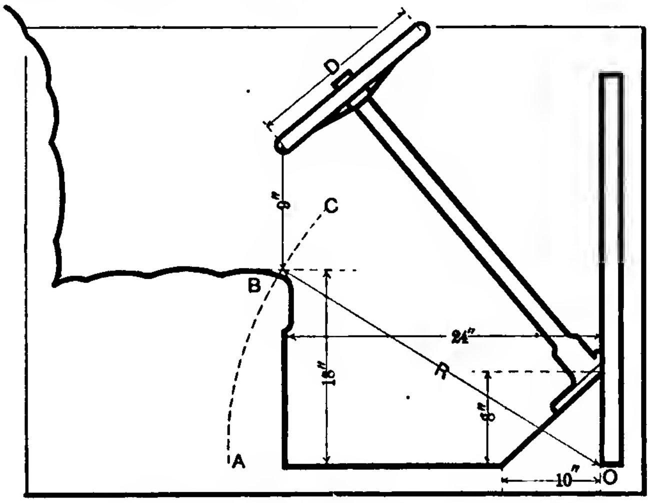


Fig. 1—Diagram showing seat and steering post dimensions

Take the driver's seat, for illustration. Why should a motorist have to get used to a different set of dimensions when he climbs out of one car into another? Referring to Fig. 1, it will be observed that the distance from the back of the "dash" to the front of the seat is 24 inches; this dimension obtains to a great extent in various cars, and if it is a sufficient distance, why should not motorists have the benefit of this measurement in all makes of cars? If it is not enough, why should body makers use this dimension? In the same figure the slant of the foot-board is that due to an elevation of eight inches, and ten inches back. If this is a convenient slant, why not standardize it? If it is not a good slant, why use it?

If the seat is 18 inches from the deck, when the distance back from the dash is 24 inches, is it not self-evident that the seat should be moved back to the radius R, on the arc A C, cutting the point B when the seat is less than 18 inches up from the deck? If the distance from the rim of the steering wheel at its low point is nine inches as a rule, would there be any objection to having this dimension fixed, so that autoists would become accustomed to the position and feel "at home" in every car at a moment's notice?

Granting that there are good reasons why all cars should not have the same length of wheelbase, even so, this does not make it necessary to employ hybrid lengths of bodies; surely a body can be some one of a regular set of lengths. Fig 2 shows the prevailing lengths expressed in metric measurements for even values, with English equivalents. The differences are represented by about five-inch increments and it would be a positive advantage to a buyer of a car were he in a position to purchase a new body in a year or so, when the style changes, as it frequently does, thus bringing his old car up to date in point of appearance at any rate, and with standard dimensions it would be possible to explore the open market, procuring a body from stock, quickly, and at a reasonably low figure.

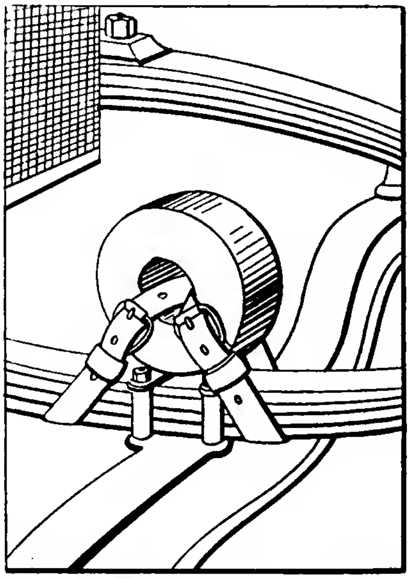


Fig. 3—Suggested standardization of clearance for frames

That the clearance should be minimized is one of the fixed principles of designing on the count that the lower the center of gravity the better will be the behavior of the car. Certainly the center of gravity will not be lowered by perching the body high in the air; the distance C, then, remains to be fixed on a basis such as will afford an adequate clearance, and no more. Under the circumstances it would appear to be the height of good sense to standardize the clearance, taking into account a reasonable vertical bounce of the body, when, if the springs are not up to a suitable standard, the idea depicted in Fig. 3 represents the cure.

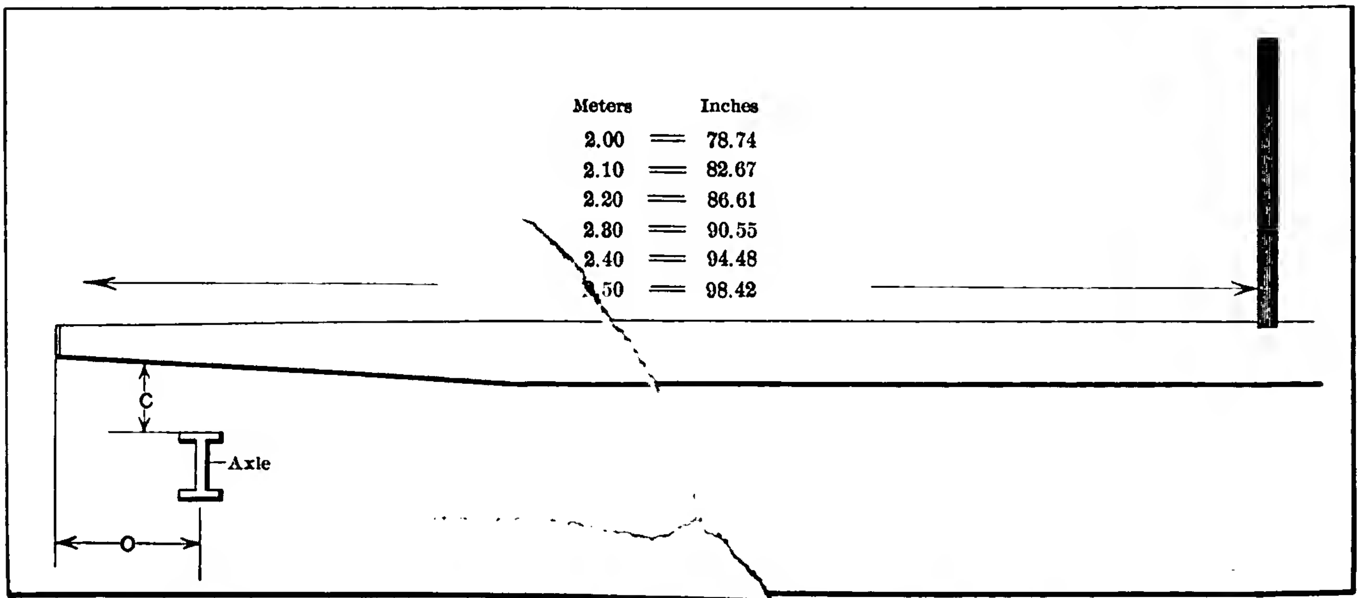


Fig. 2—Showing prevailing lengths of frames expressed in metric measurements for even values

SOME OBSERVATIONS ON THE STEERING GEAR

By THOS. J. FAY.

OWNERS of cars naturally consider that the steering gear is of even greater importance than the motor, for if the motor fails to work, it will have to be fixed before the car will be capable of rendering service, but if the steering gear fails while the car is in motion, the speed may be high enough to engender serious consequence.

It is not necessarily true that there are more accidents, due to defective steering gear, than was formerly the case, although there are more inexperienced autoists simply because there are more cars in use. Defects in steering equipment, from original causes, are probably on the decline, so much so, in fact, that the large increase in the number of cars in use has not led to a vast number of accidents directly traceable to defective gear. Still, the problem is a serious one, and the remedy lies in the use of well-made linkages. levers, and a steering wheel of undoubted competence.

Even if the equipment is of the very best possible to devise, it is likely to go awry in the hands of a man who fails to appreciate the enormity of the task involved in holding a car to the straight and narrow path, when the path is rough, and the speed of the car is high, with many turns around which the car is allowed to spin. If autoists will attend to the main question, which is a matter of keeping steering gear in good working order, and drive with prudence, especially when the road is rough and the turns are many, the number of accidents due to defective steering gear will sink so low that the "news value" of the automobile will fall below a noticeable standard. In the meantime, the preference, when cars are being purchased, will go to the class in which steering gear is given a fair measure of designing attention.

Certain Points of Design Uppermost—Of the points which should command the attention of users of cars, lost motion in the steering gear is of the first importance. It may be due to a bolt, or a nut, adrift, which will cause trouble of a serious nature. If there is more lost motion than would seem to be desirable, it may be that the worm and sector, if the gear is of that type, is not held in the proper relation. Fig. 1 depicts a

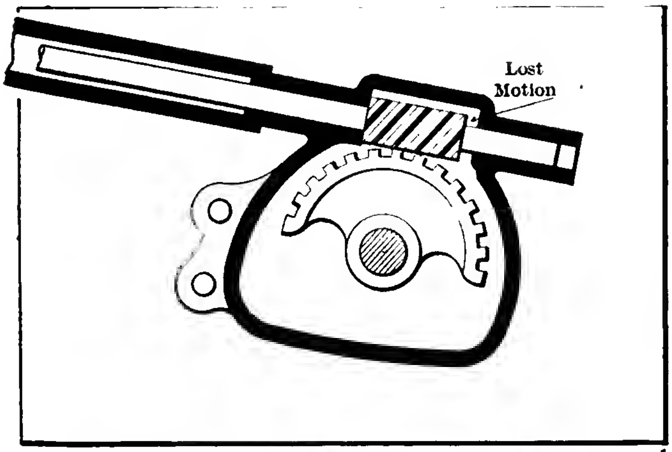


Fig. 1—Possibility of lost motion should be avoided

worm and sector type of steering gear, in a diagrammatic way, intended to show just where the lost motion, if such there is, will be of the greatest detriment. When the wheel is turned, if there is a little end play (far less than the figure indicates), the wheel-shaft will respond, but the sector will fail to do so. Until all the end-play is taken up, the sector will fail to rotate. and as strains come on, from the road wheel, the sector will then rotate, causing the shaft of the steering wheel to reciprocate, and the road wheels to wobble from side to side, in an alarming manner. To overcome this trouble, it is necessary to replace the thrust washer, if one there may be, and if necessary, introduce a washer, made of phosphor bronze, of suitable thickness to take up all the end shake of the steering wheel shaft.

Some lost motion will follow if the worm is not set on the pitch line, in its proper relation to the sector; this will be true if the bushings are worn, and when a new thrust washer is made and fitted into place, if the lost motion is still in greater presence than is desired, the only thing remaining is to replace the bearing brasses. When the gear is dissembled, it will be possible to dimension the same and determine by measurement if there is any great amount of journal wear, thus rendering the task less troublesome, since the brasses may be replaced without waiting to determine the remaining lost motion through actual trial.

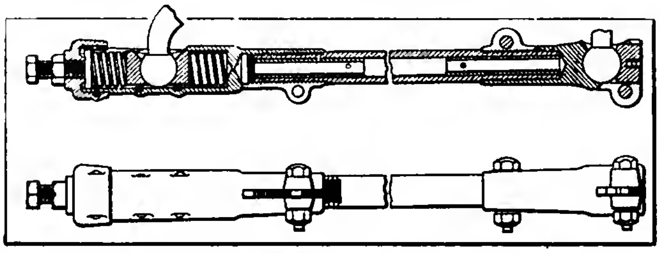


Fig. 2—Drag rod construction which shows merit

As a rule, it will be found that the lost motion is due to end shake, just as the illustration shows, and not to worn-out journal brasses on which the wear is far less than it is in thrust. If the gear is irreversible, or nearly so, as it is in many automobiles, a little lost motion is to be expected owing to the smallness of the angle of the worm, which can only be irreversible if the angle is such that a little lost motion will be present and unavoidable.

Drag and Cross-Rod Should Be Well Designed—Fig. 2 illustrates a type of drag-rod, which is of the greatest value in actual service, due, in a measure, to the use of a buffer spring. so placed that shock cannot be imparted to the materials of which the parts are made, not only in the rod, but in the rest of the steering equipment as well. Besides aborting shock, the design is such that great reliance may be placed on the parts, due to the use of good material, and the methods of design which assure permanence. The socket forgings are of a fine grade of steel, drop-forged and heat treated to render them hard over the bearing surfaces, and dynamic, which is the property that assures long life under conditions of shock loading.

The socket forgings are accurately machined, threaded to match threads cut on the tubing, and when they are screwed on, proper means are provided to lock the forgings, so that to screw them off, it is necessary to unlock them; under these conditions, for the parts to come off while the car is in motion, is quite out of the question.

Brazing Works When It Is Well Done—Many workmen labor under the impression that a brazing job cannot be done unless the parts are a loose fit, in order, as they say, to allow the brazing material to enter and form a bond. The result is. when they do the work, the parts are a very loose fit, with accentuated shearing tendencies in the section of the brazing material, and if the brazing happens to be poorly done, the result is anything but good, since, in the absence of brazing, there is not even a good mechanical bond.

A good mechanical bond is possible to procure without, in any way, interfering with the brazing process, since the parts. if they are well fluxed, will take a coat of brazing material, even when the recess is but a thousandth or two. In brazing, if the work is to be up to a sufficient standard to use in steering gear. it is necessary to clean and brighten the surfaces in a most thorough manner. This will best follow by mechanical scraping

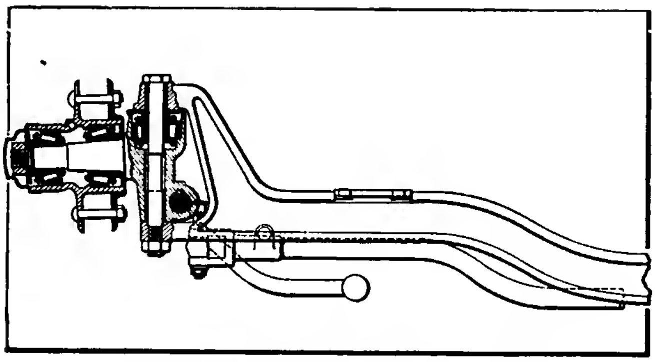


Fig. 3—Large pivot bolts make for long life

rather than by dipping in some corroding material. Dipping may be of value as a preliminary, but a file, and scraper, in the hands of a man of competence, will go a long ways toward success.

When the parts are well brightened and the grease is thoroughly removed, by the use of soda water, benzine, or equally good solvents, it remains to flux the parts with borax, and then apply the heat, either by a forge or from a Bunsen burner; if fire brick, or clay, is used to build up around the parts, the heating process will be attended with less difficulty, and the work will be in better fettle at the finish. A rather hard brazing material may be used; this may be purchased ready for use, and there is no reason at all why a motorist of but slight skill can not make a good job of brazing.

Steering Knuckles Should Be Carefully Examined—Even if the class of work found in a car, when it is purchased, is up to the very highest standard, it is the height of good judgment, on the part of every motorist, to examine the gear and the knuckle details, at regular intervals. Fig. 3 depicts a regular make of steering knuckle, in which the design features are up to a fitting standard, and all that the user can be expected to do is to keep the parts free from dirt, lubricate with regularity, and on occasions, ascertain if lost motion is creeping in. As will be observed, a pivot bolt, of excellent proportions, passes through the forging; is provided with a head to prevent it from dropping down, and a castellated nut, on the under side, holds the pin.

This knuckle pivot bolt, while it serves to center the Timken roller bearing, as shown in Fig. 3, also serves to hold the plain bearing, at the bottom, and being of a fine grade of steel, it is of the greatest advantage from the point of view of strength and safety in service. Looking at Fig. 4, it is to note a knuckle, made of steel casting, in which a knuckle bolt is not used, and if the knuckle fractures, as it may in service, the absence of a through bolt is attended by dire results. Of course, there is a great difference between the use of die-forged knuckles, of selected grades of steel, which marks the construction of the steering knuckle as depicted in Fig. 3, in contrast with the steel casting product as shown in Fig. 4. Absolute safety would dictate the use of the finer material, which is no license to do without a knuckle pivot bolt of competence and bearings such as will take thrust in addition to radial pressure.

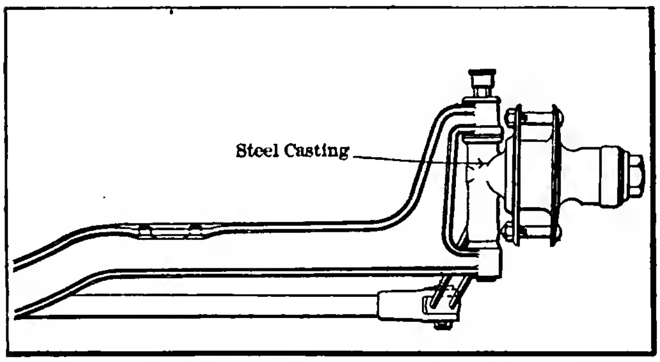


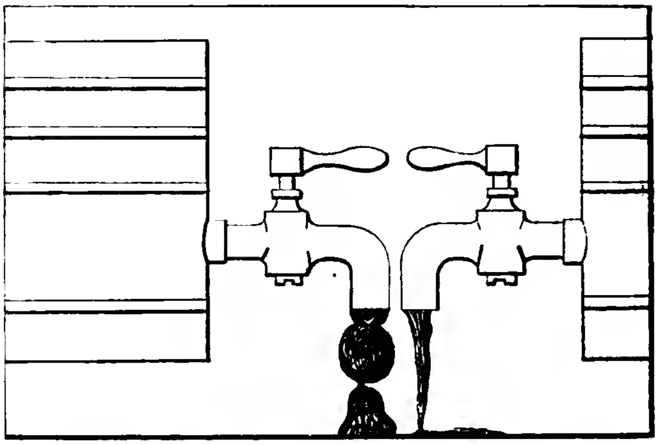
Fig. 4—Absence of a through bolt is dangerous

Arrangement and number of the bearings as well as the type of bearing used have much to do with the success or failure of any form of front axle, with which failure the best of steering gears is worthless. This is a matter that should be looked into, not superficially, but with care and great thoroughness, for not only is it a matter of moment, but a source of great danger as well. The same thing applies, although with lessened force, to the steering gear bearings. With the worm or similar type, there is a very heavy thrust load, which must be taken care of by means of a thrust bearing, since an ordinary radial-load bearing will not suffice. As improper mounting of this may cause it to seize, the whole design should be critically examined.

Materials also should receive the attention of the careful man who is buying his first car, particularly if he cannot afford to pay out a lot of money for repairs. Thus, it might be said in a general way, that other things being equal, a piece made of a forging is superior in strength to a piece which has been cast. Any metal which has been worked under the hammer, either hand or power, has been improved in quality of grain and strength, as well as reliability, if the metal has not been burned in the various heating processes.

VISCOSITY OF GASOLINE INTERFERES

Viscosity, which is a well recognized property in connection with "molasses in January," also impedes the flow of gasoline, in extent, depending upon temperature. The illustration, as here afforded, is a little far-fetched, yet even so,



Effect of Temperature on Liquids, as Molasses and Gasoline

it may be of more than ordinary value, particularly if it will accentuate the point to be made.

It is a mistake to assume that, because gasoline does not noticeably thicken up, it is not interfered with in its flow through the nozzle of the carbureter. Taking gasoline of a specific gravity of 0.71, it has been shown that the amount which will pass through a nozzle of a carbureter under a given pressure will increase as the temperature is increased in the manner as follows:

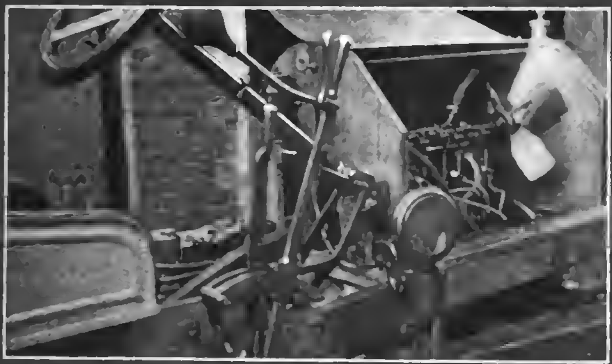
Temperature in ° F.	50	59	68	77	86	95
Relative flow	1	1.073	1.145	1.212	1.27	1.335

Since nozzles in carbureters are not adjustable readily, and with any degree of certainty, it follows that such a great difference in the weight of fuel ejected, considering the differences in temperature named, is bound to lead to a certain amount of carbureter inefficiency of the kind which does not readily bow to treatment. This source of trouble goes to indicate that some means of maintaining a constant temperature is of the greatest advantage, and in a measure it argues for the adaptation of water (hot) jacketing, not around the depression chamber, as is usually the practice, but around the gasoline (float) bowl, in order to maintain a constant temperature of the liquid gasoline as it flows through the nozzle.

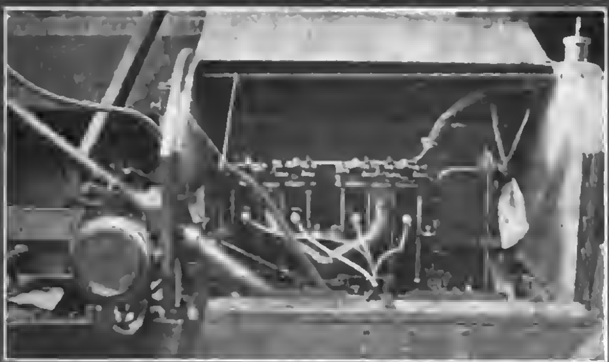
The Finished Machine and Its Two Constructors with Their Mechanic

Square Tube Radiator Gives Front a Business-Like Appearance

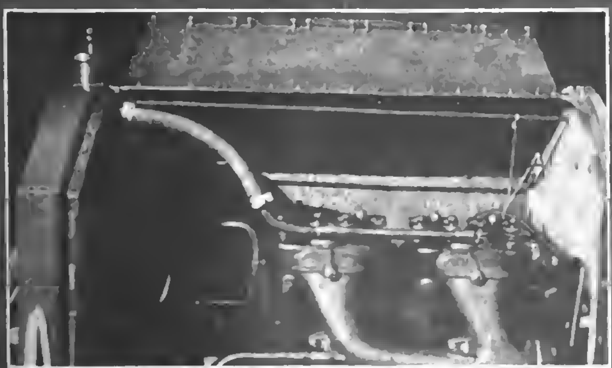
Large Gasoline Tank Behind Affords a Large Mileage



Right Side Forward Showing Steering Post and Control Levers



Full View of Engine, Inlet Side, Showing Tappet Rod.



Exhaust Side of Motor Displays Distinctive Shape of Manifold

HOW ONE AUTOMOBILE WAS BUILT

As striking proof that the family constructive ability is not confined to the older heads of the family, nor to the ability to make a good piano, an automobile recently constructed by two of the younger members of the Steinway family in New York City is a worthy example. This as presented on this page by a series of photographs of the finished car, was what is called an assembled product, in that the large units were purchased and assembled at the Steinway factory, Fifty-third street and Park avenue. The two young men responsible for the car, as shown alongside of it in the first picture are William R. and Theodore Steinway, who are grandsons of the founder of the piano business, and have served a four-year apprenticeship in the factory.

For the power plant, a Brownell was selected, this consisting of an engine, clutch, and transmission unit, the lower part of the cases being one piece. The engine is of four cylinders, 3½ bore by 4-inch stroke, rated conservatively at 17 horsepower, and is hung from three points, two forward arms and a rear pivotal point. The transmission is of the selective type affording three speeds forward and a reverse.

In selecting the running gear and frame, the pleasing lines of the B. L. M. type of frame, as made by the Merchant & Evans Company proved most attractive, while the rest of the running gear, as well as the steering gear, was obtained from the Stoddard-Dayton people. In placing the latter in the frame it was given considerable rake, while the large steering wheel lends the whole rather a racy appearance.

Ignition is of the double type, Bosch magneto furnishing the current in one case. A single set of plugs is used and they are placed in the side of the cylinder casting, thence projecting into the combustion chamber. The square-tube honeycomb radiator, their own design, was built by the A-Z Company, New York City.

The elimination of the usual rear seat or rumble allowed of making the frame very short, the 92-inch wheelbase, in combination with the narrow, 50-inch tread, making it possible to turn around in the narrow city streects. Back of the seats is carried the seamless steel gasoline tank, which holds 10 gallons, this being sufficient fuel to travel more than 150 miles.

Wheels are of the wood artillery type, 30 by 3½-inch, fitted with Goodrich quick detachable rims and Republic Staggard tread tires. The ratio of the gearing of the live axle is such that a speed of 35 to 40 miles per hour may be attained.

Other small and special parts, necessary to fit the various units together into a symmetrical whole, were designed by the constructors, and either forged or cast right in the factory. Aside from the help afforded by the machinist, all of the work was done by the two Steinways, so that the car as finished is actually "home-made."

AEROPLANE STABILITY

Editor THE AUTOMOBILE:

[2,027]—In an article which appeared in "The Automobile" of September 2 there was a statement to the effect that as yet there had been no device of any kind incorporated into an aeroplane which would automatically balance it, when in flight.

In your estimation what would be the prospect for an appliance which would positively and automatically balance an aeroplane?

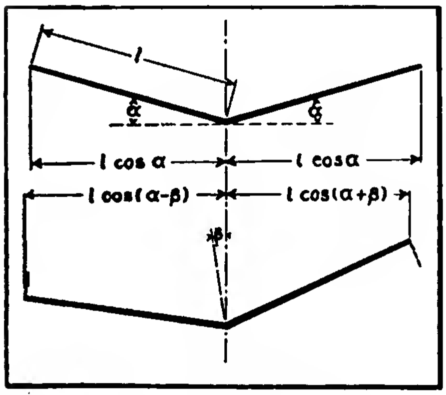
What is the pressure required, approximately, to warp the planes of a Wright aeroplane to their fullest extent when the machine is flying at its greatest speed?

Ottawa, O. L. R. B.

The statement that no device had yet been incorporated in an aeroplane to maintain its stability automatically should have been made with a reservation. The construction of practically all aeroplanes is such as to materially aid in maintaining stability. When the center of gravity of the machine is below the center of support, it has a natural tendency to remain upright. If the weight is hung too low, however, it has a tendency to act as a pendulum and rock the machine. Another idea, best exemplified in the Antoinette monoplane of Latham, is to set the wings at an angle with each other. If the machine tips to one side, the surface on that side increases and on the other decreases. This will be made plain by the diagram.

Either or both of these plans, however, appear to be insufficient to resist a sudden and violent disturbance of the air currents. Thus even the Antoinette has, in addition to its slanted planes, a system of auxiliary wings like those used by Curtiss; and the Bleriot monoplane No. 22, in which the low center of gravity is particularly prominent, uses the wing-warping system of the Wright Brothers. The statement of the previous article, therefore, is correct if understood to refer only to the control of the auxiliary wings or of the warping, which resists disturbances otherwise likely to overcome the machine's natural stability.

There is undoubtedly a great field for an appliance which will positively and automatically balance an aeroplane; obviously aeroplanes cannot be a safe and dependable means of transportation as long as they depend for their stability on the strength and skill of a single man. But the problem of inventing such an appliance is by no means as simple as it might appear. The inventor's first thought is to use some application of inertia, either the pendulum or the gyroscope. The pendulum, however, has proved too sensitive to the acceleration of the machine, which has the same effect on the hanging weight as an inclination. The gyroscope seems more promising, and it is likely that some form of it will ultimately be used.



Explaining Aeroplane Stability

If absolute stability can be secured by the construction of the machine, without the use of special contrivances, so much the better. It would naturally occur to one to try a combination of slanted planes and low center of gravity; and this line was followed by M. Santos-Dumont last winter. He was then working on the forerunner of the machine with which he recently flew five miles at the rate of 56 miles an hour. This experimental machine carried both the engine and the operator on an underslung frame; that is, at least two-thirds of the total weight at a distance of some three feet below the center of support. At the same time the planes were sharply inclined, at an angle of about 10 degrees. Now, in the machine which was the result of experiments with this trial model, both these principles were abandoned; the motor was placed on top of the planes, nearly as far above the center of support as the aviator is below, and the planes were set flat. Although we have no knowledge of M. Santos-Dumont's reasons for the change, the inference is that the original construction was found unsatisfactory. This apparently leaves a clear field for the man who will invent an automatic control for the auxiliary planes or warping.

In answer to your final question, we have no exact means of determining the pressure necessary to warp the planes of a Wright aeroplane. The only way to find out would be to apply a spring balance to the operating lever while the machine is in flight, and we doubt if Mr. Wright could be persuaded to try the experiment. However, it is quite simple to find an approximation which the necessary pressure at least could not exceed. The maximum force which a man can exert horizontally on a lever is about 25 pounds, and as the leverage between the controlling handle and the planes appears to be in the ratio of about three to one, this would give 75 pounds, directly applied, as the maximum possible force. The true figure is probably considerably smaller.

Mr. Curtiss has worked out an ingenious method of operating the lateral control, by a harness around the aviator's shoulders. The instinctive swaying of the body thus moves the auxiliary planes.

THE VACUUM AIRSHIP

Editor THE AUTOMOBILE:

[2,028]—In the August issue of "Machinery" I noticed an article recommending the development of the vacuum airship. The author has apparently made careful calculations for a ship 750 feet long and 150 feet in diameter; I checked over the figures and found them correct. He states that the envelope would contain 420 tons of air, which would be exhausted sufficiently to obtain a lifting effort of 370 tons. The airship itself would weigh 270 tons, leaving 100 tons for passengers and freight. The project seems very plausible, and I, for one, cannot see anything wrong with it. Perhaps the readers of "Letters Interesting and Instructive" would be interested in a discussion of this project. I notice that your magazine has always given much more attention to aeroplanes than to airships. J. B. WINTHROP.

Brooklyn, N. Y.

We read the article to which you refer with considerable interest, and, like you, checked over the author's calculations without finding any flaw. There are two very important objections we wish to raise, however. The first relates to the practicability of building the ship as light as 270 tons. This objection is passed over in the article with the comment that "the entire system has been worked out to the final detail, and has been attested by engineers of national reputation." We are hardly convinced by this statement. This point is crucial in the argument; the question of weight has been raised against the vacuum airship each time it has been proposed before, and has never been successfully answered. Yet the author casually says that he has solved this difficulty, and does not even give the names of the engineers who have supported him. A few calculations would have been better.

Moreover, it is not alone sufficient to provide that the framework shall resist the normal pressure of the air; it must also be calculated to resist very considerable bending moments and buckling stresses, due to being forced through the air by its engines.

Our second main objection rests on the possibility of obtaining as high a vacuum as is counted on. Exhausting 370 out of 420 tons of air corresponds to a vacuum of 30 inches, which is the highest that has ever been attained in steam turbine practice. Anyone who has ever observed the infinite precautions necessary to obtain and maintain this degree of vacuum in a turbine plant will be skeptical of obtaining the same in an airship, where both weight and space must be economized. In our opinion it will be absolutely impossible to make the numerous joints in the 0.018-inch steel sheets (the size specified in the article in question) sufficiently tight to hold this vacuum.

However, the article is completely discredited by the statement that the airship is designed for a *minimum* speed of 100 miles an hour, a ridiculous claim.

MORE OIL COOLING

Editor THE AUTOMOBILE:

[2,029]—I would like to learn through your department of "Letters Interesting, Answered and Discussed," if a light oil, such as Havoline, would be safe to use instead of water in the radiator of a car with a four-cylinder vertical engine, of the thermo-syphon system of cooling? Last winter I used a mixture of one-third alcohol, glycerine and water, but found it troublesome, owing to the evaporation of the alcohol. I am inclined to try oil this winter, and want to know what you think of it. J. A. RENÉ.
Superior, Wis.

This is a point that was covered in the letter (2019) of E. W. J., which was published in our Sept. 16 issue, except for the thermo-syphon point. This latter will be sufficient to bar the use of oil, as the latter is so heavy that it will not circulate except through the energetic action of a good pump. If you are in a position to add a pump to your circulating system, oil will do very nicely, as brought out in the letter referred to. We cannot give you a table of the properties of oil at low temperatures because no such table is available.

In case you did not like the mixture used last winter, why do you not try a calcium chloride solution, with which any desired temperature within reason may be obtained, and which is free from the objectionable evaporation you mention? That is, when using this, only the water evaporates, and this may be replaced by simply adding more water. Then, about once a month, the specific gravity of the mixture should be checked up. The only reason for this lies in the fact that if allowed to get too strong, the calcium chloride will precipitate out and this precipitate, in the form of a white powder or crystals, will clog up the system and prevent the remaining liquid from circulating. As the accompanying diagram of the freezing points of various strengths of calcium chloride solutions will show, the temperature desired may be attained by varying the amount of calcium.

The best way to make the solution is to first make a saturate solution of the chloride, and then use this, by adding water to it until the desired mixture is reached. This is done by taking half a gallon of water to 8 pounds of chloride for each gallon of saturate solution desired. It is a good idea to make a gallon or so extra to have on hand. You can tell if this makes a saturate solution by the fact that some of the crystals must remain in the bottom undissolved. If this is not the case, add more crystals until some of them will not dissolve. This solution is made applicable to the cooling system by adding to it more water, and finally when the right proportion is obtained, a handful of lime to render it slightly alkaline. The latter is done as this solution is said to have an acidic action on the metals of the whole cooling system. As the latter has never been proven, the simple precaution of the lime will counterbalance it. The diagram shows plainly what temperatures may be obtained by this solution.

SAVANNAH WINNER'S SPEED

Editor THE AUTOMOBILE:

[2,080]—Will you kindly publish in the next issue of your valuable paper, "The Automobile," the average speed of the winner of the heavy car race at Savannah Thanksgiving Day, 1908? JOHN A. HAMILTON.
Columbia, S. C.

At Savannah, the heavy car race was won by Wagner driving a Fiat. He covered the 16 laps of 25.13 miles each, a total of 402.08 miles, in 6 hours 10 minutes and 31 seconds, which is an average of 65.08 miles per hour. It might be interesting to you to know some of the details of the car. It was a four-cylinder motor of 155 mm bore by 160 mm stroke, practically 6.1 by 6.3, and was rated at 120 horsepower. The car had 50-inch tread, 107-inch wheelbase, and weighed 2,750 pounds. The tire and wheel equipment was 105 by 870 fronts and 120 by 880 demountable rear tires, all being Michelins. These sizes converted into inches and fractions are: 4 1-8 by 34 1-4 fronts and 4 3-4 by 34 11-16 rears. The car has double chain drive and Bosch magneto.

USE OF UNIVERSAL RIMS

Editor THE AUTOMOBILE:

[2,031]—Will you please inform me on the following matters? I have regular clincher rims on my car. If I have universal rims put on can I use my same old casings with safety, there, of course, being no lugs on the universal rims? W. SEVERANCE.
Stanford, Ky.

Yes, when universal rims are fitted to wheels for the express purpose of using old clincher tires on those rims, special flanges are supplied which hold the clincher tire safely on the rim. Then when the old clincher type of tire is worn out, and new ones are purchased, it is possible to obtain another set of different flanges which will hold the regular style of tire intended to be used with those rims. That is, with the exception of the flanges, which represent a very small expense, the universal rims are just what the name implies, universal, any kind of tire may be used with them, and, of course, used with safety, which is implied

WANTS LARGER TIRES

Editor THE AUTOMOBILE:

[2,032]—I have a car which is several years old and equipped consequently with very small tires. I have added a number of things to the extra equipment, as well as changing several parts of the mechanism. All of these changes have added to the weight of the car, so that now I feel that the weight per tire is too large for the tires now on the wheels. This contention is carried out in driving by the very low mileage which I obtain from the various tires. Now, I need another set of new tires and instead of getting the same old too-small size, I want to get the new larger sizes. To do this without buying new wheels, which I do not care to do now, I must use odd sizes. Can you give me a list of the odd sizes now obtainable, as well as a list of makers who make them, and local dealers who handle them? G. J. O'HARA.
New York City.

Your decision to use larger tires is a very wise one, and is to be commended. The so-called "odd sizes" have not been made very long, and even now are not

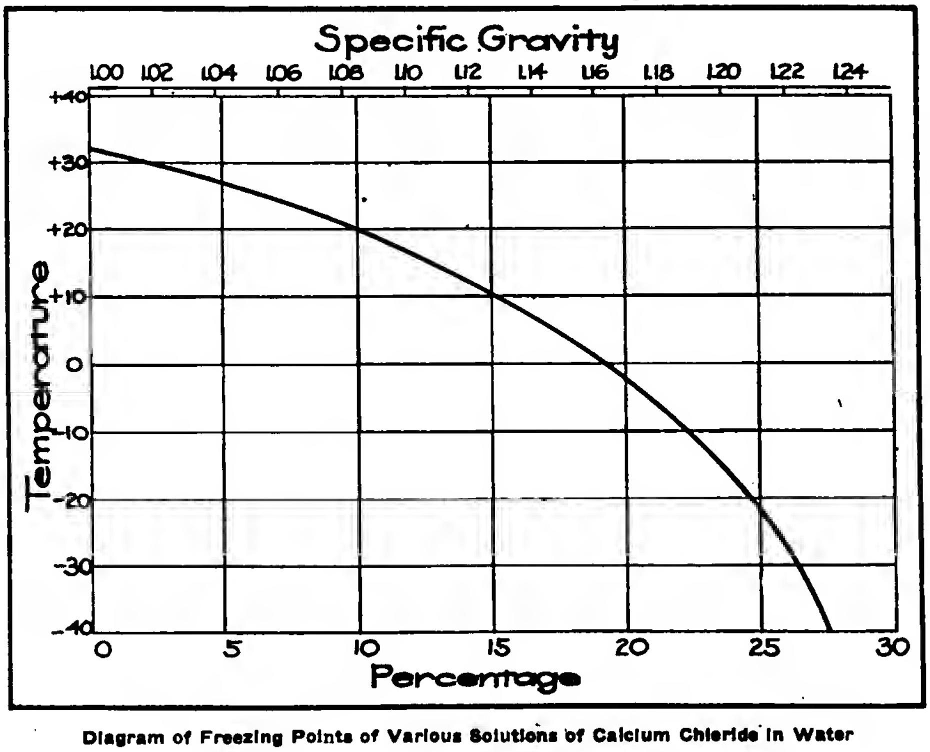


Diagram of Freezing Points of Various Solutions of Calcium Chloride in Water made by all makers. In fact, we would not care to give you a list of either makers or dealers who make or handle them, for we are not at all sure how many manufacturers have taken to them. On the other hand, we can help you to the extent of giving you a list of such sizes as have been made, and probably are made now. These are:

New Sizs	Old Rim Which it Will Fit
28 x 3 1-4	28 x 3
31 x 3 1-2	30 x 3
31 x 4	30 x 3 1-2
33 x 4	32 x 3 1-2
35 x 4	34 x 3 1-2
35 x 4 1-2	34 x 4
35 x 5	34 x 4 1-2
36 x 5 1-2	34 x 4 1-2
37 x 4	36 x 3 1-2
37 x 5	36 x 4 1-2
38 x 5 1-2	36 x 4 1-2
39 x 5	38 x 4 1-2
41 x 5	40 x 4 1-2

In making the change, it will be advisable to go to the largest size you can get for your rims as the table above shows.

VALVES MAY CAUSE IT

Editor THE AUTOMOBILE:

[2,033.]—I desire to express my appreciation for your answer and opinions to my letter No. 1,990, published in "The Automobile" of August 26. Have followed out your suggestions, but have been unable to detect any thing at fault with the water-circulating system. I feel quite positive that the source of trouble does not lie there.

Could not the trouble described, however, be caused by defective valve action? The valves sticking in their guides, due to a too close fit, or lack of lubrication here, or because the valve stems have become encrusted with carbon or gummy oil. Would not a heavy oil be apt to help in causing this trouble?

These questions show the line on which I have been working. I am not sure that I am correct in my deductions yet after the valves had been cleaned and ground, no trouble arose in taking the hill that I mentioned in the former letter. The unfortunate part of it all is, however, that after the car was driven about 600 miles I again attempted to take this hill and had a recurrence of the old trouble. Anything that you have to comment on this subject will be most thankfully received. SUBSCRIBER.

New York City.

Any one of the troubles mentioned might cause heating, that is, if the valve action is incomplete or sluggish, for any reason the engine is liable to overheat. For this reason manufacturers generally advise against the lubrication of valve stems. The argument in favor of this is that the necessary clearance is provided in the machining of the parts, and checked up or proven in the assembling of the engine. If oil is used after this it may be too thick and gum up the stem so that the valve does not function properly. If you grind in the valves to a good seat, and at the same time clean the stems and guides very thoroughly with kerosene, you may be sure that further immediate trouble of the same kind is due to some other and different cause, which will require a different treatment. On the other hand, if this stops the trouble you will know where to look for it next time.

The reason why the sticky valve stem causes heating is this: Gummy or sticky oil holds the valve against the action of the cam which tends to open it. Now, if this action is very strong it may even prevent the valve from opening at the time it was designed to and similarly cause it to be held open too long. The former in the case of the inlet would not furnish the engine sufficient fuel. Opening the throttle wider would furnish a richer mixture but the valves would not allow any more of it to enter. The two in combination would cause heating, as would also either one of them alone. Then, holding the exhaust valve closed after it was supposed to be open, would retain the heated gases in the cylinder and cause it to heat. This is a prolific cause of heating and one that marks the difference between the old and the up-to-date engine.

Formerly designers laid out the cams and valve motions so as to open the exhaust at the lower dead center. Later on experience taught that an earlier opening gave much better results. This latter might be paraphrased thus, if you are going to throw away the gases with their attendant heat, why not do it in a hurry?

As time passed and this method was proven right, the angle of advance or lead given to the exhaust opening increased until to-day it is possible to find very high speed motors in France having an opening as early as 62 degrees before the lower dead center. Angles as high as 45 and 50 are quite common, although no one angle could ever be said to be universal, designers differing very widely on this point.

HOT WALLS EXPLAINED

Editor THE AUTOMOBILE:

[2,034]—Your comments in a recent issue on the subject of hot cylinder walls indicate that you fail to grasp the full value of hot walls. I have had many people tell me that they knew a cool engine would pull better than a hot one because their engine lost power when it got hot. This is undoubtedly true. I have seen lots of men who could not fly, but the fact that one or more men have successfully flown demonstrates that flying can be done. So a single proof that a hot engine will develop more power than a cold one is sufficient. If one can do this, others can. Heat is the working medium in an engine. Take the heat away from the gases as fast as it is formed by the combustion and no increase of pressure results. Take away half of the heat and half the available power is lost. This can not be denied. It should need no argument to prove further that loss of heat through the walls is loss of power.

But if further evidence is required, attach an engine to a known load, a prony brake, or a fan, and work it at full power. If properly designed and lubricated, it will continue for hours. But turn cold water into its jacket and you at once cut down its power. This is due to cooling the walls and not only taking away heat, but also stiffening up the oil. The cooling of the charge can be shown by the indicator. It can be heard in the exhaust which, having less pressure, has less noise. And since there is less pressure at the end of the stroke it should be evident that there was less to work with during the stroke, unless some other reason than wall temperature difference exists. You are quite right that it is the aim of every designer to start with a high pressure and work it down to as low a point as possible before exhausting it, but no designer who knows his business will purposely reduce pressure by needless cooling before he is done working with the hot charge. No steam engine builder would think of putting a cooling jacket on his steam cylinder and it seems strange that gas engine builders will cool their cylinders needlessly low. That auxiliary valves are used to get rid of the gases quickly does not bear on the question. It is certainly right to throw away what cannot be used and to throw it away as quickly as possible.

Modern practice is much better in the matter of cooling temperatures than even a few years ago. There are several other things to be said in favor of hot walls. They mean faster heat radiation to get rid of the "excess" and so less radiator or cooling flanges needed. (That word "excess" is misleading. It does not mean that there is too much heat in the charge, but that the walls absorb more than they can stand and they must get rid of what they have absorbed in excess of their ability. Their ability is measured by the oil used, the likelihood of warping and the danger of their heat igniting the next charge too soon.) Heat radiates about as the square of the absolute temperature. So running the cylinder a little hotter permits a large reduction in cooling surface needed. This is along the line of reduced weight and cost. I look forward to the day when engines will be run much hotter than at present.

Your editorial on "Body Design" deserves a second reading. "Utility is the larger half of art" is a truth that cannot be told too often. Too many buyers in the past bought not to use but to show to their neighbors. No wonder second-hand rigs are cheap now. And no wonder that many people still hesitate about buying an automobile.

Reading Pa. CHARLES E. DURYEA.

ADDRESS OF FRENCH MAKERS

Editor THE AUTOMOBILE.

[2,035]—Will you please favor me with the addresses of the following French firms, or give me the name of some French publication which I can get in this country: Lion-Peugeot, De Dion-Bouton, Panhard & Levassor, Anzani, Gnome?

The above are the makers of the special long-stroke motors and aeronautical engines. J. D. MOONEY.

St. Paul, Minn.

The addresses which you request are as follows:

Lion-Peugeot, Les Fils de Peugeot Frères, 33 1-2 avenue de la Grande-Armée, Paris.

De Dion-Bouton, De Dion, Bouton et Cie., 36 Quai National, à Puteaux (Seine), Paris.

Panhard & Levassor, Société Anonyme Panhard et Levassor, 19 avenue d'Ivry, à Ivry (Seine), Paris.

Anzani, Anzani, 71 1-2 quai d'Asnières, Asnières, Seine.

Gnome, Société des Moteurs Gnome, 49 rue Lafitte (Seine), Paris.

In case you wish to look into the matter of aeronautical motors, and that only, it would be wise to consult all of the French constructors, although there are a number of firms in this country making a motor applicable to this work. However, we are adding a number of addresses of French motor constructors to your list. The additions are as follows:

Antoinette, Société Antoinette, 10 rue des Bas-Rogers, Puteaux, Seine.

Astsr, Société de Constructions Mecaniques, l'Aster, 74 rue de la Victoire, (Seine), Paris.

Buchet, Usines Buchet, 49 rue Greffulhe, Levallois-Perret, Seine.

Esnault-Psltsrie, Esnault-Pelterie, 49 rus de Silly, Billancourt, Seine.

Farcot, J.-A Farcot, 9 boulevard Denain, Paris.

Renault, Renault Frères, 139 rue du Point-du-Jour, Billancourt, Seine.

Sizaire & Naudin, Etablissment Sizaire et Naudin, 79 rue de Lourmel, Paris.

WHAT CAUSED MISSING

Editor THE AUTOMOBILE:

[2,036]—Thinking your readers might be interested in a puzzling case of missing fire, I send the following: I had just installed a magneto and overhauled my Haynes car. It worked finely for a time, but all at once began to miss fire on two cylinders. I went over the wiring and cleaned out the carbureter, but no improvement. Finally, while leaning over with head close to carbureter I heard a whirring sound, and traced it to a one-inch slit where the packing between cylinder and carbureter pipe had come out. This inlet, of course, spoiled the mixture.

Hoping this may be of service to some troubled motorist.

WILLIAM SEVERANCE.

Stanford, Ky.

PROGRESSIVE methods are bound to find an outlet, and the growth of the business of the Anderson Carriage Company, Detroit, Mich., makers of the Detroit electric carriages, is ample evidence of the support the buying public most heartily gives a well conducted enterprise. For 1910 the company proposes to extend the line, more than double the output, and introduce such refinements in point of detail as the past year's experience with more than a half a thousand cars would seem to warrant.

The title figure will afford something of an insight to the art side of the electric situation as it is coupled up to Detroit electrics, and it is needless to say that the output of this progressive company is garbed in the several very excellent designs of bodies in keeping with the requirements, and at the command of the patrons. The body situation, then, will not have to be discussed at great length, and it will be enough to point out that the line includes everything from the little "piano box" to the most luxurious type of town car.

A Regular in the Detroit Line.—The Model D chassis is shown in the lower illustration on this page with the battery divided in two sections of two trays each and located at front and hind end of the chassis, thus bringing the body in the mid position, which makes for easy riding, and places the battery where it may be examined readily, at will. The weight of the battery is distributed in such a way that half comes on each set of springs, and this is quite an important point, making the spring problem easy and reducing wear and tear on the car.

When the Model D car is fitted out as a brougham it presents a neat and distinctive appearance, rides remarkably well, and is an easy going car with a remarkable ability for mileage, according to experiences gained. Some of the leading specifications of this model are as follows:

Wheel base, 79 inches.
Tread, 51 inches.
Wheels, 32 inches front and rear.
*Tires, 32 x 3½ inch.
Battery, 24 cells, 13 M. V. size.
Speeds, five, graded to 5-8-13-17-22 miles per hour respectively.

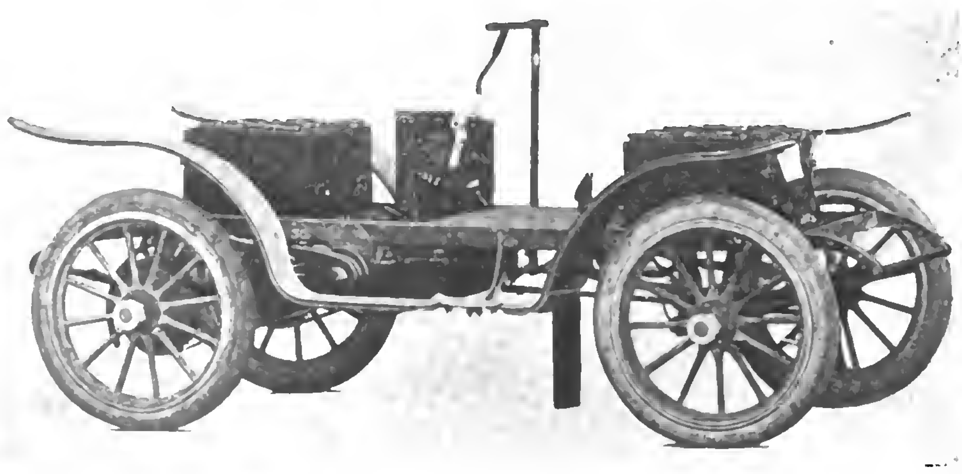
This car as a brougham weighs about 2,300 pounds, has a side lever steering gear, is equipped with two sets of brakes, one of which is on the motor and the other is on the rear wheels, of the internal expanding type.

The motor of Model D is of the enclosed type, series wound, and has a high torque characteristic, which assures the ability of the cars so fitted, will be maximum when it comes to hill climbing, soft going, and other unusual road conditions. Then, as will be well appreciated by those who may have given the matter thought, the speed of the car will be high when road conditions permit, which is to a certain extent an automatic condition.

The motor is of liberal rating, has a low temperature coefficient, will stand heavy overloading for a considerable period of time, and the commercial efficiency under average loading is very high indeed, thus insuring that the fixed losses are a minimum, while the high overloading ability is a guarantee that the copper losses are reduced to the lowest limit. These are all matters of the greatest moment to an owner of a car, and on account of the careful manner in which the electrical problems are worked out the battery "draft" is maintained at a low ebb and the radius of action is therefore on a very satisfactory basis.

Difference Between Now and Yesterday—Time was when electric carriages were not quite so satisfactory as was the wont, due to the relatively short distance that could be made on a single charge of the battery. The difference, which is now very great, when reference is made to mileage per charge of bat-

*Goodrich-Palmer web double tube clincher, 10 layer fabric.



Model D Chassis, Showing Equal Distribution of Battery Weight

Model D, 1910 Controller

tery, or better yet, per kilowatt of capacity of the same. In divers other ways the situation has undergone improvement, such as the controller, which is more simple and reliable.

But this same simplicity has been carried into the car as a whole, and by a process of elimination all the little sources of trouble have been removed. This is instanced in the rear axle for Model D car, to which is attached the distance members of the lattice form. The axle is fitted with Timken roller bearings, thus caring for friction and lateral thrust. The internal expanding brakes are of good diameter, and the shoes, which show on the axle, are faced with Raybestos, a fabric of asbestos interlaced with copper. This material is quite strong, having a tensile strength of about 2,800 pounds per square inch, and at 1,000 degrees Fahrenheit it is immune from trouble, while the coefficient of friction is better than .20 when the material is properly applied, as it is in this case.

Renold Silent Chain and Flexibility—An examination of the Model L type of motor shows more clearly than usual the aims of the designers to accomplish the main purpose, which is to assure that the mechanism of the transmission system will be flexible, efficient and durable. This particular example, with the covers removed, opens up to view the double reduction system, utilizing Renold silent chains to make the transmitting connection between the motor and the live rear axle.

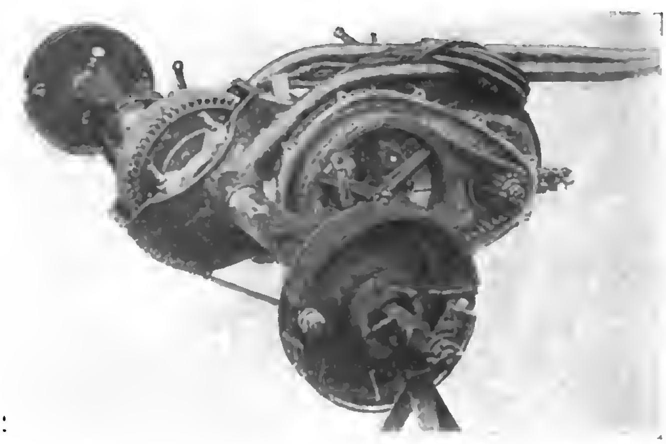
The end of the live shaft is exposed, showing a square, with a nut, castellated to accommodate cotter pins, and with the hubs of the rear wheels broached to fit tightly over the square shaft. Considering a long bearing, the results are very satisfactory. This view also presents the internal expanding brake shoes in such a way as to indicate great rigidity, which is essential to good work.

An Eye for Detail Makes for Success—Glancing over the cars in a general way at the plant of the maker discloses in a thousand ways the closest attention to detail. The batteries are received in the "green," and under the guidance of men of skill they are most carefully handled. The "trays," which hold the cells of battery, are made of selected grades of oak, properly seasoned, and so put together by dovetailing that they would stay in shape were no other fastenings used. The brass screws used to further bind the crates are countersunk, and the jars which hold the elements composing the cells of battery are so closely and properly nested that there is no likelihood of cell breakage, which form of difficulty was once so prevalent as to be a great nuisance and a source of considerable expense.

Motor Equipment, Model D, Detroit Electric

The electrical wiring is nicely done, the sizes of wire used being adequate to assure a minimum "drop," even under an excess draft from the battery as when the cars are accelerated on a grade under inferior road conditions. In a mechanical sense the cars are carefully constructed, using selected grades of material throughout, all fits are carefully made, involving suitable limits of tolerance, and of noise there is positively none.

In the steering gear all the links and levers are made of fine grades of steel, the shapes are such as to assure an adequate factor of safety, and the means for locking are standard in every way. Ball and socket universal joints are used in every case demanding them, and the bearing surfaces are so great, due to the use of large diameter balls, that wear is a minimum, yet even so, adjustment, to eliminate lost motion, may be made at will by the user without having to display a large measure of skill.



Silent Chain, Double Reduction Drive Used on Model L

POPULARITY OF ELECTRICS INCREASING

By W. C. Anderson, Pres. Anderson Carriage Co.

Enormous increase in the volume of business now being done by electric automobile manufacturers, certainly must be accepted as being first-class evidence of the degree of interest which the public is beginning to take in the electric automobile.

The utility of an electric car has never been as great in the past as it is to-day, and, therefore, it is bringing to the defense of the electric auto a class of well-posted buyers, who certainly do the industry great credit. To-day, the man who buys an electric in preference to any other style of propelled car, is not one who would either be considered as lacking in judgment.

Originally electric autos, were very much like they say religion is, namely, mostly indulged in by the ladies, and while there has not been a spiritual revival possibly among the men, there has certainly been an electrical revival, and the number of converts who are now showing their confidence in the permanency of the electric auto and its desirability, is really beyond the belief of a person who has not carefully noted this fact. As surely as every effect has a cause in any other phase of life, the same is true in the electric automobile. Its popularity will widen with the future of its development because of the natural love people have for a clean method, and a safe method, of being conveyed. So often it is better expressed by the people who come to buy an electric when they make the remark, that they want something that is "sane and simple," and therefore they investigate the merits of an electric car. The larger mileage has not escaped the notice of those who contemplate the purchase of some kind of an auto. Judging from demands, the interest of the public in the electric car cannot be overestimated.

UNDER the corporate name of the Metzger Motor Car Company, Byron F. Everitt, William Kelly and William E. Metzger will soon place upon the market a new car to be known as the Everitt Thirty. These men, it will be remembered, in company with W. E. Flanders, formed the E-M-F company, selling a car of that name. This concern was purchased on May 1 by the Studebaker Automobile Company, Mr. Flanders remaining as general manager. All of the men are well known in the trade.

The car will be a four-cylinder machine of the shaft driven type, designed by Mr. Kelly. This will be equipped with but two forms of body, a runabout and a five-passenger touring car. The latter, shown at the head of this article, is seen to possess pleasing lines. The wheelbase is long, the wheels are large, and in combination with a good spring suspension, should result in a very easy riding car. The spring suspension is seen to be: semi-elliptic springs in front and full elliptic scroll-ended springs in the rear. The former are fixed at the front end and shackeled at the back, while the rear springs are attached to the under side of the frame, which is upswept back of the tonneau entrance for this purpose. The combination gives a low center of gravity, and a low step, without losing anything from the very important clearance. Not only is the rear end upswept, but the frame has another drop just forward of the dashboard, making it what is known as a "double drop" frame. This is the form that has heen adopted by the best foreign makers, so that its use in a moderate - priced domestic car represents an unusual value, and one not heretofore offered in this class of car.

The power unit is carried well back from the front end of the chassis, rather farther than usual, in fact, the front line of the radiator being behind the front axle. The latter is of the popular I-section, and the material, steel. Spring seats are forged integral.

Pressed steel is used very freely throughout. The fenders, fender supports, steps, and many other parts are pressed from this material, which offers at one and the same time strength and light weight, an unusual combination. The fenders are both carried down to the frame on the inside, which enclosure prevents any mud or dirt from the road splashing up on the occupants.

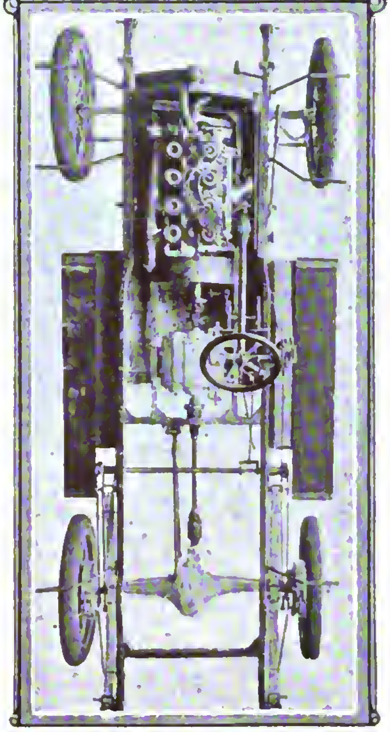
Back of a radiator of the Mercedes type, under a long hood, is located the engine and clutch. Behind the dashboard a liberal space is allowed for the driver's foot room, this being a point in the comfort of the driver. The steering wheel is given a large rake, which lends to the whole side view of the car a low, fast appearance, not at all distasteful. A large diameter steering wheel affords the driver excellent control over the car regardless of whether he uses one hand or both. Below the wheel, on the driver's left, are placed the spark and throttle levers.

Two foot pedals of the piano type are provided for control purposes, both working on the push forward principle. Besides these, there is a foot accelerator for the sudden control of the car in heavy traffic, such as in the crowded city streets, or in an emergency of any kind. The side levers are short, the emergency brake lever being placed on the outside. This is held in any desired position by a ratchet on the under side of the quadrant bar, which is notched for this purpose. The inner lever is the change speed operating means, and is the shorter of the two. While the new car has not heen placed on the market, several cars have been built and tried out on the Detroit streets.

About thirty days ago the company purchased the factory of the Jacob Meier Company, trunk manufacturers, located at Milwaukee avenue and the Grand Trunk Railroad, as shown by the cut on this page. The plans call for the manufacture of 5,000 cars during 1910.

Large and Commodious Plant in Detroit to be Occupied by Metzger Motor Car Company

What the K-10 Pullman Is Like



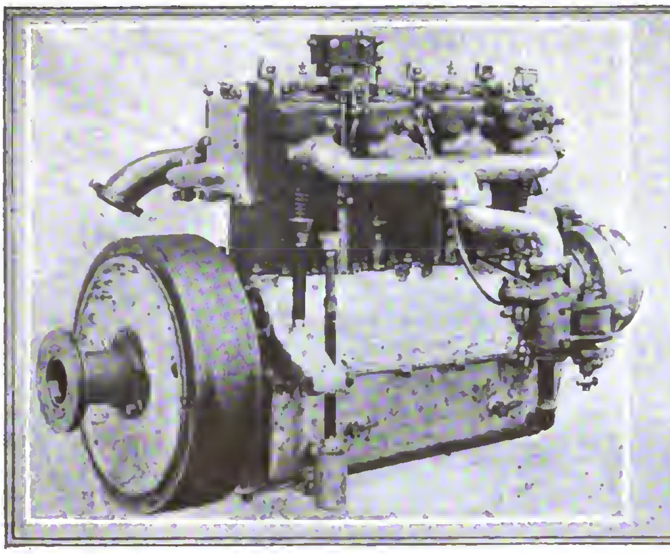
FOUR models, in many styles of body, and with three differing sizes of engines will constitute the output of the York Motor Car Company, York, Pa., for the coming season. Of these, the model bearing the mark K-10 will be the leader, and since the construction of the others follow this one in nearly every particular, it will be sufficient to describe that. The four models are: K-10, a four-cylinder car, to be had with runabout, baby tonneau, or five-passenger touring car bodies; 4-40, a four-cylinder car of greater power and speed, which is turned out with but one body, a gentleman's roadster; M, a touring car with a large and powerful motor; and finally, a new car, to be known as Model O, the details of which are not ready yet. This latter will be a high-class, light car, to sell at a lower price than Model K-10.

Probably the most interesting part of the car is the motor. This is of the four-cylinder type, with cylinders cast individually. Each cylinder has a widefaced flange cast on each end, these being machined so as to fit together. Then, in assembling, the adjacent flanges are bolted together, making the power plant as a unit. It is argued in favor of this construction that it has all of the advantages of the block construction with none of its disadvantages. In addition, this method allows of the use of five bearings on the crankshaft. This makes the shaft very stiff and strong, since the power impulse from each cylinder is taken by a pair of bearings, equally spaced on each side. Not only is rigidity of the shaft itself gained in this way, but the danger of lack of alignment is reduced to a minimum, and lubrication is improved.

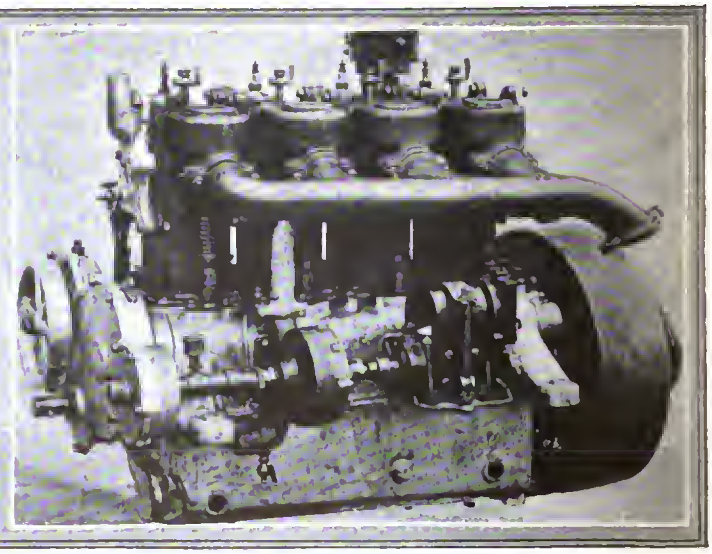
Cylinder Dimensions Increased—The size of the cylinders has been changed over that of last year, that is, the stroke has. The sizes now are 4½-inch bore by 4¾-inch stroke. In the lengthening of the stroke is to be seen the working out of the most modern tendency in engine construction, namely, the leaning toward long strokes. While this particular engine is not unusually long, the ratio being but 1 to 1.05, it denotes the movement now being made to take advantage of the superior power afforded by the "long" motor. The valve sizes have been increased, not only to care for the additional cylinder capacity, but still more than that, to allow of a better running, higher powered engine. So it is that, although the bore is not changed, and consequently the power rating by formula would not change, the output of this motor has been increased until it actually develops more than 35 horsepower on the test block. For this reason the company will call the engine a 35-horsepower unit.

Other details of the motor remain the same as in previous years. These include the well-known T-head cylinder form, with valves located on opposite sides. This symmetrical construction results in the placing of the inlet on the right side and the exhaust on the left. The right-hand placing of the inlet and carbureter puts this important adjunct where it is very convenient to the driver for adjustment or repair. Similarly, it takes the heated exhaust pipes out of the way of ordinary roadside work. The valves are located high up in valve pockets, which are well water-jacketed. The large flanges at the ends of the cylinders allow of the use of unusually large core prints at that point, which results in more accurately located cores, and also allows of the more complete removal of the core sand. Both points conduce to better cylinders. The same opening is used as the basis of the water circulating system, the pump feeding the liquid into the rear or hottest cylinder, from which it works its way forward through the interior of the cylinder water jackets to the front cylinder, the core hole cover plate there carrying an upward extension in the form of a pipe, to which the hose from the radiator attaches. This makes the system very simple.

Ignition System Most Complete—To insure perfect ignition, insofar as it is possible to have it perfect, two separate and distinct methods of firing the charge are fitted to the car, either one being complete in itself and self-contained. The source of current for the one is a high tension Bosch magneto, while batteries, acting through a single coil and distributor, furnish the



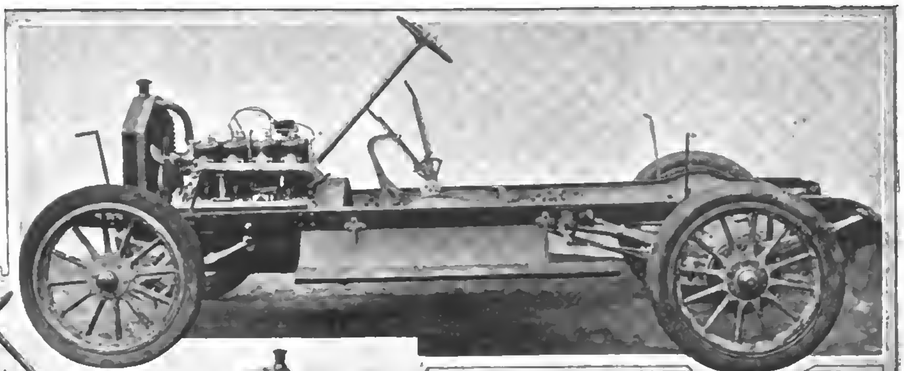
Inlet Side of Motor Shows Carbureter to Advantage



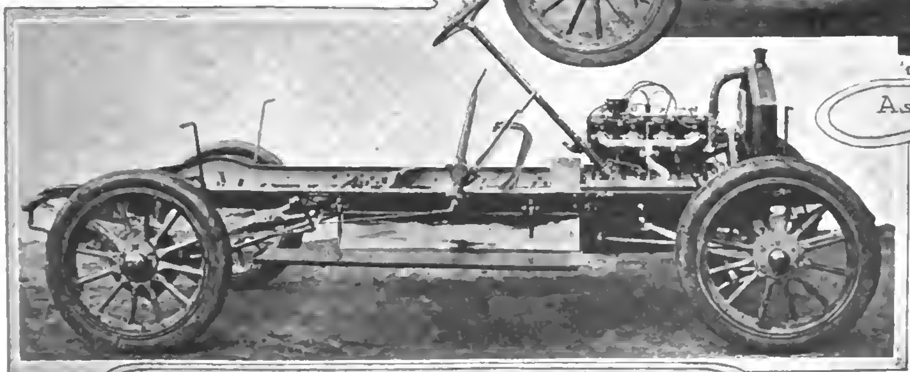
Accessories Are Grouped on the Exhaust Side alternate. The plugs for the magneto set are located in the top of the valve caps, over the inlet valves, while those for the battery-distributor system are placed in the side of the combustion chamber, projecting just above the inlet pipe.

One very marked feature of the engine is the oiling arrangement, which is distinctive. This is so designed as to furnish perfect lubrication at all times and under all weather conditions, and also to insure a continuous, perfect level, regardless of engine speed. The system includes an eccentric-driven pump located on the rear of the subbase, which receives the oil from the lower compartments of the base and delivers it to the upper compartments, provided wtih reservoirs. From these the oil is delivered to the base proper, where the splash lubrication takes place. The height of the oil in this base is controlled by eccentric valves, with stems extending outside of the base and with hands pointing to a dial marked in spaces one-fourth of an inch apart. The oil is raised or lowered by moving the hands. In other words, this is splash lubrication, with an oil reservoir in the bottom of the engine base and with eccentric pumps to raise it to the splash lubrication level.

Frame of Pressed Steel Shows Merit—The alloy steel frame of channel section with the open side turned in, shows a number of sterling features. The forward portion is narrowed by two inches to give a large steering lock. The rear end is arched over the rear axle, so as to provide



As the K-10 Pullman Appears from the Left.



Right Side of Pullman K-10 Chassis

plenty of clearance for the rising and falling action of the rear axle and springs when surmounting an obstacle. The frame has been lengthened over last year by 7 inches. This makes the wheelbase 112 inches and allows of the use of a more commodious body than before. Both front and rear springs are semi-elliptic, fixed at the front end and shackeled at the rear. The front axle is an I-section, drop-forged, while the rear axle is of the full floating type, mounted upon Timken bearings. The brakes are mounted on the rear wheels and are of two types, internal expanding and external contracting. These are of large diameter, lined with removable heatproof lining, and operate through equalizing devices, which insure an equal pull.

Almost every part of the car is now made in the Pullman factory, this including axles, steering gears, bodies, upholstery work, tops, all sheet metal work, as well as the more usual engine and transmission. This is a point well worth consideration, for it means that in case of trouble, spare and repair parts can be shipped instantly, which is not the case with an assembled car. The equipment of the cars is very complete. The factory figures for the 1910 output show that 2,000 cars will be completed, these being divided over the four models.

The crankcase is in two parts, the upper and the lower. Both of them partake of the shape of a box, the upper half being of a tapering section, while the lower is more nearly square. The material is aluminum, and it is heavily ribbed for strength. All of the accessories but the carbureter are grouped on the left or exhaust side. The shaft on this side, for the purpose of driving them, is jointed in several places so that any one accessory may be removed at will, without disturbing the others. The centrifugal pump is nearest to the front, being located midway between the first and second cylinders. The magneto is located farther back, being placed opposite the last cylinder. It is strap-held in place, a single bolt with a pivot at the bottom holding it. By loosening the nut, the bolt may be revolved out of the way, and the magneto picked right out.

CLASSIFICATION OF GASOLINE FRACTIONS

Generally, automobile fuel, which is in liquid form, is capable of classification, in the manner as follows:

(a) Olefiant hydrocarbons;
(b) Aromatic hydrocarbons;
(c) Alcohols;
(d) Combinations of the three.

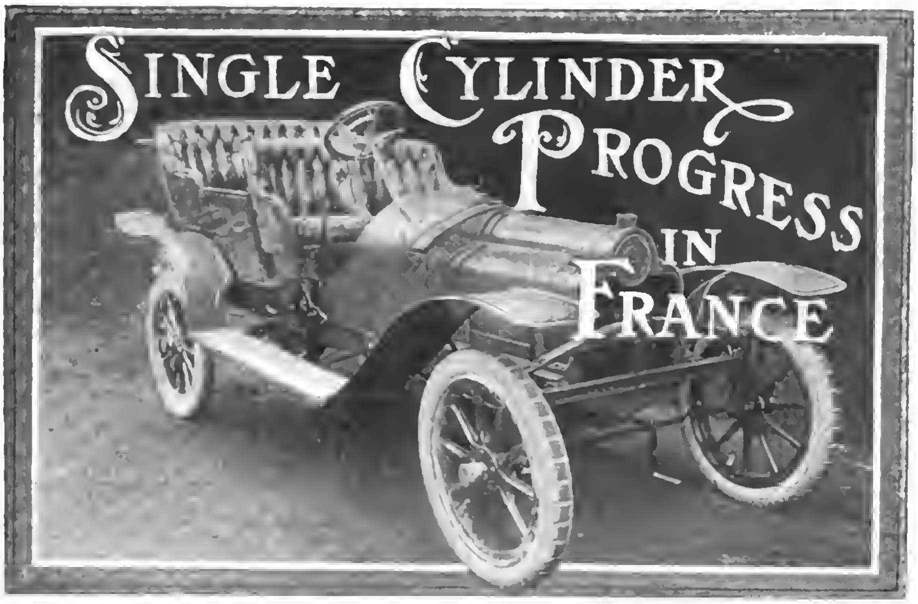
The olefiant class belongs to the series which form, or produce an oil; specifically designated as colorless, gaseous hydrocarbons called ethylene.

The formula of ethylene is C_2H_4, and the compound may be produced by the action of concentrated sulphuric acid on alcohol. It is an unsaturated compound and combines directly with chlorine and bromine, to form oily liquids (Dutch liquids) hence the name, "olefiant." The same compound is also called ethene, elayl, and formerly it was known as bicarbureted hydrogen. The aromatic class include a long series of hydrocarbons such as may be derived from benzine, the formula for which is C_6H_6.

SOUTHERNERS INVESTIGATE GOOD ROADS

Providence, R. I., Sept. 27—The party of Southerners, who, as the guests of B. F. Yoakum, of the Rock Island-Frisco railroad, are touring New England to study its systems of roads, arrived here Sunday in four Packard cars, in the midst of a driving down-pour of rain. The party has now been ten days on the road. They came down from Boston by way of Plymouth and Fall River. Poor roads were encountered between Plymouth and Fair Haven, and the machines skidded badly in the mud between New Bedford and Fall River. There were no mishaps, however, and the party was not forced to stop at any time.

The party consists of representatives from Louisiana, Arkansas, Texas and Oklahoma. Mr. Yoakum, who is an enthusiast on the subject of good roads, suggested the tour in a speech at Shawnee, Okla., August 17, and is paying the expenses. The state road officials have co-operated by giving frequent talks on the construction of the roads met on the tour. The sustained interest has surprised every member of the party.



PARIS, Sept. 24—The high price of gasoline, together with special methods of taxation and, in a smaller degree, the state of the highways, have all tended to the development and popularity of the one-lunger type of car in France. Conditions are so different in America that doubtless the one-lunger will never attain the same importance as in France. It is nevertheless interesting to note what has been done by specialists on this side of the water.

The first rule that was laid down was that the single-cylinder car must look like a four. This was not difficult to arrive at, and has been so generally copied that from an examination of the lines only it would be impossible to say whether the bonnet housed a one, two or four-cylinder engine. Frequently to aid in the deception without losing too much space the gasoline and lubricating oil tanks are fitted on the dash.

The next point was to make the engine so silent and easy running that it would be impossible for the ordinary man to declare how many cylinders were at work. This was a more difficult problem, as was shown by the fact that many a car from a good factory looked all right when it was motionless, but revealed its number of lungs as soon as the starting crank was pulled over. Such improvement has been made during the past year or two that there are now two or three makes of cars with only one cylinder that can be throttled down so low and made to turn so quietly that only an expert placed six feet away could certify to the number of cylinders. It is understood, of course, that the type of engine can be detected if it is raced, but it is a fact that if throttled down to run at the slowest speed such engines as the latest models of Sizaire-Naudin, De Dion and others that might be mentioned are not only so quiet that they cannot be heard a few feet away, but would put to shame some fours which would object to being called bad. On steady running, too, the difference between the one and the four has been made so slight as to be hardly noticeable; and it is only when it comes to varied work with much gear changing that the real inferiority is felt.

Taking the Sizaire-Naudin as one of the best examples in the one-lunger class, we find a vertical cylinder of 4 7-10 by 5 1-10 inches bore and stroke, with superimposed valves, the exhaust being operated from below and the intake from overhead. In accordance with modern practice, the valves have a large area even on the standard models, while on the semi-racing and full racing models it reaches the abnormal. There is nothing of special interest about the exhaust, but the operation of the intake, which is immediately above it, is of greater interest. The lift of the valve is varied by the displacement of a helicoidal cam, operated from the lever on the steering wheel. There is no control direct on the carbureter, the amount of lift of the valve of course regulating the amount of mixture that can be aspired. The rocker arm is a short lever with spherical ends, one of which fits onto the projecting stem of the inlet valve, while the other receives the end of the vertical push rod. It pivots on a crossbearing above its center, against which it is pushed by both the valve stem and the push rod. A wrench allows the entire valve-operating mechanism to be dismounted in a few seconds.

A light steel piston, with only two compression rings at the top and a guiding ring at the base, is employed. The piston is of more than usual length. Like the piston, the connecting rod is made as light as possible consistent with strength. Compression is high and very heavy internal and external flywheels are empolyed. The carbureter is placed very close to the cylinder walls—in fact almost touching them—in order to obtain all necessary heat without jacketing. It is an ordinary float feed type, with flow from the dashboard tank by gravity, and the air inlet at the base of a venturi tube, below the single jet nozzle. The tube mounts straight to the top of the cylinder, gradually widening as it mounts. The additional air inlet is almost direct over the inlet valve, the air being admitted through an automatic valve.

Water cooling is by thermo-syphon, the flow being through a plain copper tube radiator, with a large circular water tank immediately back of the head of the radiator. For the size of

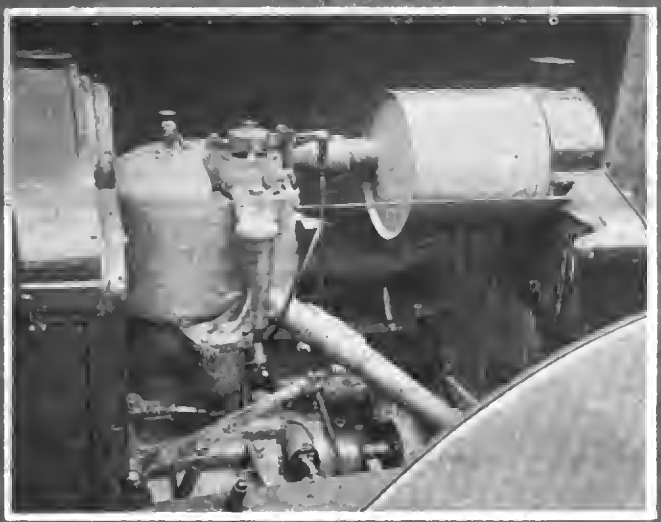
Unusually simple steering gear — **Dashboard, lubricator, and single pedal** — **Plate clutch and spring**

Some of the Mechanical Details of the Single-Cylinder 12-Horsepower Sizaire-Naudin Car, Shown In Title

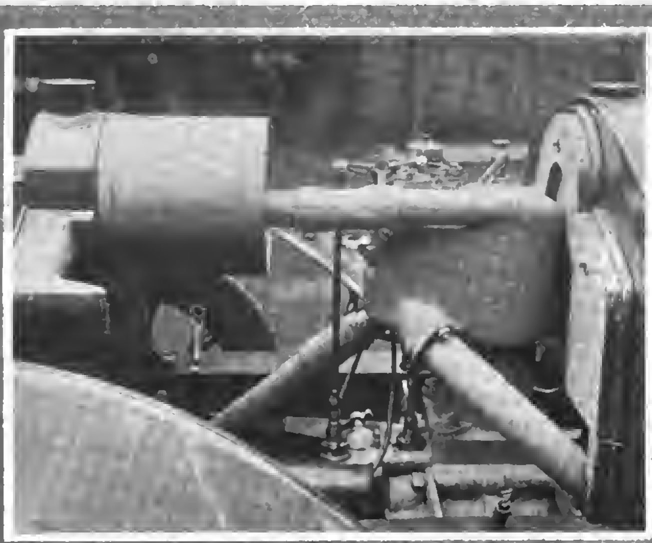
the motor the water pipes are of large diameter and are altogether devoid of bends, thus allowing a flow of water without any obstruction whatever. Ignition is by high-tension magneto with timing gears exposed. Provision is made for double ignition, but it is very rarely indeed that it is fitted. The exhaust port is of very large diameter, as is also the exhaust pipe. The use of a long and efficient type of muffler makes the exhaust absolutely noiseless. The absence of chug-chugging from the exhaust is somewhat remarkable, though there is nothing secret in the manner in which this silence is obtained, it being no more difficult to fit an efficient muffler on a one-lunger than on an eight-cylinder engine.

Lubrication for the motor is by splash, there being a couple of drips on the dash, one leading to the engine and the other to the rear axle. Some of the other features of the car are a transverse, inverted, semi-elliptic spring in front and shaft drive with differential and change speed mechanism combined in the rear axle, with direct drive on all three speeds.

A feature of unusual interest is presented in the steering gear. This consists of a coarse pitch worm of great depth, into which a hardened finger is set. When the worm is rotated in the usual manner, the finger is constrained to move, but being made a part of the steering shaft, must move in the arc of a circle.



Carbureter Side of Sizaire One-Cylinder Engine



Large Water Tank Is Hung on the Radiator

FRENCH COMPETITION FOR AERO MOTORS

Paris, Sept. 25—The light-weight motor, developing great power and being absolutely regular in its running, being at present the greatest need in the aviation world, the Automobile Club of France announces another motor competition similar to the one held in its laboratory last spring.

Several lessons learned in the first event are being put to profit. Thus instead of a minimum and maximum horsepower being given, the weight of the motors only is limited. Under the old Gordon Bennett rules, when the chassis weight was fixed at 1,000 kilos it was found possible to increase the power from about 25 to 120; it is believed that by fixing a weight limit in the same way for engines the power developed can be increased considerably.

The weight limit is 330 pounds per motor, complete with everything necessary for running. Fuel allowance is 13 ounces of gasoline and 2 ounces of lubricating oil per horsepower-hour. If this amount is exceeded the weight of the excess will be added to the total weight of the motor; if the consumption is less than this the weight of the difference will be deducted from the weight of the engine. A three hours' test will be made under full load. No engine can be classed which weighs more than 8 4-5 pounds per horsepower.

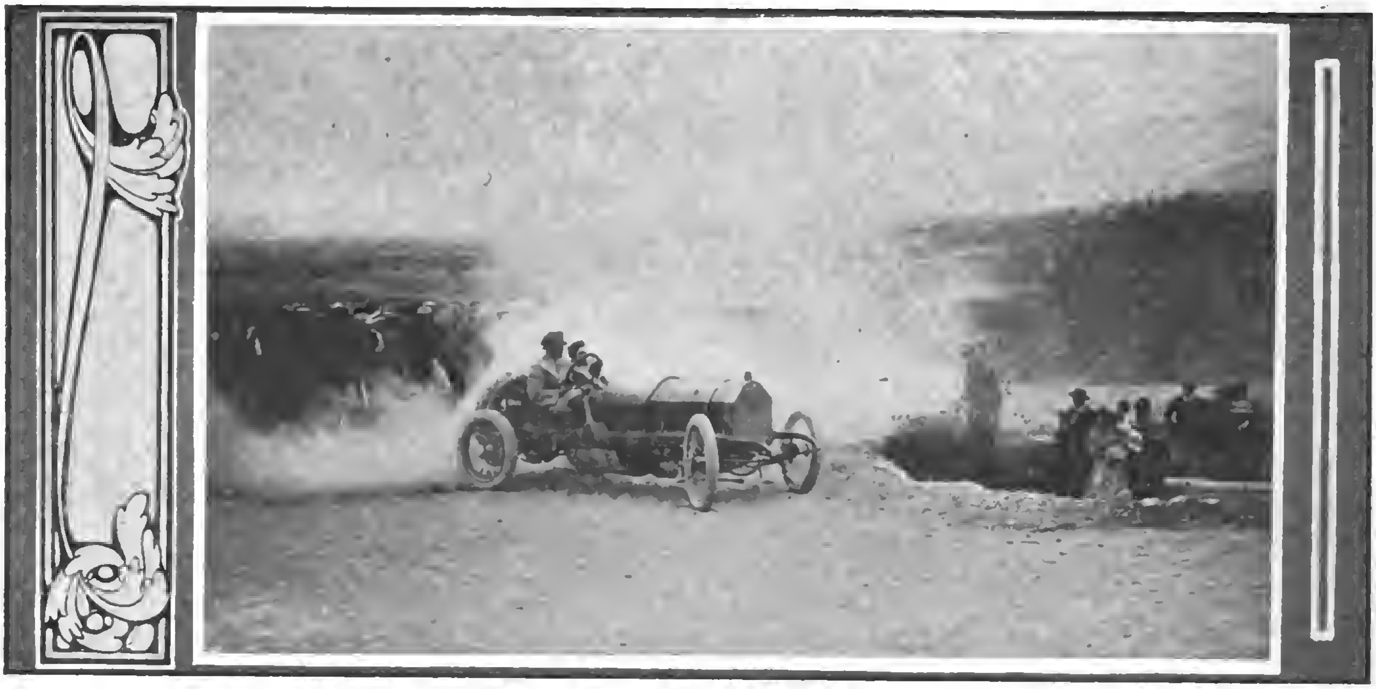
It will be endeavored to make the conditions of the test approximate as near as possible those under which an engine has to work when on an aeroplane. Thus, an air-cooled motor benefiting by a blast of air from the propeller when on a flying machine, will be allowed to use a fan, the weight of which will not be taken; the power necessary to drive the fan will be added to the effective power of the engine.

Considering the disadvantages under which water-cooled engines are placed during a bench test, a radiator, water tank and fan will not be weighed. All piping, as well as the water pump will be included in the weight of the motor. In place of the ignored cooling organs each motor will have to bear a supplement in the shape of 1 1-10 pounds per horsepower, according to the average power developed during the three hours' test. Piping will be fitted to carry the exhaust out of the testing room, but will not be included in the weight of the engine.

Since the last motor test the suggestion has been made that the engines should be mounted on a spring base. It is considered, however, that as the framework of an aeroplane has very little elasticity, this should not be allowed. The suggestion has also been made that the engine should be mounted on an aeroplane, but this has also been rejected on the ground that the aeroplane attached to the floor or a bench in the testing room would not be in the same conditions as when in the air. The flexibility of the frame, in addition, might cause the breakage of the crankshaft or the rupture of the universal joint between the engine and the brake.

The tests will be held during the month of December at the Automobile Club laboratory, near Paris. Entries are received at the rate of $20 per motor. Out of the subvention offered by the Minister of Public Works a prize of $200 and two prizes of $100 each are offered.

Entries for the light-weight motor competition are not likely to be lacking, for there are at least a score of firms that have studied this problem. Brasier, admitted one of the finest motor designers in France, has a four-cylinder aero motor ready to put on the market; Bayard-Clement has a new light-weight six; Gabriel Voisin has just designed a simple light-weight four; Buchet has produced a six; Renault, in addition to the eight-cylinder air-cooled model has an interesting four for aeroplane work, and Anzani has a new four with the cylinders placed in V. These are all engines that have not yet been fitted to any aeroplane. The number of those in daily use for flying machines is very much greater.



One of the Difficult and Trying Turns in the 13½-Mile Course Up Mont Ventoux

HISTORIC CLIMB OF MONT VENTOUX

Avignon, France, Sept. 24—Mont Ventoux, the longest and most difficult hill-climbing course in Europe, was again conquered in record-breaking time. Between the little village of Bedoin and the observatory on the summit lie 21.8 kilometers (13.5 miles) of narrow road with an average grade of 9 per cent. As in last year's meet the hero was Bablot, driving a Brasier. He drove his car up the steep and winding course, through a fog which made it impossible to see twenty yards ahead, in the remarkable time of 18:41. Bablot had the advantage of an intimate knowledge of the course, and without goggles, he took the dangerous turns at full speed. Pierron with the Motobloc took second in the same class with the time of 19:42, feeling the handicap of the fog much more than his speedy rival. Lochner with an Opel, Tangazzi with a Lancia and Ceirano with a Scat each won their respective classes. The voiturette trials on the first day resulted in a double victory for the Hispano-Suiza, a Spanish car, and Bablot also scored with a small Brasier. It is noteworthy that both this year and last Bablot succeeded in breaking the record in spite of unfavorable weather conditions, and the French sportsmen are eagerly looking forward to next year in hope that, at last, he will be able to show his best speed.

FRANCE MAY BECOME PARSIMONIOUS

Paris, Sept. 24—Automobile tourists to France, who have run over the sandpapered roads of the republic and left a fertile stream of dollars at hotels and holiday resorts, without ever being called upon to pay for the use of the highways, are now about to learn that there is a revenue officer in this land of travel. Next year's budget proposals provide for the taxation of automobiles brought into France for temporary use. It is not decided what the tax will be, the official statement being that it shall be in proportion to the length of stay, and on the same ratio as is paid by home cars. The proposal is not received with anything like joy, even by the natives, for though the foreign visitors may do a little to scratch the fine surface off the roads, it is calculated that the money they bring in is worth far more than the damage they do.

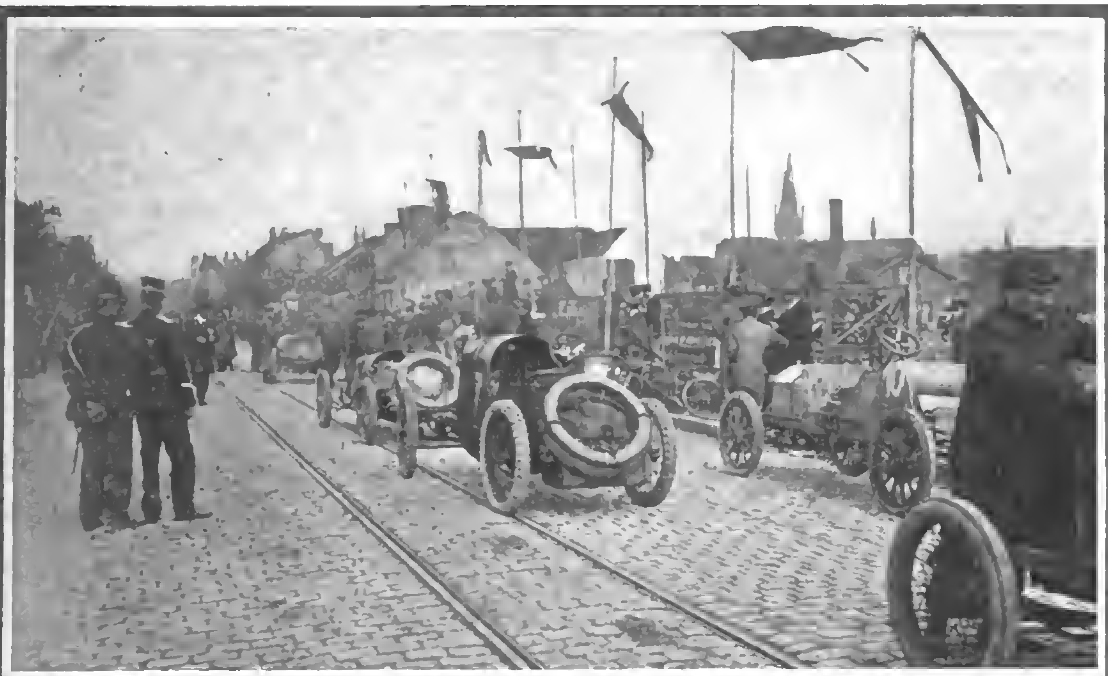
But the home autoist has not escaped attention. If he is the possessor of a car modestly rated at less than 10-horsepower he will not be called upon to open his purse strings any wider. If he has a more powerful vehicle the increase may be as high as 42 per cent. He must pay a fixed tax of $8 for a two-seated car and $15 for a four-seated vehicle, if he habits any town other than Paris, in addition to a tax per horsepower increasing from $1 per horsepower up to 10 horsepower until it reaches $6 for every horsepower above the eighty-first. If the owner lives in Paris he will have the pleasure of contributing an almost equal amount to the city authorities in addition to his State tax.

LONDON POLICE REGULATE MOTORBUSES

London, Sept. 25—The new police regulations for motorbuses show several important changes, especially in limitations of weight and speed, tire section, etc. The maximum weight unloaded is specified at 3½ tons, with an option of 6 tons loaded, in which case 4 tons must be on the rear axle and 2 tons on the front axle. The maximum number of passengers is 16 inside and 18 outside, and in estimating loaded weight 140 pounds must be allowed for each passenger, as well as the driver and conductor. The total length of the vehicle must not exceed 23 feet, nor its breadth 7 feet 2 inches; the clearance between the front and rear axles must be a minimum of 10 inches loaded. Tires must be of resilient material. All 'buses must be so geared that their maximum speed shall not be greater than 12 miles an hour, or else be fitted with a device to give an audible warning as long as that rate of speed is exceeded.

MAINTENANCE COST OF LONDON TAXICABS

Figures showing the number and cost of replacements on the taxicabs in use in London have been collected by *Motor Traction*, an English magazine principally devoted to commercial vehicles. The most valuable are those pertaining to the 10-12-horsepower two-cylinder Unic cabs, which have been in use for three years. That part of the mechanism of these cabs which wears out first is the second speed countershaft gear. This must be renewed after 10,000 miles, at a cost of $9. The sliding member of the change-gear lasts from eighteen months to two years; it costs $24, with its two pinions. The bevel driving pinion lasts 18,000 miles, and entails an expense of $10 for renewal. All the other gear wheels of the cabs were in good condition, without having been renewed, after three years' running. The total expense for replacements averaged $.003 per mile.



Contenders on the Course at Ostend, Where the Little Cars Provided an Exciting and Fast Race

FRENCH VOITURETTES RACE AT OSTEND

Ostend, Belgium, Sept. 18—The Coupe des Voiturettes, the only road race held this year, proved a complete success, and the absence of the big racers was scarcely noticed. In fact, the little cars are as fast as the big ones were two years ago, as everyone had to admit when Collomb made the fastest lap at the rate of 62 miles an hour. Lion-Peugeot added another to its long string of victories by taking first place. Giuppone was the winning pilot. Thomas, on the Le Gui, took second, being the only other contestant to finish the 248.6 miles called for. Collomb on the Corre-La Licorne took the lead from Giuppone on the third lap and held it till the sixth, when his car overturned. All contestants except Giuppone and Thomas dropped out before the tenth lap. Lormelle, driving a two-cycle Darras, was one of the last to quit, his trouble being a broken wheel. Giuppone's time was 4:33:28, an average of 54.4 miles an hour. The other two Lion-Peugeots had trouble early; Boillot cracked a cylinder and Goux burst a tire after he had used up all his spares. The race was characterized by the usual good management and was a great success as a sporting event.

EX-CHAIRMAN THOMPSON IN GERMANY

Jefferson de Mont Thompson, ex-chairman of the A. A. A. racing board and Vanderbilt cup commission, has been spending most of his summer in German touring. In the course of a long article, the Dresden *Daily Gazette* quotes Mr. Thompson on the Long Island Motor Parkway, and then continues:

Mr. Thompson for the past three years has almost continually been touring Europe en automobile, inspecting road conditions and other matters of interest to automobilists. His judgment on the Saxon roads will be read with pleasure, coming as it does from such a source. "I find the Saxon roads," he informed us, "by far the best in Germany, if not in all Europe. The materials to hand in this country are particularly adapted to road-making requirements, and the yellowish gravel used in Saxony is now recognized as the best material known to exist. I have been profoundly impressed by the superb engineering that is everywhere visible as I motor through Saxony, up finely graded hills and over perfectly smooth mountain roads."

Mr. Thompson also had many pleasant things to say of the courtesy and consideration which he invariably meets with now at the hands of German customs officials and other frontier officers. Up to eight or nine years ago, he said, conditions were very different, and an American tourist entered Germany in some trepidation. Now he comes in the full conviction that he is welcome, and as a consequence American tourist traffic, particularly en automobile, is almost doubling every year. "I always recommend the German tour to my American friends," continued our informant, "and I frequently meet over here acquaintances whom I previously advised to give the Fatherland a trial. I like to advertise the qualities of Germany everywhere I go because I get along so extremely well with the German people and German customs."

Mr. Thompson is one of the founders of the Aero Club of America and is a delegate to the aeronautical international convention to be held in Italy during next October. "We in America," he said, "are greatly interested in aviation, and at present there are six members of our club who fly at least as well as the brothers Wright."

In conclusion Mr. Thompson told our representative that this is his eleventh summer as an automobile tourist in Europe, and, "although I fear you will hardly believe me, I have never had an accident of any kind."

According to another paragraph in the Dresden paper, Mr. and Mrs. Thompson were entertained by Consul-General T. St. John Gaffney and Mrs. Gaffney, who afterwards accompanied them on an automobile trip through Saxon Switzerland.

WHY MADRID IS DISCARDING AUTOS

Vice-Consul Maddin Summers, of Madrid, furnishes the following information concerning the use of automobiles and carriages in the capital of Spain:

For the last four or five years the use of automobiles in Madrid has almost overshadowed the carriage trade. Autos became fashionable, both for excursion purposes and for use in the city. It was argued that their running expenses would be less than the maintenance of horses and carriages. This, however, has proved a mistake, as far as Madrid is concerned, as repairs and separate pieces are very expensive, owing to high duties, freight, commission, transportation, etc., very much the greater number of the machines being of foreign manufacture. Then the price of gasoline is double what it is in France. The consequence is an automobile crisis, and many persons are selling their machines very cheaply to get rid of them, while the carriage and horse trade, on the other hand, is looking up.

There are practically no American automobiles and few carriages in Madrid, for the reason that intending buyers want to see the machine or carriage before purchasing, so that they may know exactly what they are buying. The principal foreign automobile manufacturers have branch houses here, with machines to show interested persons. They also have on hand the repair parts, etc., so that the purchaser knows what he is buying.

Santos-Dumont in His Record-Breaking Flight at St. Cyr, France, Making Speed of 56 Miles per Hour

SPEED RECORDS ANNIHILATED BY SANTOS-DUMONT IN FRANCE

PARIS, Sept. 25—Maurice Guffroy and his attendant mechanics were working in their aeroplane shed by the side of the "Salt Hole," a few miles out of Versailles, when the noise of an open exhaust attracted their attention. The sound did not come from the highway, which runs by the shed, but was furnished by a motor up aloft and advancing rapidly over the plateau. A few minutes later and the aeroplane had settled down, Santos-Dumont had stepped out and Guffroy had lost his bet.

A few months ago, Guffroy, the Rep pilot, and Santos-Dumont, the steersman of his own aeroplanes, each built sheds twenty miles to the west of Paris, Santos-Dumont selecting a spot in the valley near the town of St. Cyr, and the Rep pilot pitching on a plateau six miles away. Santos-Dumont made a bet that he would pay a visit to Guffroy in his aeroplane.

Messrs. Santos-Dumont, Darracq and Ribbeyrolles

Months passed and the affair seemed to be forgotten, for the diminutive Santos-Dumont flyer had given but indifferent results at the trials. Then a new motor was procured—a simple two-cylinder, horizontal, developing 30 horsepower and weighing 110 pounds—which was found to be so satisfactory that after one preliminary trial the aeroplane was steered direct for the Salt Hole, six miles away, high up on the hill.

Santos-Dumont rose after running less than thirty yards on the ground, and with a favoring breeze behind traveled at the rate of more than fifty miles an hour. He had to rise high, almost two hundred feet above the ground, in order to clear the telegraph wires and tall trees. Seven minutes later he had settled down without breaking a spar, having accomplished a high speed cross-country flight with the smallest aeroplane in existence.

The Santos-Dumont monoplane is only 20 feet from tip to tip, compared with almost twice that area on the majority of monoplanes. It has a light bamboo backbone, at the extremity of which is a tail and the rear rudders, and has the general appearance of a large dragon fly. The motor is a two-cylinder opposed horizontal of 5.12 by 4.73 inches bore and stroke, without flywheel, and of very simple, even ordinary design. It is the first of this type that has been built at the Darracq factory, but has given such satisfaction that a series will be commenced.

While winning his bet with Maurice Guffroy, the Brazilian aviator won another with Henry Farman, who had declared that an aeroplane of such small dimensions would never be able to fly. It has not only flown, but proved itself very much faster than any other machine in France. It is believed that an aeroplane of this type could be built for $1,000. Santos-Dumont declares that he has no intention of entering the business, but that anybody is at liberty to copy his design who desires to do so and build for themselves. He is satisfied to have created the "baby" type of aeroplane.

Santos-Dumont Also Gets a New Starting Record

Not satisfied with making a cross country trip of six miles on the smallest aeroplane in existence, Santos-Dumont returned from Buc to his shed at Saint-Cyr, landing within a few feet of his own doorway. After the trip out, the aeroplane passed the night in the Rep shed on the Buc plateau; the next afternoon the areoplane was brought out, the motor started and the home trip across the open fields, woods and streams was commenced. Seven minutes were occupied in making the journey, the increased length of time being accounted for by the presence of a brisk head wind.

The next exploit was to beat the starting record established by Glenn H. Curtiss in Italy. This Santos-Dumont succeeded in doing, getting into the air in 6 1-5 seconds, after a run of 229 feet on the ground. Curtiss had only been able to rise after 8 seconds, during which time he covered 246 feet before getting clear.

The attempt was disappointing to the aviator, for he had imagined that he could get away in half the distance necessary for the Curtiss machine, that is in a little over one hundred feet. Several attempts were made, one of them being on the highway, but it was not possible to get a shorter time than 6 1-5 seconds. It will be interesting now to watch the machine in a speed test round a course such as that at Rheims. It appears to be faster than either the Curtiss or the Bleriot flyers, but estimates even of experts are apt to be so far from the reality that an officially timed test should be made. The aeroplane, which is only 30 square feet in area, is fitted with a Darracq two-cylinder horizontal water-cooled motor, developing 30 horsepower for a weight of 110 pounds.

LATHAM FLIES ACROSS BERLIN

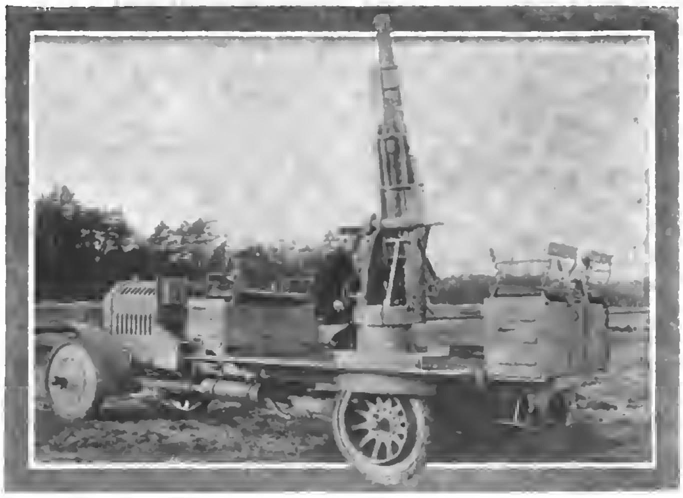
Berlin, Sept. 27—Hubert Latham to-day made a brilliant flight across the city from the Tempelhof Field to the aviation field at Johannisthal. The distance travelled was about ten kilometers and the time seven minutes. The wind was favorable, and Latham soared for most of the distance at a height of 100 meters. His machine was an Antoinette monoplane.

The aviation meet here has been disappointing. Yesterday only the speed contest was begun, and none of the contestants covered the minimum distance of eight kilometers. Leblanc, on a Blériot monoplane, turned a somersault on alighting, but was not injured. To-day Henry Farman made eight rounds of the field, covering twenty kilometers in eleven minutes. Blériot made five rounds. Orville Wright is not participating, and his failure to appear has done much to spread the feeling that the meet was incomplete. The public turned out in large numbers to see the "bird-men" and was consequently greatly disappointed.

WRIGHT THREATENS FOREIGN AEROPLANES

Two aeroplanes arrived in New York last Sunday on the *Chicago,* and caused no little worry to the customs officials. One was the machine Curtiss used at Rheims, and the other the Farman biplane brought over by J. W. Curzon, of Jackson, Miss. Wilbur Wright has threatened to enter a suit against Mr. Curzon on the claim that the Farman machine infringes his patents. Mr. Wright also threatens a suit against Hayden Sands, of New York, who has purchased a Blériot machine, which is expected to arrive in a few weeks.

The owner of the latter, as well as the French builder have given expression to opinions to the effect that the Wright patents are worthless, and say that they will fight the case out to the limit. It promises to be a very hard fought case.



Krupp Gun Designed to Annihilate War Airships

GERMAN AUTOMOBILE AIRSHIP GUN

Frankfort, Germany, Sept. 27—The Krupp Company is exhibiting at the Frankfort Aeronautical Exposition an ingenious automobile gun for fighting airships. The chassis has a 50-horsepower motor which drives all four wheels, in order to maneuver more easily on rough ground and steep grades. The platform affords room for five men and sixty cartridges. The gun is mounted on a steel pedestal, and can be trained through an arc of 360 degrees horizontally and 180 degrees vertically. When it is to be fired the platform is secured by struts to take the shock off the frame and axles. The projectiles weigh 11 pounds each, and leave a trail of smoke in the air to assist the gunner in finding the range. The gun and car complete weighs 4315 kg. (9500 pounds). The maximum range horizontally is 9100 meters (5.64 miles), and vertically 6300 meters (3.9 miles).

CLEVELAND INVENTOR HAS BALLOON GUN

Cleveland, Sept. 27—Dr. S. W. McLean, of this city, has built an airship gun which has received some preliminary tests mounted on a Baker electric truck. The gun itself appears to be the usual naval type of semi-automatic, firing a six-pound shell. It is capable of delivering 200 shots per minute. The mounting has been altered to allow of a maximum elevation of about 45 degrees According to Dr. McLean, the difficulty is to devise a missile which will damage the airship, even if it does hit it. The ordinary shell will not explode under less resistance than that offered by a one-inch pine board. The idea of the new gun is to riddle the dirigible or aeroplane by a number of shells, not depending on their explosion. For this purpose mobility is the prime requisite.

American Weapon Built to Destroy Aerial Fighters

NOW KILL AERIAL GORDON-BENNETT

PARIS, Sept. 24—The cry, "Kill the Gordon-Bennett," has again gone forth. This means the trophy just won by Curtiss at Rheims. The French review, *L'Automobile,* has uttered the cry of death in the following note:

"It appears to us that French aviators have nothing to gain by taking part in this event, and that it is calculated, indeed, to do much evil to the French aeronautical industry. The reason is simple. There are at present not less than ten aeroplane constructors in France. What do we see abroad? Two Americans took part in the competition at Rheims and no other competitors existed anywhere. What is more extraordinary would have been to see Farman fly for England, for he is of English nationality, while at the same time being essentially Parisian. In any case he is a member of the French school, and in that respect as much French as Bleriot or Levasseur. Suppose Farman had won the Gordon-Bennett cup; every foreigner would have declared that the English aeronautical industry was at the head of the world and that the French product was inferior.

"America is the only country that can meet us in aeronautical matters. The Wrights have presented series of machines which class them among the best constructors. As to Curtiss, the winner of the cup, he has only one machine of this type. In France there are various constructors, among them Bleriot, Antoinette, Farman and Voisin, who are daily selling machines to the public. Elsewhere only the Wrights are in this position.

"Under these conditions we are playing the rôle of dupes in taking part in a competition in which equal importance is given to the industry of various nations. We are about to repeat in the aviation world what was done in the automobile world, where France played into the hands of the German, English and Italian industry, by putting on the same footing the fifty French factories and the rare foreign factories.

"The cup has been gained by a compatriot of the generous donator. It has gone to America. Let it stay there forever. It is to be hoped that our constructors will see the danger at once, and that they will inform the Aero Club that they have no further desire to take part in such an event."

Had Blériot, who placed such importance on the winning of the cup, been successful in his attempt, it is certain that such a wail would never have gone forth. This causes the whole affair to look very unsportsmanlike, because the French are losing.

THEORIES AS TO LEFEBVRE'S DEATH

PARIS, Sept. 24—Juvisy, the Paris suburban aerodrome, should provide a series of good races from October 3 to 17, if numbers of participants count for anything. The entry list has been closed with 34 names, many of which, it is true, are those of newcomers never having been aloft, but at the same time including a number of veterans. Among the important pilots are Hubert Latham, Leon Delagrange, Henry Fournier, Comte de Lambert, Jean Gobron, Louis Paulhan and Henri Rougier.

After an examination of the wreckage of the Wright biplane and a close inquiry into all the conditions, two theories are put forth regarding the unfortunate death of Eugene Lefèbvre, the Wright pilot. One is that the front elevation rudder controls either broke or jammed while the planes were in position for descending. The motor running and continuing to run, the fall of the apparatus took place at a terrific speed.

The other theory, put forth by the constructors, is that after the smash the controls were found to be bent, but were not broken. Thus the machine must have been overturned by a gust. At the moment the rudders were set for a downward sweep a gust of wind caught the machine from above. The apparatus quickly passed its central pivoting point, and nothing that the pilot could do could bring it back to an even keel within the thirty feet drop at his disposal. Had he been at a height of 100 feet it would have been possible to get on an even keel before striking the ground.

FRENCH DIRIGIBLE BURST IN FLIGHT

NEVERS, FRANCE, Sept. 25—The military dirigible *République* burst while in flight near here to-day. Four army officers, who formed its crew, were instantly killed. It is believed that the accident was due to the breaking of a propeller, the pieces of which ripped through the envelope. The torn remnants failed to form a parachute, as they often do in such cases, and the wreckage fell straight to the ground, a distance of 300 feet.

French Aviator Victim of Accident

BOULOGNE, FRANCE, Sept. 22—Captain Louis Ferber was killed at the end of a successful flight near here to-day. His machine was a Voisin biplane. In landing, one of the wings struck the ground and caused the machine to turn a somersault.

THE AUTOMOBILE CALENDAR

Shows, Meetings, Etc.

Nov. 6-13	Atlanta, Ga., Auditorium-Armory, National Automobile Show, auspices of National Association of Automobile Manufacturers, Samuel A. Miles and Alfred Reeves, General Managers, 7 East 42d Street, New York City.
Dec. 31-Jan. 7	New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.
Jan. 8-15	New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.
Feb. 5-12	Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.
Feb. 22-26	Kansas City, Mo., Convention Hall, Fourth Annual Automobile Show.
March 5-12	Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.
Nov. 12-20	London, Olympia, Eighth Annual International Automobile Show, Society of Motor Manufacturers and Traders.

Races, Hill Climbs, Etc.

Oct. 5-9	Danbury, Conn., Stock Car Races in Connection with Danbury Fair.
Oct. 8-9	Louisville, Ky., Endurance Run, Louisville Automobile Club.
Oct. 7	Philadelphia, Second Annual Stock Chassis, 200-Mile Race, Fairmount Park, Quaker City M. C.
Oct. 15	New York City, Brighton Beach Track, 24-Hour Race (postponed from September 24), Motor Racing Association.
Oct. 16	Denver, Col., Start of "Flag to Flag" Reliability Run, G. A. Wahlgreen, Manager.
Oct. 23	San Francisco, Road Race, Automobile Club of California.
Oct. 28-30	Dallas, Texas, Three-Day Track Meet, Dallas Automobile Club.
Oct. 30	Vanderbilt Cup Race, Long Island Motor Parkway, Motor Cup Holding Company.
Nov. 8-9	Savannah, Ga., Georgia Highway Reliability Contest to Atlanta, Savannah Automobile Club.
Nov. 9	Atlanta, Ga., Track Races, Atlanta Automobile Association.
Nov. 20-21	New Orleans, Annual Fall Meet, New Orleans Automobile Club. Homer C. George, Secretary-Manager.
Dec. 29-30	Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.
Feb. 4-6	New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.

What the Clubs Are Doing These Days

NEW CONNECTICUT LAW IS UNPOPULAR

New Haven, Conn., Sept. 27—The directors' meeting of the Connecticut Automobile Association last week made it apparent that the new automobile law does not meet with universal approval. C. M. Robinson, chairman of the legislative committee, made a report on the work with the last legislature. He said that it was the practice of the committee on roads of the legislature to agree to suggested measures and later to ignore the agreements and bring in a different report. "We could have obtained just as much by letting them go ahead and draw up any old bill they saw fit, instead of trying to be reasonable and meet them half way. The whole thing was run by politics." He strongly advocated that the association contest the new law, on the ground of unconstitutionality. In this he was supported by Joseph P. Tuttle, the association's attorney.

In the general discussion which followed it was agreed that although the taxation was unjust, automobilists should be willing to contribute a reasonable amount since the money is to be devoted to road improvement. The general opinion seemed to be that 40 cents per horsepower was all right, but that making the rate 50 or 60 cents was "rubbing it in." In the absence of President Fuller, Vice-President Staples, of Bridgeport, presided.

HARTFORD CLUB IN NEW QUARTERS

Hartford, Conn., Sept. 27—The Automobile Club of Hartford is now located in its new home in the Allyn House Annex, 201 Trumbull street. At the recent house warming and formal opening nearly the entire membership attended, and Mayor Hooker, who is a prominent member, was present to carry out his part of the program. The rooms have been newly fitted up with mission furniture and with every facility to make it pleasant for members to drop in frequently. The hotel café connects with the club quarters, and the members can thus have the house service at any time. The list now has about 300 names of active participants.

Road maps, touring information, and a clerk to attend to the wishes of touring autoists in this particular, are important parts of the new programme of the club. Accurate touring directions may thus be obtained, and special care will be taken to keep posted on all road repair work, so that detours may be made, if necessary, en route.

JERSEYITES TO HAVE CLUBHOUSE

Newark, N. J., Sept. 25—The proposition of securing a club house came up for general discussion at the third dinner of the New Jersey Automobile and Motor Club last Wednesday evening, at the present quarters on Park place. The banquet was one of the most elaborate of the season, and more than fifty members were present. The club requires more room for social functions than is afforded at the present location, and it seemed that its interests would be best served by the change. The matter was finally decided favorably, and a new location will be secured.

SEA ISLE, N. J., HAS AN AUTOMOBILE CLUB

Sea Isle City, N. J., Sept. 27—The Sea Isle City Motor Club has been permanently organized by the automobilists of this city. Over thirty members have already been enrolled, with prospects of securing eighty by the end of the season. The following officers have been elected: Charles Woertz, president; Bismarck Kiessewetter, vice-president; Walter Brooks, secretary and treasurer. A committee on constitution and bylaws was appointed, consisting of Messrs. Coyle, Beckett and Bell, and it was decided to apply to the A. A. A. for a charter.

PHILADELPHIA ROADS AND SIGNS IMPROVE

Philadelphia, Sept. 27—The Philadelphia Automobile Club deserves the good-will of every automobilist who has used the roads in the vicinity of the Quaker City this summer. Apart from its signboarding work—which benefits everybody who travels the roads—and its maps and routes, the club has been getting down to the actual work of putting the roads in shape, or at least of providing the means therefor. There was one bad stretch in particular on the New York-Philadelphia route which no one seemed in any hurry to improve. The club bought a King split-log drag and so interested the turnpike company that it put a top dressing of stone on the bad stretch and ironed it out with a steam roller. The method of the chairman of the club's good roads committee is to take the road supervisors out in his car and show them just where the roads ought to be improved, and it is working to perfection. The authorities get busy immediately after this ocular demonstration, and the result has been the elimination of any number of bad spots on the turnpikes leading into the city.

BALTIMOREANS TO CONFER WITH LAWMAKERS

Baltimore, Sept. 27—Members of the Automobile Club of Maryland are anxious to have an amicable agreement with the Automobile Commission in regard to the proposed bill which the commission will present to the General Assembly next January. It has been decided to invite Governor Crothers, Mayor Mahool of Baltimore, the Baltimore County Commissioners and the members of the Automobile Commission to attend a special meeting of the club within the next few weeks. The club members wish to have some agreement reached regarding the special tax and a more liberal speed limit than the present 12-mile one.

Osborne I. Yellott was appointed to head a committee to cooperate with the Baltimore County Commissioners for the placing of road signs about the state. It was also decided to have the club publish a road map for tourists.

NATIONAL SIGNPOSTING DAY SUGGESTED

Columbus, O., Sept. 27—Members of the Columbus Automobile Club are enthusing over the prospects for the establishment of a national signposting day. The club has been very active in this particular during the present season, and appreciates the value of a plan along more extended and uniform lines. Many of the members have offered to assist in erecting guides on all the roads of the central part of the State. A nuisance which will be fought is that of vandals who destroy the automobile club posters, and it is probable that an effort will be made to have the Legislature constitute this a misdemeanor, with suitable punishment. This is a despicable trick and the club is being commended on every side for the firm stand which it has taken, even by people who do not drive an automobile.

COLUMBUS, O., PLANS "OLD PEOPLE'S DAY"

Columbus, O., Sept. 27—"I am over 70 years old and I have never ridden in an automobile," said an aged man in front of a Columhus business house recently. W. E. Heskett, a member of the Columbus Automobile Club, heard the statement and immediately got busy. After conferring with the officers of the club a movement was started for an "old peoples' day," similar to orphans' day. It is proposed to give all old people over threescore and ten a long automobile ride and entertain them at the clubhouse some time in October. The movement is finding support on all sides and already many members of the club have volunteered the use of their cars.

THE AUTOMOBILE

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WHAT SHALL THE MATERIALS BE?

Following the establishment and fitting out of many and very complete laboratories comes the natural sequence, the results obtained therein. These take divers forms, some following along and amplifying present and past knowledge, others simply bearing out what has been said in previous years before complete testing equipments were available, and on the whole adding nothing to our knowledge. Then there is a third class of results, which have had a startling effect. These are the tests which have upset previous theories in many cases.

In cases of this sort there remains much work for the laboratory to do in the way of repeating the proof, and verifying it, until the newer idea has been placed upon a firm footing. In the line of materials there has been much room for this sort of thing, and the forehanded manufacturer has gained not a little by the work of his chemists and testers.

As noteworthy of the whole range of special metals, for which it may be said that the automobile has developed them, is the ultra-lightweight metal, aluminum. When first brought out, this was hailed as the successor of cast iron, and in some cases of steel and malleable iron, for motor car use. Time proved that the strength was lacking for the two latter uses, although it persisted as a substitute for the first named. Now, it would appear as if the growing feeling that it was too treacherous a metal to use has been proved by modern laboratory tests. Coupled with the tendency to lower prices for cars, and the still later medium-priced car, it appears as if the metal for automobile use is on the downward path.

Any mention of the price of the latter-day cars, in particular the very low-priced runabouts, shows that the metal is, there at least, out of place. To put it otherwise, what place has 60-cent-a-pound metal, and unreliable at that, in a car listing at $950?

STATUS OF SPEED CONTESTS

The year has been remarkable for the number of racing events which have taken place in this country. No less than four road races of national importance have been run or are scheduled, besides many local ones. One large automobile track has been opened, and another will open within six weeks. In addition, there have been about the usual number of races on mile tracks, in spite of the agitation against this form of the sport.

Several conclusions may be drawn from this unexpected abundance of speed contests. First, that automobile racing has a firm hold on the great mass of the people, the class whose support is necessary to the success of such costly enterprises as have recently been undertaken. Second, that the races are now on a commercial basis. The good of the industry has ceased to be the consideration. Much as we may regret the passing of the picturesque old days, it cannot be helped. Perhaps the reason is that the industry is too big to be coddled.

PROGRESS CLAIMS ITS VICTIMS

The progress of the sciences of aviation and aerostation has claimed, during the past month, the sacrifice of six human lives. To the names of Lilienthal and Selfridge must now be added those of Etienne Lefèbvre, Captain Ferber, Captain Marchal, Lieutenant Phaure and Sub-Lieutenants Vincenot and Reux. Such wonderful advances have been made this summer in the practice of these sciences that the worst danger seemed past. We now realize how scant is our knowledge, in comparison with that which is yet to be learned.

The lessons which misfortune can teach should not, however, be neglected. These accidents have discredited two theories which formerly were widely believed. It had been contended that, if the envelope of a dirigible should be punctured, allowing the gas to escape, that the envelope would still act as a parachute to retard the descent. This has happened several times in the case of spherical balloons, but the disaster to the *République* shows that dirigibles do not act in the same manner. On the other hand, there have always been dire prophecies of the danger of an aeroplane's motor stopping in mid-air. Several such incidents have now demonstrated that no consequences need be feared in such cases except the curtailment of the flight. The accidents to both M. Lefèbvre and Captain Ferber took place with the motor running and the machine flying low. On the whole, we think that the advantage has been with the aeroplanes. Just what the future will bring forth to prove or disprove the worth of either form remains to be seen. From the viewpoint of the present day status of the two, the balance seems to favor the birdlike form.

ACCESSORY ALLOTMENTS FOR ATLANTA SHOW

ATLANTA, GA., Sept. 27—Forty members of the Motor and Accessory Manufacturers' Association have taken space at the Atlanta automobile show, which is to open November 6, and practically all the leading parts and accessories makers in the country are included in the list. The allotment of space among the members of the association was completed Monday by the show committee of the M. and A. M. and contracts are now being mailed. More than 7,000 square feet of space has been disposed of in this distribution.

One of the features of the show, according to the latest reports, is to be a collection of oil paintings illustrating automobile scenes. These paintings, the work of well known artists, will be 8 by 24 feet in size, and a score of them will be used as decorations around the elevated platforms. The use of such paintings shows the pains taken to make the show a success.

The following is a list of the members of the M. and A. M. A., who will be represented at the show:

Ajax-Grieb Rubber Co.
Badger Brass Mfg. Co.
S. F. Bowser & Co.
Byrne, Kingston & Co.
Conn. Telephone & Electric Co.
Diamond Rubber Co.
Jos. Dixon Crucible Co.
Dow Tire Co.
Electric Storage Battery Co.
Empire Tire Co.
Federal Rubber Co.
Firestone Tire & Rubber Co.
Fisk Rubber Co.
G & J Tire Co.
B. F. Goodrich Co.
Gabriel Horn Mfg. Co.
Goodyear Tire & Rubber Co.
A. W. Harris Oil Co.
Hartford Rubber Works Co.
Herz & Co.
Kokomo Electric Co.
Jones Speedometer Co.
Leather Tire Goods Co.
C. A. Metzger Co.
Michelin Tire Co.
Morgan & Wright.
National Carbon Co.
Never-Miss Spark Plug Co.
N. Y. & N. J. Lubricant Co.
Oliver Mfg. Co.
Randall-Faichney Co.
Republic Rubber Co.
C. A. Shaler Co.
Stromberg Motor Devices Co.
High Wheel Auto Parts Co.
C. F. Splitdorf.
Sprague Umbrella Co.
Veeder Mfg. Co.
Weed Chain Tire Grip Co.
Hartford Suspension Co.

TIRE PRICES ARE AGAIN INCREASED

AKRON, O., Sept. 27—The increased price of crude rubber is alarming tire manufacturers. The Goodyear Tire & Rubber Company has announced an increase of 15 per cent. in the price of its finished tires, and similar announcements are expected from the Goodrich, Diamond and other companies, in addition to the increases made several months ago. The best grade of crude rubber was quoted last week at $2.10 per pound, and rubber men say that tires now cost to make 25 to 30 per cent. more than a year ago. The only hope the manufacturers see of checking the steady rise is that the cultivation of rubber will be made practicable, and all attempts to do this so far have been in vain.

Sixty branch managers and tire salesmen of the B. F. Goodrich Company were here for two days last week, and were in conference with the officers of the company. Among those present was A. E. Lumsden, the European manager, who makes his headquarters at London.

"AROUND LONG ISLAND" POSTPONED

The New York Automobile Trade Association has thought it advisable to postpone the "Around Long Island" tour, originally scheduled for September 28 to 30, to a later date, because of conflict with the Hudson-Fulton celebration. The members of the association, while ostensibly enthusiastic over the prospects of the tour, had developed an embarrassing unwillingness to absent themselves from the metropolis on those three days. In addition, the sanction from the contest board of the A. A. A. was not forthcoming, as expected, because several features of the A. A. A. rules had not been embodied in the Trade Association regulations. The delay will give time for the adjustment of this matter, and will also allow the members of the association to take part in the general festivities.

While the postponement has caused much disappointment, it is in line with many other similar changes of dates caused by the celebration.

DO WOMEN MAKE SAFE AUTO DRIVERS?

MILWAUKEE, WIS., Sept. 27—There has been some agitation in this city toward prohibiting the operation of automobiles by women in the downtown district, but the council probably will not take any notice of the matter. A majority of automobilists oppose such action, reasoning that women make better drivers than men; that they do not take chances, are the least reckless, and maintain the speed limits more conscientiously than men. No cases are on record in Milwaukee of accidents to cars operated by women. In view of these facts, it is likely that the agitation will be short-lived.

EXPORT TRADE DISCUSSED BY COUZENS

"No American maker should look for foreign trade with the idea that it is to be obtained easily," said James Couzens, of the Ford Motor Company, when he landed from the *Caronia* after a six weeks' trip through England, France, Germany and Switzerland. "There is an opportunity abroad to sell a great many American cars, and the field is constantly enlarging. In order to obtain the business, however, European conditions must be carefully studied." According to Mr. Couzens, 115 Ford cars were sold in France this year, and the French agent, Henry De Passe, has ordered 300 for 1910. A branch has been established in London at 55 Shrewsbury avenue. The French are expecting great things of the new car manufactured by the Darracq Company, a 20-horsepower four-cylinder machine to sell at $1,000.

VANDERBILT CUP ENTRY BLANKS OUT

With the receipt of word from Buffalo recently, to the effect that Chairman F. B. Hower had granted a sanction for the Vanderbilt cup race, on Long Island, Oct. 30, the last obstacle has been removed. The Motor Cups Holding Company immediately opened offices in the Long Acre Building, at Seventh avenue and Forty-third street, from where entry blanks have been issued.

Boxes and seats in the grandstand have also been placed on sale at the offices, and so great has been the interest displayed to date, that the offices will be kept open nights. Enough entries have been already made or promised to insure a good, fast race.

N. A. A. M. STARTS TRAFFIC DEPARTMENT

Information on any matter pertaining to the shipment of automobiles can be obtained from the traffic department of the National Association of Automobile Manufacturers, 7 East 42d street, New York. In order to give dealers the fullest benefit of its work, the executive committee of the association has notified them to this effect. The service of the traffic department will include advice as to correct freight rates, and the collection, without charge, of claims against railroads for overcharge, or for loss or damage.

OHIO LICENSING SEEMS PROFITABLE

COLUMBUS, O., Sept. 27—The report of State Registrar of Automobiles Caley for the month ending September 15, indicates an increase in the number of automobiles registered and also the usual number of renewals. Owners have registered new cars to the number of 603, bringing in a revenue of $5,277. Manufacturers and dealers to the number of 20 paid license fees of $1 each, and 225 chauffeurs were registered. The total revenue of the department for the month was $8,192.

Arrival of Mitchell Transcontinental at San Francisco

Presenting Major-General Wood's Despatch to Major-General Weston at Pacific Coast U. S. Army Headquarters, Presidio.

GOOD ROADS HELP SALE OF AUTOS

CLEVELAND, Sept. 13—"Millions for good roads" is the slogan of the middle West and the further West, according to O. B. Henderson, sales manager of the Baker Motor Vehicle Company, who has just completed a tour of that part of the country. For two months he was visiting the sections where the automobile business is rapidly increasing, and he says: "The good road ideas are spreading remarkably. One county in California, alone, has appropriated a million dollars; Seattle is cutting down its hills; cities are constructing boulevards; States are pushing out splendid highways, and improvement is evident everywhere. It is a prophecy which the wise dealers are heeding, and modern, substantial buildings are going up in many places. Foresighted business men are securing the agencies for well-established automobiles, and all of this is caused by the growing demand for better roads.

"I find the sale of electric vehicles increasing immensely, for years of steady growth have been followed by a sudden desire for this type of automobile. I found electrics in many places where a year ago there were none. City men are realizing the field which these cars have that in no way conflicts with the one of the gasoline cars, especially for family use or when women wish to operate their own machines. The most remarkable development is the introduction of the gasoline automobile in the farm life of the middle section. Farmers do their traveling in this way and this will be a bonanza year for automobiles.

MINNEAPOLIS AUTO MAKERS ENLARGE

MINNEAPOLIS, MINN., Sept. 25—The continual growth of the automobile industry in the Northwest is becoming noticeable in many directions. The retail trade has increased by leaps and bounds and now comes the anouncement of interesting doings by the manufacturers of this district. This city will become an important factor in the automobile and truck manufacturing lines, for the local concerns engaged in this work have recently been reorganized to handle a much increased amount of business. Between 3,200 and 3,500 machines will be turned out during the coming season.

The Wilcox Motor Car Company has been put upon a million-dollar basis and is arranging to construct 3,000 touring cars and about 100 trucks. P. W. Strong, for many years the sales manager of the Welch Company at Pontiac, Mich., has been secured to handle the pleasure car end of the business, and John H. Shields, the present sales manager, will take care of the commercial department. The president of the new concern is Harry E. Wilcox, the man who has been most influential during the past three years in bringing success to the company. C. H. Davidson, of Carrington, N. D., and John F. Wilcox, of this city, are principal financial backers of the Wilcox Company. It is the impression that a car which will sell for about $1,500 will be produced, following in a general way the design of the former Wilcox cars. It will have 16 inches road clearance and double side-chains.

The Minneapolis Motor & Truck Company has recently been organized to market its own product consisting of trucks and pleasure cars designed especially for the use of the farmers. The firm is capitalized at $100,000, and is engaged now in building a factory. Its first models have appeared and have met with favor.

Jersey City, N. J.—One of the finest garages in New Jersey will be the new home of the Crescent Automobile Company in September. The new building is on the site of the old one, at the Boulevard and Duncan avenue, and will be three stories high, 70 feet wide and 100 feet long. The first floor will be used for offices, show rooms and garage; the second will be used for storage purposes; and the top, for a repair shop. The agency for the Cadillac, Peerless and Pope-Hartford is held.

Baltimore—A handsome garage at 1113-15 East Mount Royal avenue has just been completed, and is occupied by the Zell Motorcar Company, formerly on Morton street. The building is of steel, concrete and brick, 50x100 feet, three stories high. It is attractive in appearance, with a front of tapestry brick.

How Two Enthusiastic Maxwell Owners Solved the Vacation Problem in a Unique and Enjoyable Manner.

With a family of moderate means the vacation problem is always a perplexing one. The illustration shows how R. L. Shipman and F. C. Edminister managed to have the best time ever, touring Central New York with their families, the party including three adults, six children, and the dog "Flip."

1. Admiral Robley D. Evans Rounding Cape of Good Hope, Grossmount So. California

2. Adm. Evans, Col. Fletcher, and "King Edward" Gross, whose likeness to the British Soverign gets him into trouble every time he visits London.

AUTOING ROUND "THE CAPE" WITH AN ADMIRAL

By JAMES A. CRUIKSHANK

FIFTY years at sea have only served to make Rear Admiral Robley D. Evans, the beloved "Fighting Bob" of the American navy, the keener lover of the beauties of the land and the joys of speedy travel over perfect roads. For a man who has seen and participated in all the great naval progress of the past half century, the Admiral is one of the most progressive enthusiasts over the newer method of land cruising that could be found. Last Winter, after the cruise of the Atlantic Squadron from Hampton Roads to San Francisco, the Admiral, relieved of his command by the stern decree of his doctors, began an overland cruise from the Pacific coast to the Atlantic. This was partly in response to requests for lectures and addresses and partly for the purpose of seeing many sections of the United States which he had never before visited.

He did not take his departure for the East, however, until he had spent many weeks in Southern California. That region is indeed an automobiling paradise, and no single spot there is better adapted to the pleasures of the sport than the charming little city of San Diego. Some of the trips to be found in that vicinity are unsurpassed by anything of their kind on the continent; for instance, the journey to the Old Mission, or the day's run about exquisite Point Loma, where the Theosophists have their headquarters. Such distinguished people as A. G. Spalding, the baseball magnate; John D. Spreckels, the sugar king, and Lyman J. Gage, ex-Secretary of the Treasury, have settled here, and world-famous stretches of road are being built of disintegrated granite.

But without doubt the most interesting trip in this region is to the summit of Grossmount, some twenty-five miles to the west of San Diego. Such, at least, was the opinion of Admiral Evans. Grossmount is primarily the result of the daring engineering skill of Col. Ed Fletcher of San Diego, a Westerner with faith in himself and his wonderful country, who saw the place, scaled its heights in hobnailed boots and came back with a road drawn on his cuff. It was not long before that road began to eat its way into the solid rock of that titanic upheaval, amid which the luxuriant vegetation which only California knows grows as in a garden. In association with Col. Fletcher came another Californian, "King Edward" Gross, whose striking resemblance to the sovereign of England gets him into trouble every time he goes to London. These two men finally drove that wonderful piece of road-building clear to the inspiring heights of the summit, providing their city and its visitors with one of the most superb views on the continent. Mile after mile of checkered farm land lies at the feet of the spectator, and to the far east and north rise the snow-capped peaks which are the perpetual delight of the dweller in the sunshine below.

This road is so tortuous, so daring in its swings around the edges of precipitous cliffs and jagged ravines, that it has the superlatives crowding the expressions of the traveler every half mile. It is as smooth as a billiard table, being made of that disintegrated granite, which, next to the shells of the sea, makes the finest road mankind has so far discovered. The apotheosis of this superb climb is found in the "rounding of Cape Horn," a jagged bunch of geological odds and ends grouped close to the summit of the peak. Here the wind gods hold high carnival, and the road is so narrow that but one machine can use it at the time. But a true Westerner never knows when to slow down. When Admiral Evans made this trip, Col. Fletcher, who was chauffeur, swung his Franklin round those dizzy heights in such fashion that he could not restrain exclamations of surprise. Finally the grizzled veteran of the sea paid the skillful driver one of his characteristically quaint compliments.

"Young man," said he, "I appoint you herewith chief steersman of the swiftest torpedo craft in the United States Navy. You surely know your job."

Breaking Ground for Addition to Overland Plant at Toledo, O.

Quick Work in Building Factory—Ground has just been broken for the five-story, 100 by 600 foot addition to the Overland plant at Toledo, O., to be used by the finishing department. The photograph was taken two days after the contract was let, and gives only a small idea of what was actually going on, as it was said that at the time there were 500 men and 100 two-horse teams at work. On taking possession of the Toledo plant the Overland Company found itself handicapped in various directions. The shipping facilities were entirely inadequate, especially in view of the prospective output of 80 cars a day. New spur tracks and sidings had to be run in and platforms and shipping rooms built. The brick building shown in the background of the photograph was especially built for the construction of radiators, frames, oilers and other parts. Many thousand dollars' worth of old machinery was scrapped, to be replaced by later and more modern equipment. When it was found that more room was needed for the finishing department plans for a new building were drawn and a contract was let calling for delivery, ready for occupancy, within 40 days.

Rushmore to Build Again—The Rushmore Dynamo Works, of Plainfield, N. J., has extended its capacity by the erection of a large fireproof storehouse, and will soon break ground for a two-story 50 by 200 concrete addition to the machine shop. In addition to over 300 horsepower already supplied by the power plant, a 125-horsepower gas engine is to be installed soon. One entirely new department has been added, for the silvering of lenses; this enables the factory to make its lenses complete from the rough discs to the finished product. As these lenses are not made from the ordinary "green" glass, but from annealed optical lead glass, the economy resulting from the saving of the optical manufacturer's product is an important item.

Trucks on Maintenance Contract—The Rainier Motor Truck Company, recently organized, is to act as agent for the Reliance commercial cars in New York City and proposes to offer purchasers a maintenance contract, whereby, for a stated sum per year, the trucks it sells will be kept in repair and their operation guaranteed for a term of years. John T. Rainier, P. N. Lineberger and G. C. Comstock are the incorporators of the new company. Messrs. Rainier and Lineberger were among the first to introduce electric trucks in New York City on a large scale. A garage will be opened at Fifty-first street and Twelfth avenue and trucks of 2½, 3½ and 5-ton capacity will be sold, with bodies to suit the purchaser.

Prepares for Moon Visitors—Several hundred Moon owners are expected to drive to St. Louis to witness the Centennial week celebration, October 4 to 9, and the Moon Motor Car Company has been making arrangements to welcome them to the city. The company will provide for their entertainment, and will award trophies to those making the longest runs. All the Moon cars available in the city, as well as the visitors, are expected to participate in the automobile parade on October 9. The Moon Company has announced that it will gladly furnish any information or aid possible to prospective visitors.

Mason Meets Its Waterloo?—The Mason Automobile Company, of Des Moines, Ia., has definitely arranged to move to Waterloo, Ia., and expects to be settled in the latter city by the end of October. The capital of the company has been increased to $500,000. The new plant at Waterloo comprises three buildings, 100 by 300, 120 by 160 and 70 by 120, and it is planned to make further additions to the available space. As an evidence of confidence in the Mason the citizens of Waterloo placed an order for 100 1910 cars.

The Better the Road the Better the Car—In the official program of the National Good Roads Convention at Cleveland there appeared this advertisement by the Knox Automobile Company:

"Put us down as being for good roads. The better the road the better the car, and conversely, the better the car the better the road. We are constantly working to better the car, but we are with you on the other end of the proposition."

Big Deal in Northwest—It is reported that C. F. Van Sicklen, sales manager for the Fal Motor Company, Chicago, has just closed a big agency contract with the Northland Motor Car Company, of Minneapolis, which calls for 950 cars. The company is composed of W. D. Rightmire and Harold Vorce, the only other car handled being Stoddard-Dayton. Although in receipt of over thirty orders from that city, the big contract requirement took Van Sicklen's breath away.

First Taxicab in Montreal—The first taxicab to make its appearance on the streets of Montreal attracted considerable attention. It is the first of a large number to be placed in operation by the Berna Motors and Taxicabs, Ltd. W. P. Kearney, the manager, said that regular service would not begin till next Spring, as it had been found necessary to have motors specially constructed to overcome the steep grades of the city.

Thomas to Use Truffault—The use of Truffault-Hartford shock absorbers on Thomas cars during the last season has proved so satisfactory that the Thomas Company has decided to specify them as stock equipment on its entire 1910 product. This announcement is of interest, in view of the growing tendency among manufacturers to sell their cars completely equipped for the road.

Canadian Bank Uses Auto—The Bank of Montreal is now using an automobile to convey its messengers with money and documents between the head office and the branches in the city. The messengers' headgear is not unlike the German army cap, and when three or four of the boys get into the car it looks as though the Kaiser's bodyguard had come to town.

Olds Increases Capitalization—The capital stock of the Olds Motor Works, according to amended articles of incorporation filed with the Secretary of State of Michigan, has been increased from $2,000,000 to $4,000,000. The reason for this increase has not been disclosed, but it is supposed that it is a part of the plan of reorganization of General Motors.

For the Suppression of Noise—The Xargil Mfg. Co., of Utica, N. Y., a manufacturer of mufflers for automobiles and motor boats, will move into a new plant on October 1. It will then be located in a large three-story building at 34-38 Broadway, Utica, which, it is said, will be the largest plant in the country devoted exclusively to mufflers.

Hupmobile Pleases the Owls—The Hupmobile carried off the principal honors at the race meet held at Chillicothe, O., September 23, under the auspices of the Order of Owls. The races were held on the 1-2-mile track at the county fair grounds, and in spite of unfavorable conditions the time was fairly fast.

First Aid for Marylanders—The W. W. Garage & Machine Company, of Cumberland, Md., is building a "trouble wagon," driven by a 40-horsepower motor, which will carry a full shop equipment, spare wheels, parts, etc., for the relief of machines broken down on the road.

I. H. C. Now at Tiretown—The International Harvester Company has announced that henceforth the old plant of the Buckeye Mower & Reaper Company at Akron, O., will be used for the manufacture of I. H. C. automobiles of the high-wheel type.

IN AND ABOUT THE AGENCIES

Reo and Premier, Cleveland—These cars will be represented by an agency to be known as the Cook Motor Sales Company, which will occupy two floors of the building nearly completed on Euclid avenue above Twenty-second street. It is expected that 1910 models will be on exhibition there by October 1.

Apperson, Boston — Sales Manager George H. Strout has announced that the Apperson will be represented in Boston by W. L. Russell, who will establish temporary quarters at 369 Atlantic avenue. Later an office will be opened on Massachusetts avenue.

Stearns, Minneapolis, Minn.—A. G. FitzGerald and J. F. McKanna have formed the FitzGerald Selling Company, to handle the Stearns line in Minnesota, the Dakotas, upper Michigan and northern Wisconsin, with headquarters in this city.

Oldsmobile and Oakland, Atlanta, Ga.—The Olds-Oakland agency in this city is now settled at its new quarters at 132 Peachtree street. The garage, however, will continue at the old location on Auburn avenue.

Stewart Speedometers, Chicago—The Stewart & Clark Mfg. Co. has leased the building at 1312 Michigan avenue, formerly occupied by the Cadillac agency, and will take possession December 1.

Oldsmobile, Brooklyn, N. Y.—The A. W. Blanchard Company, 342 Flatbush avenue, which already holds the agency for the Waverley and the Herreschoff, has decided to take on the Oldsmobile.

Stoddard-Dayton, Minneapolis, Minn.—The Northland Motor Car Company has been formed by W. D. Rightmire and Harold Vorce to handle the Stoddard-Dayton in the Northwest.

National, Houston, Tex. — Clarence Martindale will handle the National here at 406 Scanlan Building. His territory will include Galveston, Beaumont and San Antonio.

Stearns, Detroit—The Palmer Auto Company has been agent for the F. B. Stearns Company, of Cleveland, and will handle the Stearns exclusively in this city.

Haynes, Boston—H. C. and C. D. Castle, the Lozier agents, have secured the New England agency for the Haynes, formerly handled by C. S. Henshaw.

Midland, New York City—The Midland Company of New York, which sells the Midland in the metropolitan district, is now located at 1851 Broadway.

Continental Tires, Boston—E. H. Kidder, resident manager of the Continental Caoutchouc Company, has opened his new office at 895 Boylston street.

Empire, New York City—The Poertner Motor Car Company, agent for the National, has decided to add to its line the new Empire "20" runabout.

Moon, Minneapolis—The agency for the Flour City has been taken on by the Segerstrom Auto Company, now handling the Rider-Lewis Six.

Jackson, Hartford, Conn.—A. E. Kilby has taken the agency of the Jackson, which was formerly held in this city by A. E. Lazarro.

PREMIER AGENTS AT THE HOME BASE

INDIANAPOLIS, Sept. 27 — Thirty-two agents of the Premier Motor Mfg. Co., coming from every large city between the Atlantic and the Pacific, were entertained here last week. It was a school of instruction as well as a sociable gathering. The agents were taken through the factory, shown the 1910 models, and loaded up with selling points for the coming year. A banquet was also given them at the Denison Hotel, at which H. O. Smith, president of the Premier Company, was toastmaster. The speakers included President Smith, Mayor Charles A. Bookwalter, R. I. Eads, Webb Jay, Charles Davis, Henry Eitel, of the Indiana National Bank; R. W. Macy and J. B. Orman. Later a sightseeing trip was made to French Lick; five of the cars used had been completed in the factory the preceding day and were untested.

MORLEY JOINS FORD COMPANY

DETROIT, Sept. 27—Walter G. Morley has succeeded H. C. Limbach as purchasing agent of the Ford Motor Company of this city. Mr. Morley is a pioneer in the gas engine and automobile field, having been connected with the Olds Gasoline Engine Works in the early days of the industry. When the Olds Motor Works plant was opened in Detroit in 1898 he was the purchasing agent. He has since been connected with the Aerocar Company, and as manager of the Canadian interests of the Reo Motor Company, located at Windsor, Ont. When this branch was discontinued Mr. Morley embarked in business for himself as a parts manufacturer. This business he has only recently given up to take his new position with the Ford Company.

Walter G. Morley

FROM INDIANAPOLIS TRADE CIRCLES

INDIANAPOLIS, Sept. 27—During the last week a number of new companies have been organized in this city, and many old-established concerns have made arrangements to increase their business during the coming season. Probably the most important of the new local companies is the Coesir Tire & Rim Company, which has been organized with a capitalization of $100,000 for the purpose of manufacturing a clincher tire invented by John L. Coesir.

The Maxwell-Briscoe Motor Company has leased a site at Illinois and Vermont streets, on which it proposes to erect a three-story sales branch building, at a cost of $60,000. A reorganization of the Cadillac Automobile Company of Indiana has been effected, and the name changed to the Peck Motor Car Company. The company has leased a building at 322-324 North Delaware street, which it will occupy immediately. Roy Shaneberger, John A. George and Oliver Shaw have organized the Reliable Auto Exchange and will open a salesroom.

At Richmond, Ind., the organization of the Pilot Motor Car Company has been completed with $100,000 capital stock. It will manufacture a line of gasoline cars. The automobile business which has been conducted at Anderson by John D. Clark has been reorganized under the name of the Clark Motor Car Company, and the plant has been moved to Shelbyville, Ind.

POPE COMPANY DECLARES DIVIDEND

HARTFORD, CONN., Sept. 27—At the meeting of the directors of the Pope Mfg. Co., held in New York City, a dividend of 6 per cent. was declared for the fiscal year ending July 31, payable September 30. When the new company was organized and new stock issued, the preferred stock carried cumulative dividends dating from August 1, 1908. The new company only began business December 24, 1908, so that it has made up a year's dividends in seven months—a record which speaks well for the management of the directors and for the business being done by the company. A further dividend, the quarterly from August 1 to November 1, was also declared, amounting to 1½ per cent. and payable November 1.

Sixty-One of the Eighty Firestoneites That Attended Convention

The annual convention of Firestone Tire & Rubber Company representatives, held recently at the factories of the company, at Akron, O., was the largest gathering of the Firestone selling force that has been held. There was plenty of enthusiasm over next season's prospects and an enjoyable time was interspersed with the business sessions

Chicago Branch House Where Will Be Met Western Demand for Continentals

CONTINENTAL OPENS CHICAGO BRANCH

CHICAGO, Sept. 27—The Continental Caoutchouc Company, maker of Continental tires and demountable rims, has opened a branch at 1412 Michigan avenue, in this city, which is one of the most attractively arranged automobile tire stores on automobile row. This branch will supply owners, dealers and manufacturers throughout the Middle West and has been established to care for the growing demand for Continental products. C. A. Gilbert, the resident manager, is always glad to welcome the automobiling public, and visitors are assured of courteous treatment and prompt fulfillment of their requirements.

PERSONAL TRADE MENTION

Walter A. Woods has been appointed manager of the New York City sales department of the Rainier Motor Company, with headquarters at Broadway and Sixty-fourth street. For the past season Mr. Woods has been connected with the New York branch of the E. R. Thomas Motor Company. He is a veteran salesman, with an extensive acquaintance of local trade conditions, and will conduct an energetic campaign for the Rainier for the coming season.

John E. Kay has been appointed assistant manager of the Maxwell-Briscoe Southern Company, at Atlanta, Ga. He was formerly with the Maxwell-Briscoe Motor Company at the Tarrytown, N. Y., factory.

K. T. McKinstry, formerly connected with the sales department of the Columbus Buggy Company, Columbus, O., has accepted a similar position with E. D. Crane & Company, of Atlanta, Ga.

F. H. Banbury, of the Acheson Oildag Company, Niagara Falls, N. Y., sailed for Europe September 25 to attend to the patent interests of his company.

William T. White has resigned his position with the Roebling Company to act as manager of the Mercer Automobile Company, another Roebling enterprise.

RECENT TRADE PUBLICATIONS

Peerless Motor Car Company, Cleveland—A wonderfully beautiful booklet, one of the finest productions imaginable, has just been issued by the Peerless Motor Car Company to illustrate its enclosed cars for 1910. In harmony with the luxuriousness of the subject, and of the high class of trade which will thereby be reached, the book is really a work of art. The illustrations are fascinating in their coloring and clearness, and the typography is splendid. Printed on heavy, embossed paper, with a cover of brown printed in gold and a touch of red, with the colors on the inside pages, this is an edition of which any concern might be justifiably proud. Those pictures which are intended to show the comfort of the limousine and landaulet as compared with that of persons traveling in snow and rain, either on foot or in cabs, are so much better than ordinarily seen out of the most expensive art books and magazines that they are especially noticeable. In all of these the principal car is the Peerless and the representations are so accurate, even in the most minute detail of automobile construction, that they are particularly pleasing. The cars themselves are fittingly shown, exterior and interior, and from several angles, while the tables indicating the size of the doors, height of the interior, size of the seats, and other similar details, give the correct idea of the machines at once. The specifications for inclosed bodies on both the four and six-cylinder chassis are included.

Pierce-Arrow Motor Car Company, Buffalo, N. Y.—"The Seal on the Door" is the title of the latest book issued by the Pierce-Arrow Motor Car Company, and it is "a symbol with historic suggestion," according to the statement on the first page. Two Pierce-Arrow cars are being used in the Presidential service at the Executive Mansion in Washington, and the story, written for the Pierce makers by John Foord, is a clever and dainty bit of history interwoven with former and present methods of locomotion for the Chief Magistrate and his family. The booklet is handsomely printed in black and colors, bound in a cream-colored, heavy paper, and the creamy effect pervades the interior also. The illustrations are impressionistic and appeal to the artistic, with their splashing of colors distinctively Washingtonian. The tale is an interesting one, not at all being a suggestion of advertising, for it is one dealing with scenes from the life of the White House taken from a period of slightly over a hundred years, and the episodes perhaps are those which do not often come to light. As compared with the days of old, when the coaches were not perhaps the best even for the President, are the circumstances now, when the two Pierce-Arrows, one of 36 and the other of 48 horsepower, are used by the occupants of the big house at the end of Sixteenth street. Both of these cars have the great seal of the United States painted upon their doors—the first time it has ever adorned the Executive equipage.

Hartford Auto Parts Company, Hartford, Conn.—Hartford universal joints and drive-shaft assemblies are favorably known in the trade and are used on many high-priced cars, so that this catalog assumes in some measure the importance of a compendium of engineering practice. Unlike the policy of some makers, who make the construction of their products a jealously guarded secret, the Hartford Auto Parts Company shows mechanical drawings, apparently reproduced from the original blue-prints, of each type of joint and shaft it manufactures, fully dimensioned and with all necessary data. Such frankness cannot help making a favorable impression on the engineer, who is keenly interested, and with good reason, in just these points which are so often concealed. The Hartford joints are made in sizes to transmit from 20 to 60 horsepower of the double yoke and cross-piece type, for drive-shaft use, and also in special designs for couplings between the clutch and gear-box. The company specializes on complete drive-shaft assemblies, with two joints, one sliding, and a shaft of any desired length between centers. The front joint may be provided with a brake drum. Shaft sizes range from 1¼ to 1⅝ inches in diameter. The catalog consists of eighteen loose sheets, each illustrating a single size or type.

Kellogg Mfg. Co., Rochester, N. Y.—Tire pumps of every possible variety are shown in the eight-page catalog issued by this concern. First on the list is the familiar compound hand pump, which is claimed to handle nearly twice the volume of air of an ordinary type. Another old stand-by is the quick-detachable engine-driven pump. An innovation in the pump line, however, is the new four-cylinder model, which seems to embody every latest improvement. It is furnished with a jaw clutch on the drive shaft, and either a gear or sprocket for the engine connection. All working parts run in oil. For use in garages there is a two-cylinder pump driven by an electric motor through a worm and gear. The motor is of 1-6 horsepower, either direct or alternating current, and may be connected to a lamp socket, for which purpose it is provided with 12 feet of cable. Twelve feet of tubing is also supplied, with a safety valve to prevent excessive pressure. As the outfit weighs but 40 pounds, it may easily be carried around the garage.

Lawrence Portland Cement Company, New York—In view of the extensive use of cement and concrete in garage construction, automobile owners should be interested in the booklet of the maker of "Dragon" Portland cement, which is favorably known in building circles. This booklet, issued from the sales offices at 1 Broadway, New York, really is a technical treatise on the uses of cement in every form. It gives specifications for standard mixtures of concrete, methods of testing, and information as to its proper employment. Readers of "The Automobile" will be interested in details of the construction of the Thirty-ninth Street Building, in which the editorial offices and press rooms of the magazine are located. This building is a fine example of the possibilities of concrete construction, as it is eleven stories high and contains many heavy printing presses.

Winton Motor Carriage Company, Cleveland—The Winton Six Upkeep Book, the second annual edition, has been issued to show the records of the Winton cars winning prizes for low cost of maintenance. The booklet is very artistically compiled and the statements of the judges and of those who won are very interesting. That a car can be driven for 17,003 miles without a cent being paid for repairs is wonderful. Other sets of figures are of equal importance. In each case of the ten, the details of the records kept for eight months are given, sworn to by both the chauffeurs and owners. It is especially noteworthy that the first three prize winners this year were not new machines, and these facts are well brought out in the edition.

American Tap & Die Company—Catalogue No. 3 of the American Tap & Die Company, of Greenfield, Mass., has recently been issued and is of special interest to the automobile manufacturers and trade. It illustrates threading tools, such as taps, dies, tap wrenches, die stocks, screw plates, etc., and gives a list of the various sizes in which these are made. There are now screw plates produced in the A. L. A. M. sizes, a move which will be welcomed by the autoists. The catalogue itself is a handy one to have where such tools are required, for by a systematic arrangement of head and foot notes there is no time wasted or trouble in looking for any certain part, and for its exact description.

Cox Brass Mfg. Co., Albany, N. Y.—This company makes a specialty of automobile brass work, and has issued a small catalog devoted exclusively to this line. There are included six different types of tire holders, at varying prices; almost as many designs of robe rails and foot-rests, and lamp brackets to suit everybody. This company also makes a compound tire pump of the lever type for garage use, and a lighter plunger pump. For use with liquid carbonic gas tanks there is furnished a new pressure reducer and regulator.

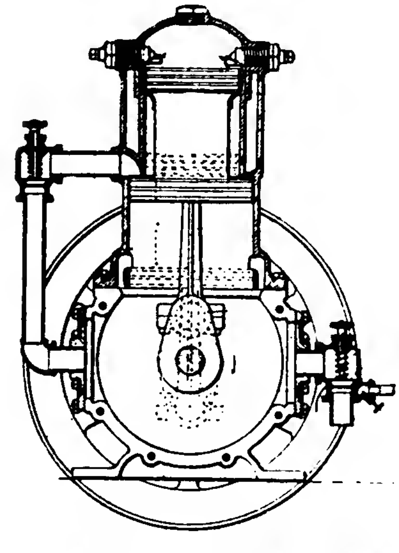
Firestone Tire & Rubber Company, Akron, O.—An artistic book on the subject of 1910 demountable rims for quick detachable and clincher tires is being distributed by the Firestone Tire & Rubber Company, Akron, O. The book illustrates the operation of tire-changing with these rims and explains why the Firestone company has discarded its demountable rims requiring clincher tires exclusively, in favor of the new Firestone demountable rims, which permit of repeated tire changes on the road.

SOME SELECTED AUTO PATENTS

Issue of Sept. 7, 1909

933,109. Gas Engine—Frederick W. Reeves, Pittsburg, Pa. Filed Feb. 22, 1908.

This two-cycle engine seems a rather com-

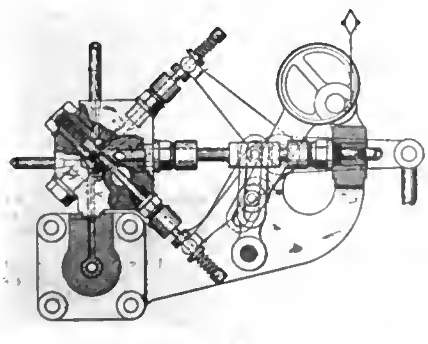


Concentric Piston Engine by Reeves

plicated embodiment of the differential piston idea. It consists of a compression chamber, to be swept through by the larger end of the piston, and a combustion chamber above the piston. The middle part of the piston is smaller in diameter than either end, and the space between it and the cylinder wall is called the secondary compression chamber. The fresh gas is first drawn into the crank-case, thence transferred through a by-pass into the compression chamber. As the piston rises the gas is compressed, at the same time that the exhaust gas is being driven out of the combustion chamber. When the piston is nearly at the top of its stroke it uncovers a series of by-pass ports, through which the fresh gas is transferred around the piston into tbe combustion chamber.

933,325. Fuel Feeder for Internal Combustion Engines—Norman McCarty, Indianapolis, Ind. Filed Feb. 9, 1909.

Direct fuel injection into the combustion chamber of oil engines has become prominent of late, especially in aeronautic motors, as this method, dispensing with the carbureter, has been used on the Wright motors and on several foreign eight-cylinder machines. The device under consideration is positively operated by an eccentric and provides means for varying the charge considerably. It consists of three chambers, the inlet, the measuring, and the outlet, with valves between the first and second and



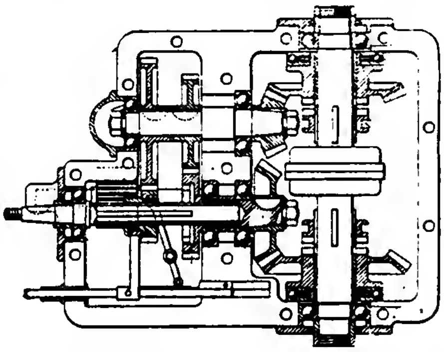
McCarty's Fuel Measuring Device

the second and tbe third, all ingeniously operated by the same eccentric. A movable plunger is fitted in the measuring chamber to vary its capacity.

Issue of Sept. 14, 1909

933,870. Change-Speed Gearing—Austin M. Wolf, New York City. Filed Nov. 13, 1908.

Mr. Wolf's gear, a four-speed selective one, is of the double bevel gear type, suitable for use on cars with double-chain drive or on the rear axle of shaft-driven cars. The two opposed bevel gears on the cross-shaft are normally free, but can be locked to the shaft by jaw clutches. There is but one sliding gear, which has three positions. That to the left gives the reverse; the central

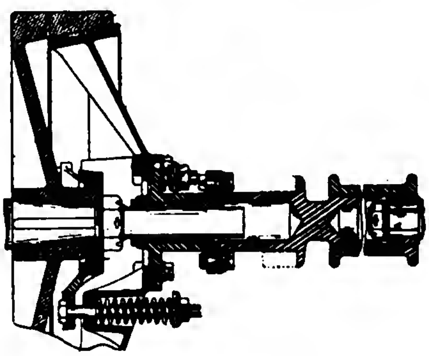


Four-Speed Transmission—Double Bevels

position gives the first and second, according to which of the bevel gear pairs are used, and in the same way the position to the right gives the third and fourth. The power is transmitted through two pairs of spur gears on the second, through one pair on the first and third, and through none (direct drive) on the fourth. Tbe only objection is the number of shafts and gears revolving idly.

934,043. Coupling for Power Transmission—Howard E. Coffin, Detroit, Mich., assignor to the Chalmers-Detroit Motor Company. Filed Nov. 6, 1908.

A sliding coupling to be used between the clutch and the change-gear of an automobile

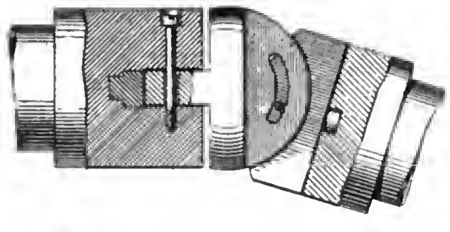


Chalmers-Detroit Cone Clutch

forms the subject of this patent. The specifications call for a member detachably secured to the clutch-sleeve forming an extension thereof beyond the clutch spindle, no longer than the distance between the end of the clutch spindle and the primary gear shaft, the rear end of the extension forming the male member of a flexible coupling. and a coupling sleeve telescoping over the end of the extension and the end of the gear shaft. The object is to enable the clutch to be removed without disturbing the engine or change-gear.

934,140. Universal Joint—Daniel Corcoran, Yonkers, N. Y. Filed Aug. 14, 1908.

The shaft ends are rounded and slotted across their faces, and carry between them

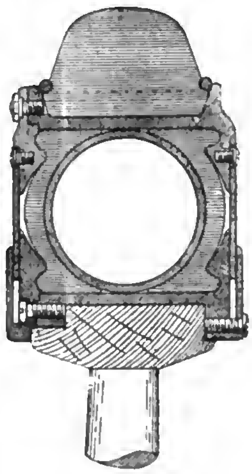


Flanged Disc Type of Universal Joint

a disc with flanges on either side which enter into the slots. As the flanges are in perpendicular planes a universal motion is allowed. The joint is held together by annular slots in the flanges through which pass pins supported in the shaft ends. The turning effort is taken by the flanges, acting in shear. The joint seems especially adapted to use in cases where an Oldham coupling is usually specified; in fact, it seems to be really an adaptation of this form of coupling to give a greater possible range of angular movement.

Issue of Sept. 21, 1909

934,472. Tire—John S. Stevenson, Detroit. Filed Dec. 23, 1907.



New Cushion Tire

This tire arrangement is somewhat similar to a number of the tires brought out in France by the last tire and wheel trials, in that it consists of a solid tire mounted upon tbe exterior of a sliding member, the latter carrying within itself a resilient tire, either pneumatic or cushion, which limits the yield of the solid exterior tire and the slidable felloe. Except for the contact of the yielding (and from its nature, soft) rubber member with the metal all along its side, the design seems to possess merit, at least, for heavy vehicle purposes. The flaw in the construction seems to lie in the large distance from the wooden felloe, which is the real support, to the outer solid tire, which is the point of application of all road stresses. In other words, the lateral strength is small.

934,547. Braking Means for Automobile Vehicles—Arthur Krebs, Paris, assignor to La Société Anonyme des Anciens Etablissements Panhard et Levassor, Paris. Filed Feb. 15, 1908.

This is the well-known Panhard braking device, which consists of additional cams mounted upon the exhaust camshaft. The latter is slidable longitudinally, so that the auxiliary cams may be brought under the valves. When so located, the exhaust valve is opened very little or not at all, depending upon the position of the cam, which is of varying contour. In this way the exhaust gases are retained in the cylinders, and the power is expended in pumping them.

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VOL. XXI NEW YORK—THURSDAY, OCTOBER 7, 1909—CHICAGO No. 15

THE AUTOMOBILE

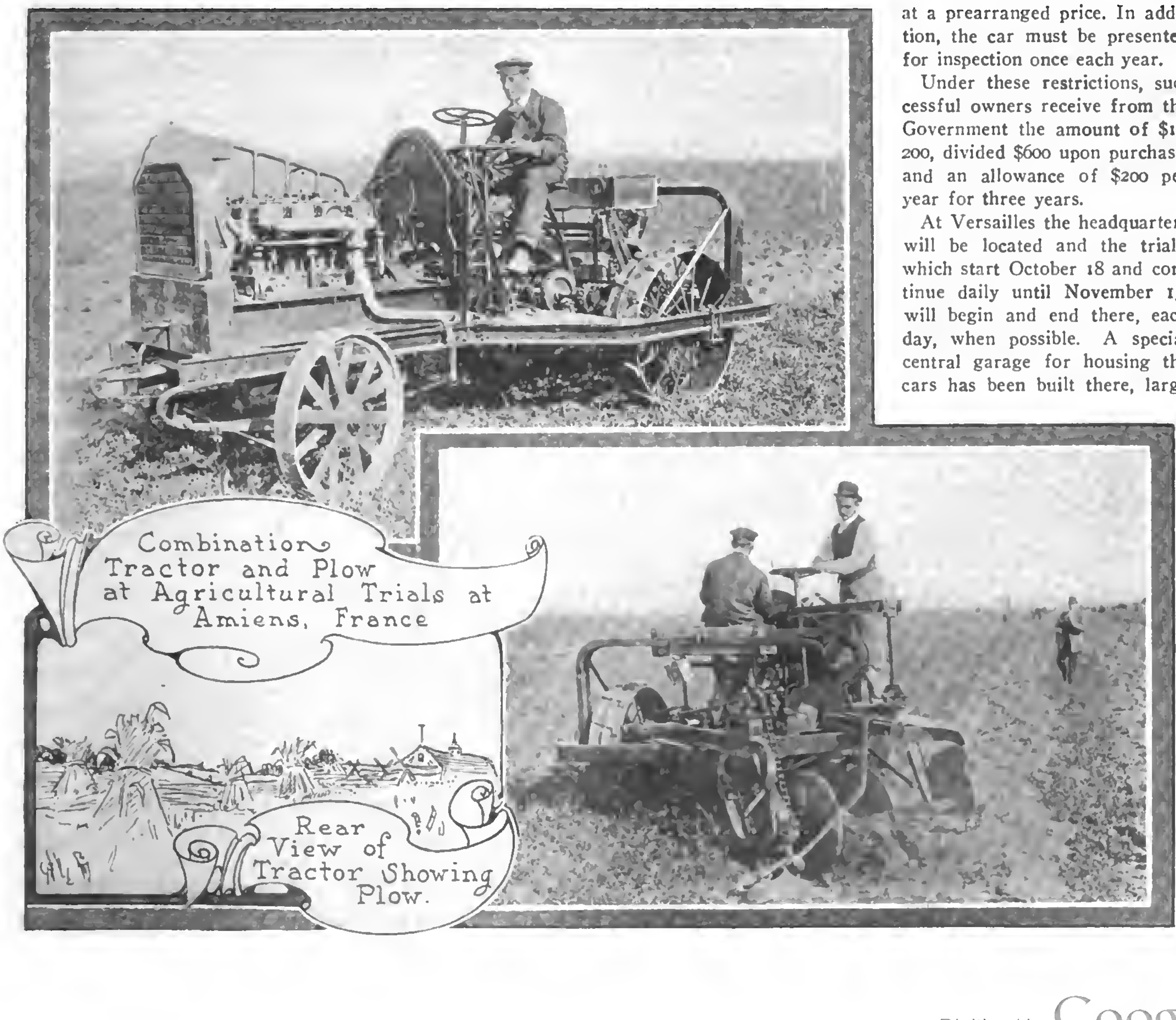
57 ENTRIES IN FRENCH VEHICLE TRIALS

AMIENS, FRANCE, Oct. 1—Spurred on by the prospect of government subsidy in addition to the natural and usual advantages accruing to a winner, the French manufacturers have entered the commercial vehicle trials in such numbers as to insure most strenuous competition. Not only have the lists filled well, but the unusual number of 57 entries have been received. These are divided over the three classes of competition, as well as being spread over the other departments relative to governing power. Thus, of the machines entered, 8 are to be submitted to the War Office trials only, 17 to the Automobile Club's requirements, and the remaining 32 to both.

The trials are to be held jointly by the Automobile Club de France and the French Government, as represented by the War Department. This has necessitated the formulation of two separate and distinct sets of regulations for the conduct of the day's trials. This really makes the competition into two contests daily, and under parallel road and weather conditions, but different rules. In addition to formulating a separate set of rules, the War Department has announced a schedule of subsidies to be paid to owners of vehicles which meet with the department's approval as well as with success in the trials. These subsidies are, of course, given subject to the government privilege of buying the car in case of war, at a prearranged price. In addition, the car must be presented for inspection once each year.

Under these restrictions, successful owners receive from the Government the amount of $1,200, divided $600 upon purchase, and an allowance of $200 per year for three years.

At Versailles the headquarters will be located and the trials, which start October 18 and continue daily until November 15, will begin and end there, each day, when possible. A special central garage for housing the cars has been built there, large



Combination Tractor and Plow at Agricultural Trials at Amiens, France

Rear View of Tractor Showing Plow.

enough to contain all of the cars entered, and fitted with all necessary facilities for doing work upon them.

There are three principal classes for competition, but each class is subject to a further subdivision. The classes are: motor trucks, road trains, and omnibuses. The first is divided according to carrying capacity into various classes, from 880 pounds on up to 6,000 pounds. The second main class has these subdivisions: tractors, freight trains exclusively, and passenger trains. Then, the last class has three sub classes, nemly: carrying capacity of from 6 to 10 passengers, 11 to 20 people, and above 20.

Daily trips will be made over two courses, one measuring 62 miles in length, and the other 93 miles. This takes the competing vehicles over all kinds of bad roads, hills, and through conditions intended to test them out very thoroughly. On the third day, a long trip is to be made to Clermont-Ferrand by easy stages, where the cars will be placed on exhibition, returning later to Versailles to continue the tests.

Added interest will be brought out by the compulsory variation in fuels, alcohol, benzol and gasoline being used in turn, and the results with each being carefully noted. Thus, from October 18 to 31, gasoline will be used; from November 2 to 6, carbureted alcohol will be substituted, and for the concluding week, November 8 to 15, the fuel employed will be benzol.

How much of the French excellence in this form of vehicle is due to mechanical superiority and how much to clever exploitation is very hard, if not impossible, to determine, but it is a self-evident fact that the various makers, exploitation to the contrary, are both ready and willing to enter into public competition to prove their assertions. Never has a trial been so carefully planned out, and so many features of the contestants' comfort catered to in advance. In response to this careful and able planning, the promoters (if the Club and the Government can be called that) have been rewarded with the largest and best entry list ever received. Among the entries are the following high class makers, the number of cars entered by each one being given also: Aries, 4; Berliet, 4; Berna, 1; Clément, 4; Cohendet, 2; De Dion-Bouton, 5; Delaugère, Clayette et Cie, 4; Desmarais et Morane, 4; Krieger, 3; Lorraine-Dieterich, 4; Malicet et Blin, 3; Panhard et Levassor, 4; Peugeot, 4; Société de Poids Lourds, 2; Saurer, 5; Schneider et Cie, 2; Vinet, 2. With this kind of competing vehicles, many of the figures set last year, and in previous trials should be wiped out. Thus, the figures for heavy vehicle economy made in 1905 by a Daimler, carrying 6.8 kilos, at an average of 20.8 km per hour, on .035 litres of gasoline per ton-km, should be displaced. The trials should bring out construction novelties.

SOME SUGGESTIONS TO TOURISTS

A consul who has long resided in a non-English-speaking country and who has seen many instances where misunderstandings and misconceptions, with subsequent unpleasant contingencies which could have been avoided by patience and courtesy, offers the following suggestions to tourists and travelers:

When traveling through a non-English-speaking country, one should remember that it may be extremely difficult for the people to understand what the tourist wishes. Neither should one forget that the customs, tastes and traditions of the people differ from that of the tourist, as a consequence of which the multifarious things and customs which he encounters do not coincide with those to which he has been accustomed. Nor should one expect to be served as punctiliously and satisfactorily as at home, considering his varied environments. In fact, anything which one finds abroad should be given due consideration and, in case of any complaint, an effort made to remedy the matter in a reasonable manner.

This can be easily done through the use of a little tact and common sense. Courtesy is something the public have a right to expect of a tourist. The tourist expects it from all those with whom he comes in contact and almost invariably receives it; then why should he be reluctant to reciprocate this kind attention and friendly disposition on the part of the foreigner?

Through courtesy and its inherent subsidiaries more than through any other characteristic a traveler may not only more easily raise himself, his people and his country in the estimation of the foreigner, but he thereby places himself in a position oftentimes to obtain many favors and concessions from the people among whom he is sojourning which might otherwise be graciously refused.

THE AUTOMOBILE CALENDAR

AMERICAN

Shows, Meetings, Etc.

Nov. 6-13.........Atlanta, Ga., Auditorium-Armory, National Automobile Show, auspices of National Association of Automobile Manufacturers. Samuel A. Miles and Alfred Reeves, General Managers, 7 East 42d Street, New York City.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 21-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 22-26........Kansas City, Mo., Convention Hall, Fourth Annual Automobile Show.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

FOREIGN

Nov. 12-20.......London, Olympia, Eighth Annual International Automobile Show, Society of Motor Manufacturers and Traders.

AMERICAN

Races, Hill Climbs, Etc.

Oct. 5-9..........Danbury, Conn., Stock Car Races in Connection with Danbury Fair.

Oct. 7............Philadelphia, Second Annual Stock Chassis, 200-Mile Race, Fairmount Park, Quaker City M. C.

Oct. 8-9..........Louisville, Ky., Endurance Run, Louisville Automobile Club.

Oct. 15-16........New York City, Brighton Beach Track, 24-Hour Race (postponed from September 24), Motor Racing Association.

Oct. 23...........San Francisco, Road Race, Automobile Club of California.

Oct. 28-30........Dallas, Texas, Three-Day Track Meet, Dallas Automobile Club.

Oct. 30...........Vanderbilt Cup Race, Long Island Motor Parkway, Motor Cup Holding Company.

Nov. 8-9.........Savannah, Ga., Georgia Highway Reliability Contest to Atlanta, Savannah Automobile Club.

Nov. 9...........Atlanta, Ga., Track Races, Atlanta Automobile Association.

Nov. 20-21.......New Orleans, Annual Fall Meet, New Orleans Automobile Club. Homer C. George, Secretary-Manager.

Nov. 22...........Denver, Col., Start of "Flag to Flag" Reliability Run. G. A. Wahlgreen, Manager.

Dec. 29-30........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

Feb. 4-6..........New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.

NEW YORK CITY HAS A LOOK AT AERIAL TRAVEL

WILBUR WRIGHT firmly established himself as the popular hero of aviation by two marvelous flights at New York during Hudson-Fulton week. From Governor's Island, on September 29, he sailed out across the bay and circled the Statue of Liberty; and on October 4, again rising from the little island at the lower tip of Manhattan, he took his way up the Hudson River to Grant's Tomb, passing over the warships at anchor, and returned to the starting point calm and smiling as ever. It was done so easily and so quickly that the cityful of spectators stood in a daze, almost forgetting to cheer. Then, at the very moment of starting on another flight, which would have thrown the first two into insignificance, a cylinder head of the motor blew out, and the crowds waited in vain. But the practicability of aerial travel had been demonstrated as never before in the presence of half a million witnesses.

The Hudson-Fulton committee began negotiations with Wright and Curtiss in August, and secured the signatures of both aviators to contracts binding them to make flights in the vicinity of New York. A large tract of made ground on Governor's Island, the military station, was set apart as an aviation field, and sheds were erected to house the aeroplanes. Wright arrived in New York September 19, and Curtiss two days later. Both quickly had their machines ready, but rain and high winds prevented the trials for several days. Curtiss was the first to take the air. At 7 A.M., September 29, he made a short flight about one minute in duration, returning to his starting point without trouble. He postponed further attempts to fit a new propeller.

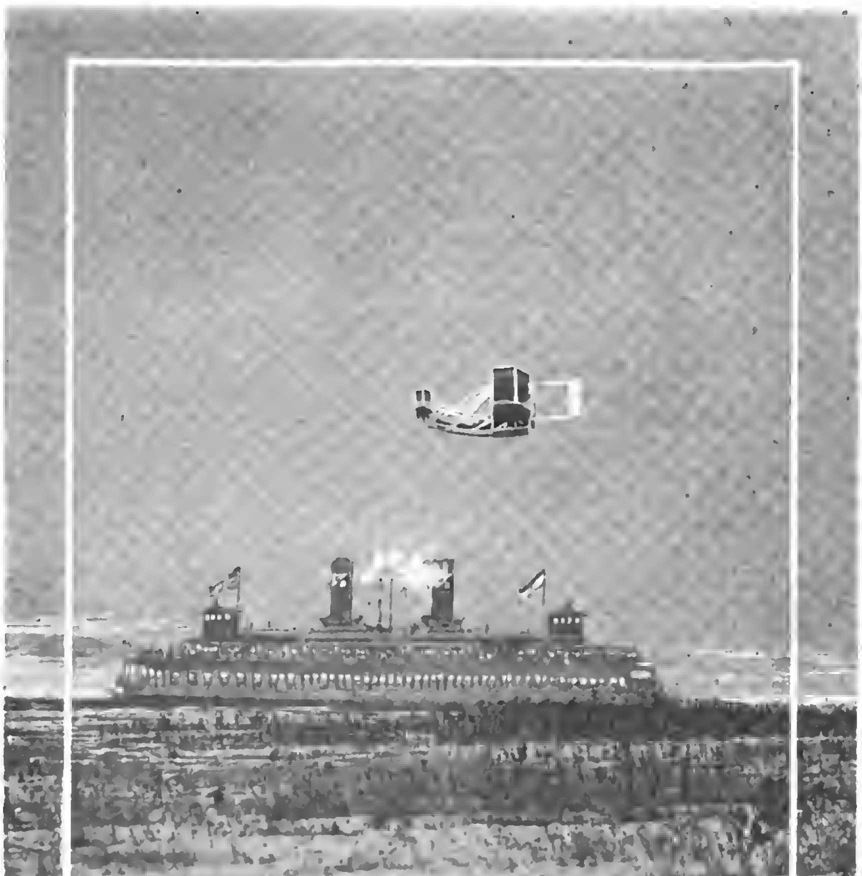
Wright arrived on the island soon after the Curtiss machine had been taken back to its shed, and after a short inspection brought out his flier. Pointing the machine directly into the wind, he ran lightly along the starting rail and went easily into the air. Two circuits of the filled-in ground were made, and then the machine headed straight out over the water. It flew over two tugs at a height of 100 feet, turned up Buttermilk Channel, and coming abreast of the upper end of the island, turned back again in full view of the crowds on the Battery sea wall. It landed rather abruptly, but without damage, having been in the air altogether 7 minutes 10 seconds. Then instead of taking the machine back to the shed, Wright had it again placed on the rail, and after an hour spent in looking it over, he climbed into the seat. The start was even quicker than before, and after a short circuit of the ground at a height of 30 feet, he turned out over the bay, headed straight for the Statue of Liberty. The crowd set up a mighty shout.

With three or four long rolls, like a ship at sea, the flier rose some 200 feet in the air. It sailed smoothly on; came abreast of the statue, and passed it. Over the narrow strip of water between Bedloe's and Ellis Island Wright brought it around in a magnificent sweep, his silver planes inclining gracefully. He circled back to the goddess on the south side, passing over the breakwater of the island and within twenty-five feet of the statue, at the height of its waist. At this moment the *Lusitania* came in sight, outward bound down the bay. Her decks were black with passengers, but the roar of the whistle drowned their cheers. The flier crossed her bows only 150 yards distant. Six minutes 40 seconds after the start the aeroplane settled gently on Governor's Island, and Wright stepped out, clearly pleased with his trip.

Late in the afternoon the flier was again brought out. The wind was now blowing twenty miles an hour, and the spectators could not believe that Wright was considering another ascension in such weather. Nevertheless the aeroplane was set on the rail and started off. It made three circles over the island and the bay to the south, often heeling over sharply in the wind, and landed without mishap. Many thought this flight the most remarkable of the three.

A period of unfavorable weather prevented further trials till October 4. That day, which was to be the climax of the week, dawned bright and clear; flags drooped from their staffs, and from the chimneys smoke rose in straight columns. It had been announced the day before that a flight was probable, and the city was on the lookout.

The aeroplane left Governor's Island at 9:53 a. m., and immediately headed out over the water. For a time it was lost from the sight of those on the island in the smoke of a harbor boat; when it reappeared it was bound straight up the Hudson at a height of 75 feet. The whistles of



Wright Starting from Governor's Island on Memorable Flight

Wilbur Wright and His Epoch-Making Aeroplane—The Canoe Was Carried in Case of Fall into the Hudson River

tugs and ferryboats set up a deafening chorus, warning the whole city. Little work was done downtown that morning. Opposite the Singer tower Wright rose 200 feet in the air, but at Fulton street he swooped down, resuming a straight course at about half the former altitude and nearer the Jersey shore. Riverside Drive was lined with spectators as he passed, and the sailors on the foreign warships turned out to man the yard-arms. He had now come over to the New York side, and passed Grant's Tomb at 10:13, only 200 feet off shore. He made his turn around the British cruiser *Drake,* a thousand feet to the north, and returned on the Jersey side. Going down, he had the wind in his favor, and at 10:26:33 he alighted on Governor's Island. The distance was 20 miles, and the time 33 minutes 33 seconds.

Preparations were immediately started for another flight in the afternoon, which was to be up the East River, under or over the bridges, and possibly clear around Manhattan Island. Just before 4 o'clock the motor was started, and Wright turned aside for a moment. Suddenly there was a muffled explosion, and a piece of metal shot through the upper plane and fell within a few feet of the aviator. It was the head of the forward cylinder of the motor. The whirr of the propellers died down. Wright glanced at the ruin; then dropped his arms to his side and turned away. The flights were over.

Dirigibles Fail to Fly to Albany

The dirigibles of Capt. Baldwin and George Tomlinson, which were to race up the Hudson to Albany for a $10,000 prize, both failed signally. After several postponements, they started, September 29, from the station at 120th street and Riverside Drive, near Grant's Tomb. Capt. Baldwin's steering gear broke after he had gone four miles, and he fell in the river. Tomlinson got as far as White Plains, and came down in a field.

Captain Baldwin's Dirigible Starting from Riverside Drive, September 29, for Albany, in the $10,000 Prize Race

SELDEN DECISION BRINGING STARTLING RESULTS

Eight Big A. M. C. M. A. Concerns Will Be Affiliated with the A. L. A. M., with More to Follow—Ford May Continue the Contest—General Motors Company Situation in Doubt

DEVELOPMENTS of the past few days and attendant possibilities of the near future indicate that the recent Selden patent decision will bring about startling organization changes in the automobile industry. Following the decision of Judge Hough came the information that the Association of Licensed Automobile Manufacturers would undoubtedly take a broad view of the situation and not attempt anything which might prove detrimental to the industry as a whole. There has seemed to be a realization on both sides of the patent litigation that the present extraordinary demand for automobiles is inducing manufacturing preparations of such proportions as to arouse fears of a dreaded over-production and more or less disaster to all concerned, including those firms who bore the brunt of experimental expenses in the early days, when the making of motor-driven vehicles proved somewhat unprofitable.

That Important Conference at Buffalo

First of the moves in a new alignment of concerns was a meeting held in Buffalo on Wednesday of last week, at which were present H. O. Smith, of the Premier Motor Manufacturing Company and chairman of the A.M.C.M.A. committee of management; Benjamin Briscoe, of the Maxwell-Briscoe Motor Company and ex-chairman of the A.M.C.M.A. committee of management; C. G. Stoddard, of the Dayton Motor Car Company and vice-chairman of the same committee; R. E. Olds, of the Reo Motor Car Company; Charles Lewis, of the Jackson Automobile Company and another member of the committee; William Mitchell Lewis, of the Mitchell Motor Car Company, besides Mr. Mathews, of the Jackson company, and Mr. Bates, of the Mitchell company.

It was a natural sequence that a representative of the A. L. A. M. should be more or less present during the somewhat prolonged session. One question propounded to him was whether the A. L. A. M. would take in the A. M. C. M. A. as a whole, and the reply was that each company would have to make separate application and fulfill the conditions imposed.

New Conditions of Licensed Membership

Covering all cars delivered and sold since 1903, new members will be asked to pay eight-tenths of one per cent., same being based upon the list prices of the cars at the time of sale. It is understood that the Licensed representative had power to offer specified conditions, but no authority whatever to change them in any particular.

These concerns are understood to have decided at the Buffalo meeting to qualify for A.L.A.M. membership:

Maxwell-Briscoe Motor Company
Reo Motor Car Company
Premier Motor Manufacturing Company
Mitchell Motor Car Company
Dayton Motor Car Company
Regal Motor Car Company
Jackson Automobile Company.

It was only a couple of weeks ago that the Willys-Overland Automobile Company vaulted the fence into the Licensed field by absorbing the Toledo Motor Company, which held a Selden license. This gives a total of eight A.M.C.M.A. concerns on the Licensed roll call.

Respecting future applications from the A.M.C.M.A., only such other companies as may be recommended by the above concerns, and only those which have built cars on a considerable scale, will be considered for membership by the A. L. A. M.

To Prevent Possible Over-Production

Once the A.L.A.M., after a reasonable length of time, concludes its consideration of new members, the indications are that it will proceed against all the remaining concerns, and insofar as it is possible so to do, will prevent the many newcomers from an over-production which would flood the market disastrously.

In a letter sent out by the chairman of the A.M.C.M.A. executive committee following the meeting at Buffalo, the concluding paragraph read as follows:

"It seems to be the general opinion of those present (referring to the Buffalo meeting) who had conferred with their patent counsel that the hearing on appeal (referring to the Selden case) would probably occur at a comparatively early date, and, if confirmed, the position of the Licensed association would be such that it would control the situation."

If this statement represents the present general view of the unlicensed makers, in the face of all the legal talent that has been employed in the Selden case, it is not difficult to understand why eight important makers have already decided to enter the Licensed fold.

What Henry Ford Will Decide to Do

Up to the time of going to press the only news available from the Henry Ford camp was to the effect that his company would continue its independent course, though both the head of the concern and Vice-President James Couzens have had various conferences in New York City, where all the leaders of the industry are now gathered.

An impression prevails that Mr. Ford will hold out, rather than pay at this time the large sum which would represent back royalties.

If Ford appeals, it is contended by some, the measure of damages cannot be more than the eight-tenths of one per cent., which is the basis of agreement as between the Licensed association and the companies already as good as taken in. Others say that the measure of damages will be more, because the royalty has been all the way from five per cent. down, it having been reduced from time to time. But it is pointed out that there were but few Ford cars built during the time when the higher royalty was in vogue, and if Ford puts up a fight, all he has to risk is the cost of the appeal and defending the suit for damages which must be brought before the Licensed association can spend any of Ford's money. This will be true if it is a fact that the measure of damages is now fixed by the agreements made with the companies that have accepted the Hough decision as final.

The Situation of the General Motors Company

A decidedly interesting phase of the present situation relates to General Motors, now comprising Buick, Oldsmobile, Cadillac, Welch, Rainier, Oakland, Reliance, and Rapid, with W. C. Durant as the man in the saddle. It will be remembered that last Winter, when the combine of which he is the head only included Oldsmobile and Buick it refused to continue paying royalties, since which time a suit has been pending in the courts. Mr. Durant is on the ground, but whether he wants to renew his Licensed affiliations or whether he will be permitted to do so even if he is willing, are questions yet to be answered.

(Continued on Page 620.)

Elmore, Two-Cycle Winner, Only Survivor with Clean Score

Renault, the Foreign Car Participant, Winner of Its Class

12 Pullman Which Was Most Successful in Division 3

Maxwell "Q" Which Took the Honors in Division 2

TWO-CYCLE ELMORE

WASHINGTON, D. C., Oct. 2—Two-cycle Elmore survived the Munsey reliability contest with a flawless record, thus winning the sweepstakes prize for the car making the best score in the tour, and at the same time winning the trophy offered in the $2,001 to $3,000 division. The car was driven by Frank Hardart, Jr., son of the entrant, and hailing from Philadelphia. While a protest has been filed by Ray W. Harroun, it is far from probable that the technical committee will have its findings revised by the contest board of the A. A. A. Harroun drove No 30 Marmon, which was penalized only seven-tenths of a point. Here is the complete list of winners:

Class.	Points.
$4,001 and over...	
No. 28, Renault	4
$3,001 to $4,000	
No. 21, American Simplex	.9
$2,001 to $3,000	
No. 36, Elmore	.0
$1,251 to $2,000	
No. 12, Pullman	62.3
$851 to $1,250	
No. 9, Maxwell	29.
$850 and under	
No. 7, Ford	6.

The trophy in division 3 was originally given to the Crawford. but the fact that a front wheel was replaced the first day, which did not appear on the observer's card, gave the car a greater penalty than first appeared. This made No. 12 Pullman the winner of this division, but the award of the trophy to this car has been protested by the Carter Motor Car Corporation, of Washington, entrant of No. 5 Washington. The basis of this protest is that the Pullman, which sustained a broken spring, could not replace it for $2, as claimed. No. 5 Washington had 68 points against it.

The entry of the travel-stained motorcade into the National Capital was on the order of a triumphal progress from the time the limits of the district were reached until the cars drew up in front of the Munsey building. A parade was formed on the outskirts of the city with a quartet of United States Army buglers in the van. Half a hundred escorting cars followed the 25 cars which had participated in the run, and when Pennsylvania avenue was reached the crowd was so dense that the lines of police who were on hand to keep the crowd in order had all they could do to maintain a passageway for the procession. Each car and driver was lustily cheered by name as it finally checked in and was sent off to the official garage, where it was immediately put through the

PERFECT SURVIVOR

brake, clutch and other tests preliminary to the final technical examination. The "can't-lose-me" Autocar truck reported at 8.30, having left Philadelphia three hours after the run.

Wednesday night the tourists were entertained at Belasco's Theater by "The Yankee Girl." Thursday's program included a monster floral parade in which the contesting cars with their mud and grime shared interest with the many beautifully decorated machines which contested for prizes. From 8.30 until midnight the tourists were entertained by a smoker in the red room at the New Willard Hotel, during which the results of the run were announced and trophies presented.

The tour was a big success in many ways notwithstanding the bad weather encountered during the greater part of the time. The rain and mud played havoc with some of the cars, and of the original twenty-five starters but twenty of them completed the tour. The tourists received an ovation in Philadelphia and Baltimore on the return trip and their entry in Washington was the occasion of the greatest outpouring of people since the inauguration.

Why Penalties Were Imposed

The Ford received a total penalization of 6 points, of which 1.4 points were sustained for carbureter trouble the first day and .3 point for stalling the motor that day. On the second day .2 point penalty was again levied for stalling the motor twice and .1 point for adjusting the carbureter. In the technical examination the car lost .2 point for a loose right rear fender bolt and loose bolts on the right and left transmission arms; .5 point for a loose extension muffler pipe; .1 point for a loose nut on the driving shaft; .2 point because the muffler cut-out stuck open, and 3 points because the front wheels were loose.

No. 29 Hupmobile, the other entrant in division 1, was listed as finishing as a non-contestant, but the driver objected to this procedure, stating he would prefer to have the car's score made up rather than have it placed in the non-contestant division. The Hupmobile sustained an accident coming out of the garage at Willimantic, which made it late in reaching Washington. R. W. Keeler, the driver, drove the car from Willimantic to Washington without stop, finishing at 10.30 o'clock, September 30. Referee Trego is now figuring out his score.

The model Q Maxwell, winner in division 2, received a total penaliza-

American Simplex, a Two-Cycle Performer, Prize-Taker in Division 5

Ford, Winner of the Smallest Class of the Contest

The Autocar Delivery Wagon Which Finished Strong

All Survivors Participated in the Floral Parade tion of 29 points. This car had a perfect score up to the seventh day, when Lambert stalled the motor, receiving .1 point, while on the ninth day .2 point was received for a loose magneto wire. In the technical examination .5 point was assessed for a loose right front wheel; .1 for a loose left front lamp bracket; 4 points for the coming off of a rear axle truss rod and 6 points for work on same; .1 point for loose muffler extension; 12 points because the rear universal joint was badly worn and 6 points for work on same.

The Reo in this division lost 94.3 points, of which 27 points were lost on the road and the remainder in the final examination. The latter penalties consisted of 20 points for play in the steering wheel; 34 points for a wornout steering knuckle and 12 points for work on same; .2 point for lost radius rod bolt and .5 point for replacing same; .1 point for a loose right rear spring clip and .5 point because the drive chain was too loose. The car was a 1908 model that had been driven 15,000 miles by its owner.

No. 12 Pullman, winner of division 3, lost 62.3 points; the Crawford, 71.9 points; No. 5 Washington, 68 points. No. 31 Washington lost 438.7 points, divided as follows: .1 point for stalling motor the first day; .1 point for tightening pump the second day; .2 point for stalling the motor twice and 31 points for being late in the final control the third day; 358.1 points for work done and for being late the fourth day; .3 point for stalling motor three times and .1 point for work on rear mudguard the seventh day; .1 point for stalling motor and .4 point for tightening front fender the ninth day. This car lost 48.3 points on the final examination for play in the steering wheel, loose front and rear mudguards, broken rear axle truss, crushed muffler exhaust pipe, loose magneto ribs, play in the fan bearing and a leaky water-pipe joint.

No. 32 Washington received 1,555.6 points, 1,451 of which were received the fourth day, when accidents to the car delayed its arrival in Boston many hours. The car lost 74.6 points on the final examination.

In division 4 the Chalmers-Detroit drew a total penalization of 51.2 points, of which 49.2 were the result of the technical examination and 2 points for stalling the motor twice and work done on the road. The technical examination developed a penalty of 7 points for a broken right front mudguard brace, .2 point for loose spring cleats; .1 for loose right front fender; .5 point for play in the left front wheel; .1 point for loose fan bearing; .6 point for loose rear fenders; .2 point for lost nut off fanshaft pulley, 35 points for a badly broken subframe in the rear of the transmission; .1 point for loose right front engine arm bolts.

Six and three-tenths points was the score of the Spoerer. On the first day this car was penalized .3 point for oiling the clutch, while on the seventh day 3.2 points penalty was incurred, of which .8 point was for removing wires from and adjusting the magneto; 1.6 point for adjusting the timing rod and .2 point for cleaning the carbureter. On the ninth day the motor was stalled twice, which added .2 point. In the technical examination the car lost 2.6 points.

The Corbin finished with 662.1 points against its record. No. 20 Winton lost 5.5 points, of which 1.1 point were sustained on the road and 4.4 points in the technical examination. The Marmon lost .6 point in the technical examination and .1 point for work on the road. No. 13 Pullman was penalized 10.7 points, of which 9.9 points were on the final examination.

The American Simplex, winner of division 5, lost but .9 point. On the second day the driver stalled the motor, which cost .1 point. In the technical examination the car lost .8 point.

The Renault came through with but .4 point marked against it, winning division 6. The penalties consisted of .1 point for adjusting hub cap, .1 point for loose spring cleats, .1 point for loose leather boot on universal and .1 point for loose transmission oil stud.

The Maryland and Columbia finished as non-contestants. Both received severe injuries that put them out of the running. The Matheson was disqualified in New York when the driver put the car in the Matheson garage unattended by an observer.

The two Croxton-Keetons were withdrawn, No. 17 at Willimantic and No. 16 in New York; No. 37 Pullman was withdrawn in Albany and the Selden in Philadelphia.

Details of Harroun's Protest

The protest filed by Harroun is set forth as follows:

"The penalizations against the Marmon, in my opinion, were on technicalities which should have been considered negligible, considering the amount of leeway given all contestants. The Elmore, in my opinion, finished the contest with defective brakes, which was demonstrated by the fact that this car ran into the Marmon when approaching Washington. During the excitement of the moment the driver of the Elmore made the remark that he 'had no brakes' as his excuse for the incident. Furthermore, the Elmore had a very noticeable dish in the left front wheel, showing that the spindle was badly bent. During the latter part of the tour the Elmore had a bad knock under the bonnet, which was very noticeable when the car was standing still and the engine running.

"I claim that the penalization given me of 0.1 point on the road score for removing and replacing the filler cap of the radiator while the car was in motion; 0.5 point for a very slight perceptible shake in the right front wheel bearing, and 0.1 point for what I consider an allowable play in one spring cleat, should not have been made against the Marmon."

Why the Croxton-Keeton Cars Were Withdrawn

Editor THE AUTOMOBILE:

The Croxton-Keeton entries in the Munsey reliability tour went through as far as New York City on the return with the following scores, as you have undoubtedly noted: The 45 horsepower German type arrived at New York with a perfect score, and the 30 horsepower French type was penalized four and one-half points for breaking an unessential bolt.

Our vice-president, Mr. Bernhart, was threatened with a very serious illness on account of the wet weather encountered, and at the arrival of H. A. Croxton, the president of our company, conditions were such in our New York branch that they demanded the immediate use of these entries for demonstration purposes.

Having covered all but the last two days of the reliability run, we had proved all that we wished to prove in respect to endurance and speed under unfavorable weather conditions and rough roads, and as they were the only cars available for demonstration in our New York branch, Mr. Croxton gave orders for an immediate withdrawal from the tour, and placed the cars at the disposal of J. P. Stoltz of the Croxton-Keeton Motor Company of New York City.

Massillon, O. THE CROXTON-KEETON MOTOR CO.,
S. W. CROXTON, JR.,
Publicity Manager.

Floral Parade Will Be an Annual Affair

Washington turned out en masse Thursday to see the automobile floral parade arranged by the Chamber of Commerce. The great outpouring of people to witness the pageant was a revelation to the promoters of the parade, and it has been decided to make the event an annual affair.

The grand marshal of the parade was W. D. West, president of the Automobile Club of Washington. The cars that competed in the Munsey reliability tour headed the parade, and the drivers received an ovation all along the line.

The sweepstakes prize, a $600 rose bowl, donated by the Chamber of Commerce, was won by a float entered by employes of the Naval gun factory. The vehicle was a 5-ton Studebaker truck, which was decorated with American Beauty roses and laurel leaves.

The first prize for cars decorated with natural flowers only was won by Harry Wardman, whose Pope-Toledo was designed as a Venetian gondola and decorated with pink and white chrysanthemums. The rose-decorated Waverly electric of Mrs. T. B. Spence was an easy winner in the class for flower-decorated electric machines with women drivers. The car was fashioned in the shape of a huge basket filled with pink roses. The first prize for the handsomest floral decorated cars in the gasoline division was won by the entry of the Auto Livery Co. The Washington *Post* carried off the prize for the most unique float. A big Packard truck was utilized to form the upper half of the globe, upon which were traced America, Europe, Asia, Africa and the north pole in Southern smilax.

Special Machinery Used In Making Automobiles

By Thos. J. Fay

QUALITY is measured, not only in terms of the life and efficiency of a unit, but with reference to the interchangeability of parts, so that when repairs are to be made, the delay will not be long. One other point: a repair part, when substituted for a worn out part, should fit so nicely that the recovered situation will be as good as new.

It is one thing to make one good automobile, but it is quite another matter to make them in quantity and have them all alike, with every part so closely held that repairs can be made by the simple expedient of sending for the part and inserting it in place when it is received without any machining or fitting.

The first difference to be noted as between "foreign" cars and the home product lies in the very chance that no two of them will be alike. This is due to a surplus of cheap labor, and the absence of jigs, special tools and gauges. It is generally well understood that special tools reduce the labor account, and in countries where labor is cheap this way of going about the manufacture of automobiles is ignored in order to save the enormous cost of the special tools.

One important point is overlooked—interchangeability is absent—and no matter how good the material may be, or how well a car may run, if the parts cannot be removed when broken and then replaced the cost of making repairs will be high. Even this phase is not of such great importance abroad, for if there is plenty of cheap labor to do the original work there is also a surfeit of the same class of labor to make repairs. The change in scene from Continental Europe to the United States, with far inferior roads, changes the situation very much. Since the liability to accident is greater, more stress must be laid upon the matter of replacement of damaged parts. In this respect the cars built on the other side by means of the over-plentiful cheap labor are at a disadvantage. The best of materials avail little if repair parts show the human failing of differing slightly from the piece originally used. So it is that the tendency abroad to economize on shop tools and special machinery while the supply of labor continues abundant has brought home to the American manufacturer all the business that he can handle. If but to encourage home manufacturers after their investment of millions in special machinery, cars made on this side should be given the preference.

This is the story of the difference beeween the foreign and American automobiles. Although slightly tinged from their viewpoint by the supposedly superior materials available, it is enough to point out that the American maker who will spend hundreds of thousands of dollars to equip his shop with "duplicating" machinery will be just the maker who will go to Japan, if necessary, for the material requisite to accomplish his task.

Labor Saving Is but One of the Purposes—We hear so much of the labor saving idea that most of us fail to remember that there is a second and stronger reason for using special machinery in a shop. Remembering, however, that it is of far greater importance to be able to duplicate parts than it is to save a little labor, it will be profitable to enter a shop and see how the multiple task is performed.

Take an Elmwood Avenue car, and after a pleasant ride through one of the most beautiful sections of Buffalo a broad expanse of buildings of the most modern "concrete construction" will intercept the line of vision on the right hand side. It is the plant of the Pierce-Arrow Motor Car Company, makers of the Pierce-Arrow. The entrance is imposing, and the uniformed attendant at the entrance will politely direct the visitor to the reception room. The first impression is that the managemen is alert, wishes to consider the comfort of the visitor, but the scheme is far deeper, as we shall presently see. The real inside of the situation is that workmen cannot do the finest grade of work without light, heat and ventilation, and as a matter of fact, the visitor when he enters the reception room is treated with precisely the same consideration as the blacksmith, the machinist and the artist who are responsible for the body creations used on Pierce-Arrow cars. Everywhere is light, with ample provision for heat, and sanitation has a place in the plan.

It might be said this is not relevant to the subject but, really, the first requisite is to have a suitable place to house the special tools and the men who must direct them. In the old days, before pyrometers came into vogue, forges had to be placed in a dark room, in order that the "smith" might be able to judge of

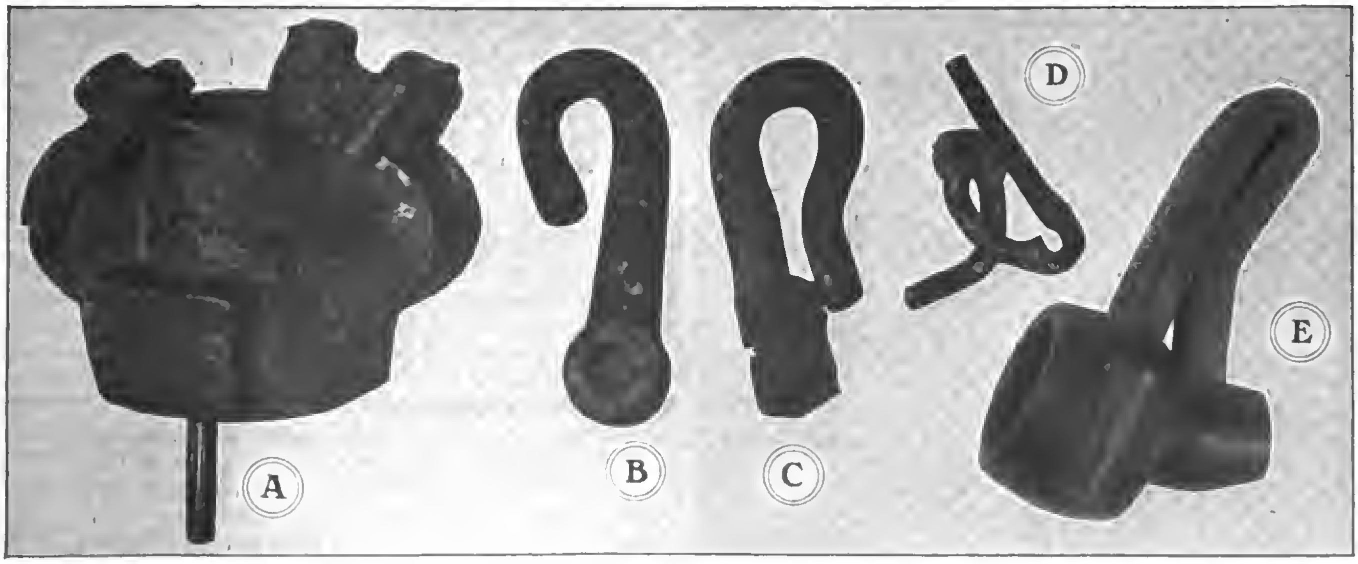


Fig. 1—Drop forgings bent to illustrate the good effect of annealing, and of heat treating in other ways

Fig. 2—Traveling crane used to eliminate dead labor and reduce cost of handling heavy units

the temperature of heated work, merely by the color. With pyrometers to tell the story in a much more accurate way, the dark forge is no longer a necessity, and the level of the "smith" is increased until to-day he is one of the most important men around a plant in which fine automobiles are evolved.

What the Forge is Reduced to—Where once the "smith" fashioned parts to intricate shapes by hand, using a fire, an anvil and a certain showing of muscular energy, the heat treatment of parts is substituted for the most part. The parts are made in dies by drop forging, or in a hydraulic press. As they come

Fig. 3—Moving platform for handling supplies with or without a truck

from the process they are not fit to use, due to the high heat at which they are drop forged, hence they have to be heat treated, which consists of annealing, heating, subsequent quenching, etc., depending upon the quality of the material used and the duty it is to perform.

Fig. 1 shows just such parts, and A represents one which was experimented upon to bring out the point here to be made. An inspection of this part will show that the bent-over arm fractured near the end and developed a fissure besides. This bending-over process was conducted before the forging was heat treated, and just to show that this condition of irresponsibility could be eliminated the forging was then heat treated, after which the arm was subjected to the same bending process, with the result that the part shows no sign of fracture or distress.

Glancing again at Fig. 1, B, C, D and E will disclose more of the results that follow heat treating. In the Pierce plant, in order to uncover the surfaces, all forgings are subjected to a "sand blasting process." This is but a part of the business of the room or department where once the "smith" held domain, and, as the story goes, every part that now enters a car is suitably manipulated. This means that it must be subjected to one or the other of the processes as follows:

(A) Annealed to remove internal stresses.

(B) Cemented, to grow a deep surface coat of carbon, in order that it may be rendered strong and hard of surface, without reducing the dynamic ability of the soft core.

(C) Quenched, in oil or water, according to requirements, to bring out certain qualities.

(D) Subsequently tempered to accentuate kinetic ability.

The laboratory stands in the shadow of the department where parts are heat treated, and the foreman is carefully informed by the chemist as to the composition of the material, in order that the correct temperature will be maintained. A pyrometer tells the manipulator just what the temperature is at all times, and a recording master pyrometer affords, for the benefit of the chief engineer, permanent information in relation to this important matter. Likewise the testing machine is used to determine the degree of benefit derived, and in these several ways the quality of the steel is exactly determined.

Many Parts are too Heavy to Lift—The elimination of common labor, which ranks on the "cost system" as dead labor, is necessary if the product is to be up to a fitting standard and have a price tag which will not be too high. Since many of the parts have to be moved about and are heavier than a machinist or a fitter could be expected to lift, it would require the use of common labor were it not for the presence of traveling cranes, one of which is shown in Fig. 2, which spans the erecting shop and is used to move the units quickly under the guidance of one skilled man, and at the beck of the men who do the work, thus placing one machine of great range and ability at the disposal of the men of skill instead of a horde of common labor.

A traveling crane is not easy to arrange in the loading shed where the freight cars are backed in on a siding to deliver materials. Fig. 3 shows how the Pierce engineers disposed of this rather troublesome matter, and it will be observed that the moving platform depicted is so contrived that materials may be dumped on it, to be moved in or out, or trucks may be run on to the platform and up the incline to the cars outside, or down the incline, to the floor inside.

Insight into Some of the Processes—If the name of the maker is to be on the hub-caps of the cars it is important to have it engraved on in such a way that it will present evidences of taste. It is not possible to have this work done in the foundry by means of letters on the patterns and comply with the requirements. Fig. 4 shows how the work is done in the Pierce plant by means of a machine operated by a man who could not possibly engrave the name on the hub-caps, yet even so, by aid of this ingenious machine the man is enabled to accomplish the task. The process is simple and consists of a platen on which a master engraving rests; a chucking vice holding the hub-cap; a system of parallel motions, so contrived that a pointer which the operator moves over the master plate directs the engraving tool (an end mill suitably ground and shaped) over the hub-cap. The graver imitates whatever figure is on the master plate and all that the workman has to do is to follow the design.

Fig. 4—Process of engraving names on hub caps, thus saving cost of skilled engraver, and producing identical results

More Important Work Done With Equal Ease—In interchangeable work there is no part of an automobile that can be regarded of such great importance as cylinders. They have to be made of cast-gray iron, and they are subjected to high and variable pressures. If they are not interchangeable the cost of a replacement will be very high indeed. Fig. 5 depicts a big multiple milling planer used for facing off the cylinders, and with nine milling spindles so disposed as to accommodate as many milling cutters, two sets of twin cylinders are faced off at a single setting. Considering the use of high-speed cutters, maintained in the best possible shape by competent men who do no other kind of work, the finished cylinders are accurately faced and interchangeability is accomplished. As an incident the work is done quickly, and, considering the accomplishment of the main task, the cost is not excessive.

The same figure shows how the cylinders are held in a fixture, the object of which is to eliminate the personal equation, preventing the workman from setting up the cylinders excepting in a way to afford the desired results. It is equally advantageous that the time of setting up the work is much reduced, considering the desire to have all cylinders exactly alike, in order that a repair will be easy to make if the occasion requires.

In the process the milling cutters rotate, due to the use of gears which engage a driving shaft, through a speed changing gearset. This takes power from an individual electrical motor which is bolted to a base cast on the frame of the planer. The platen on which the cylinders rest has a power feed, and it moves the cylinders up against the rotating cutters at the required speed.

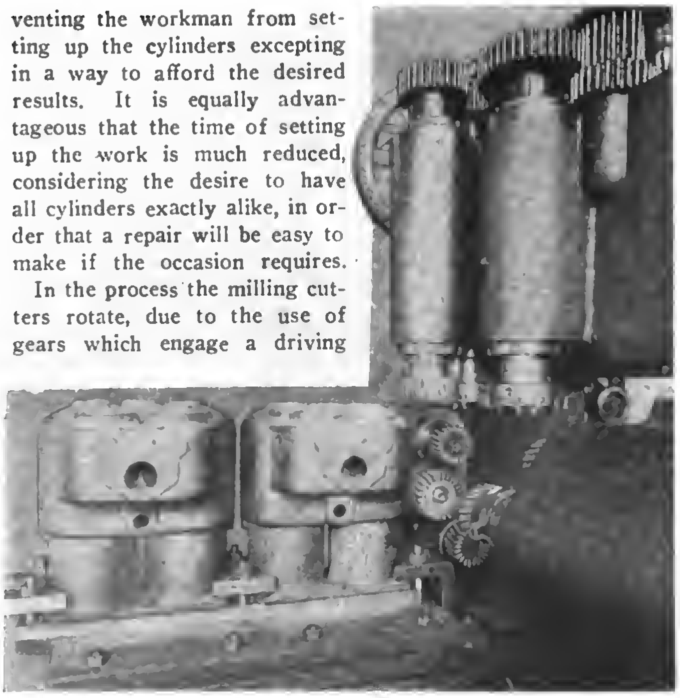


Fig. 5—Milling planers engaged in facing two sets of twin cylinders, and engaging nine milling cutters simultaneously

Big Turret Lathes Perform Intricate Tasks—Fig. 6 shows a drop forging which incorporates into the live rear axle for the finished car. The extending arms on this piece, to hold the brake fulcrum pin, render the part a difficult one to machine, which trouble is accentuated on account of the fine quality of the steel used. Chucked in a turret lathe of great strength and range, this task is reduced to practicability, and with six fixed tools on the turret the workman is enabled to do six separate operations at a setting, thus eliminating the error which would surely follow if the part had to be chucked six separate times. In this case the work rotates and the fixed cutters feed (with the turret) up against the rotating work, performing the operations to a nicety. As each operation is done the turret is swung back, a new tool is turreted into range, the feed is thrown in, and the next operation is performed. In this way there may be as many operations as there are fixed tools on the turret, and the work will be as accurate as the tool department keeps the cutters, which, in a shop of this character, is so close that interchangeability is a normal expectation

Fig. 6—Turret lathe working on a drop forging of intricate shape, as used in live rear axle work

Fig. 7—Turret lathe working on a nickel steel steering pivot held in a steady rest

Fig. 7 represents another important operation being performed on a turret lathe, in which a steering pivot is held on a face plate, centered in a steady rest and bored out by a boring tool. This is an extremely difficult operation, primarily, because the bore is not for a complete circle, then, due to the difficulty in holding the part, and finally in view of the tough and hard character of the nickel steel used.

Check Methods Must be Used.—When the parts are made, they go to the inspection department to be gauged, micrometered and inspected. If they come up to drawings and standards they pass on to the assembling departments. When they are assembled, considering the checking they receive in the testing department, it would seem as if they might then go directly into cars, especially in view of the customary road test every car receives.

Not so. If an adjustment is not rightly made noise will be the normal expectation, and if a bearing is set up too tight heat will soon be induced, even though oiling be profuse. To guard against all such matters the assembled rear axles, motors and transmissions are set up in testing machines, one of which is shown in Fig. 8. As will be observed, the axle is set upon pedestals so that the propeller shaft engages the shaft of an electric motor, from which power is obtained in excess of the power of the regular motor in the finished car. Fan blades are clamped to the live shaft of the axle and the motor is started. The speed of the electric motor may be increased at will, and may be even considerably higher than the highest possible speed the motor in the car will run at. If the bevel drive makes any noise at all it is examined and adjusted; if the noise cannot be removed the axle is dissembled and the reason ascertained. When the axle is made to run noiselessly at all speeds the test is continued until the bearings are run in. In this way much delay is saved, and the road testers of the finished cars are then able to make the customary 100 miles without having to tinker with the mechanism. A similar machine is used to test transmissions, and after they are adjusted to a noiseless performance they are kept under load until the bearings are run in and to assure that there is nothing wrong.

The idea has been to illustrate the manner in which special devices are made to serve the purpose of building cars, in which interchangeability is the main criterion, and with the understanding that quality must never be beyond the reach of the class of buyers who are catered to. The machines illustrated are but a few of the many in use in the Pierce plant.

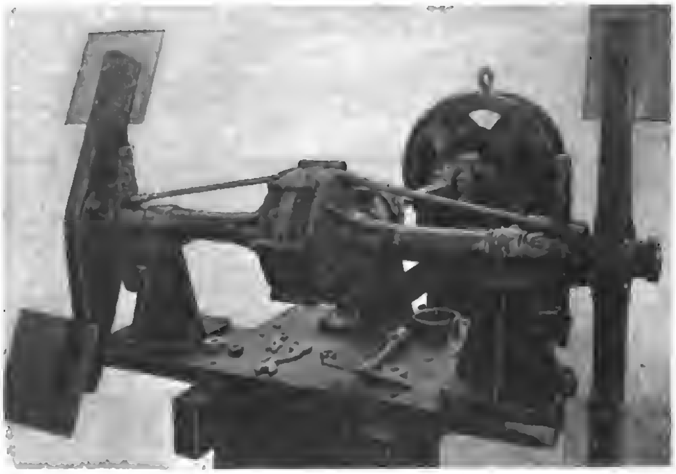


Fig. 8—Testing a live rear axle after it is assembled to see if it will make noise, and to give it a test load

AGRICULTURAL TRIALS AT BRANDON

Following the Winnipeg trials, so closely in fact as to almost form part of them, were the trials at Brandon, the same machines appearing at the latter place as competed at Winnipeg. As planned, the trials were to include brake, hauling, and plowing tests, but the tests dragged out so long that it was necessary to abandon the hauling test, which was last on the program. The plowing tests showed some very interesting results, the 25-horsepower Rumely steam tractor, for instance, hauling a 14-furrow 14-inch Deere plow a mile in 15 minutes. This was, however, done at the expense of fuel and water consumption, so this machine did not figure in the final results. There were, aside from the class awards, two championship prizes to the International Harvester Company, for gasoline engines, with the No. 3 20-horsepower machine; to the Avery Company, for steam engines, with No. 12, a 30-horsepower machine.

Tabulated Results of the Trials at Brandon.

		Brake test (20 points.)						Ploughing test (40 points).												Price. 10 points.		Turning, 5 points.		Pnts 80 & 90	
No.	Maker.	Rated brake h.p	brake h.p.	Class.	Pounds water per lb. coal.	Pounds fuel per h.p. hour.	Score for brake test.	No. of ploughs hauled.	Width of furrows.	No. of rounds ploughed.	Time per round.	Total fuel used (lb).	Total water used (galls.).	Depth ploughed.	Acres ploughed.	Pounds of fuel per acre.	Score for ploughing	Score quality of ploughing.	Score for water used, 4 points.	Price f.o.b. Brandon.	Score on price.	Turning diameter.	Score for turning.	Protection, clearance, construction, etc.*	Total score.
1	Avery, 12 h.p. (gasoline)	36	16	A	—	1·094	7·3	3	in. 14	2	23 / 23½	10	6	in. 4	·948	11·79	10	13·5	—	$ 2,500	2·8	ft. in. 42 6	2·9	75·5	111·5
2	I.H.Co, 15h.p. (gasoline)	19	21	B	—	·416	19	3	16	3	20 / 19 / 18	30	27	4	1·45	13·79	8·54	10	—	1,700	4·7	18 4	4·1	60	105·84
3	I.H.Co., 20h.p. (gasoline)	26	25·9	B	—	·50	15·8	6	14	2	26½ / 25½	13	44	4	1·7	6·46	18·2	17·5	—	2,300	4·3	18 0	4·1	61·6	121·4
4	I.H.Co., 20h.p. (gasoline)	28	26	B	—	·654	12·2	6	14	2	23 / 21	10½	27	4	1·7	6·17	19	12	—	2,100	4·7	17 8	4·15	61	118·03
5	Avery, 30 h.p. (steam)	60	60·9	E	6·84	4·84	15·6	8	14	1	16½	119	300	4	1·181	105·2	11·14	14	2·8	not given	8·6	26 0	3·7	79·8	135·54
6	I.H.Co., 20h.p. (gasoline)	26	20·7	A	—	·53	15	4	14	2	30 / 30	21	27	4	1·131	16·97	6·38	12·5	—	2,100	3·6	15 9	4·2	58·5	100·13
7	Case, 32 h.p. (steam) ..	110	96	D	7·9	4·03	16·5	12	14	1	18	185	881·4	4	1·454	99·8	12·6	16	2·47	4,106	8·2	35 0	3·25	79·7	137·68
[illegible]	G. Scott, 25 h.p. (steam) ..	76	76	D	7.04	4·26	15·2	14	14	1	20½	164	681·6	4	1·98	77·7	15	14	4	3,756	7·8	21 0	3·95	75·25	134·7
10	Case, 30 h.p. (steam) ...	60	62·9	E	7·21	4·37	17·1	8	14	1	16½	181	756·4	4	1·181	116·8	10	16·8	1·84	not given	8·5	22 0	3·9	79·64	137·28
11	Rumely 30 h.p. (steam) ...	90	90	D	7·38	3·97	12	14	14	1	20½	278	2420	4	1.98	140·4	8·3	14·5	·92	3,663	9	33 0	3·10	71·2	126·02
12	Avery, 30 h.p. (steam) ...	90	94	D	5·47	4·94	15·6	12	14	1	29	183	600	4	1·454	126·1	9·28	17·5	3·65	3,750	9	29 0	3·50	79·8	138·38
13	Rumely 25 h.p. (steam) ..	75	78·4	D	7·68	4·17	18·1	14	14	1	15	199½	1460	4	1·98	97·2	11·9	14	1·65	3,188	9	36 9	3·15	79·2	133·95
15	Marshall, 25h.p. (gasoline) ...	60	56	C	—	·86	—	13	14	1	27½	38	162	4	1·7	18·53	8·7	14	—	3,500	5	42 0	2·9	71·5	111·2
17	Rumely, 35 h.p. (steam) ...	120	99·5	D	7·75	5·186	14·56	14	14	1	20½	197	1720	4	1·98	99·6	11·71	15·5	1·43	4,400	8·2	27 0	3·65	79·2	134·25

In column marked *, 80 points are the basis for marking gasoline engines—90 for steam. Possible points in gasoline engines, 155—in steam, 166.

IMPROVING CARBURETER FLEXIBILITY

By H. L. Towle

ALMOST any carbureter will give a reasonably good mixture through a limited range of action. Frequently, however, this range is found insufficient for a particular engine. If right for low speeds, it is wrong for high speeds, and vice versa. The owner, therefore, adjusts for the best results at his usual driving speeds, and he keeps within those speeds as much as he can. This limits the use of the machine.

Possibly the carbureter found thus deficient is giving the best results of which it is capable. If, however, it is of good design, there is hope of improving its action considerably by the simple device of providing it with the most suitable spring or springs, and occasonally by modifying the fixed air inlet or the spray orifice as well. The principles governing the action of helical springs are extremely simple, and by a few minutes devoted to their study any auxiliary air valve may be made to give the best results of which it is capable in that particular carbureter. The major portion of the following paragraphs will therefore be devoted to explaining the behavior of the springs.

The theory of carbureter action as regards the behavior of the gasoline jet under different air velocities is still only partially understood, and has been the subject of a great deal of more or less blind theorizing, based in many cases on wholly inadequate data. Into these theories it is not the purpose of the present article to digress, but rather to indicate to the non-technical owner how he can obtain the best results with the means at hand. That is, it partakes of the practical.

Non-Automatic Variety Causes Richness to Increase with Speed—A non-automatic spraying carbureter (i. e., a simple nozzle in an air tube) makes no mixture at all till the velocity of the air stream reaches a certain minimum. Beyond this point, the richness increases with the speed. Dilution from the auxiliary valve is therefore required only when the richness of the mixture exceeds the normal. At this point it should be remembered that, so far as the spray is concerned, there is no difference between a wide open throttle at slow engine speed (e. g., up hill) and reduced throttle with high engine speed. The spraying action is concerned only with the velocity of the air past the nozzle before the throttle is reached.

Almost every carbureter is provided with a needle valve controlling the spray orifice. With this provision it is very easy to determine whether or not the carbureter is doing as well as it should at either low or high speed. For example, suppose that we start with an adjustment known to be satisfactory for medium speeds. If the low speed performance is under suspicion, it is only necessary to increase the needle valve opening slightly to ascertain whether starting is thereby made easier and a walking pace more smoothly maintained. If overheating results, reducing the needle opening will probably cure it. Similarly slight changes in the needle opening, without changing any other adjustment, will determine whether or not the mixture is improved by less or more gasoline at high speed. The subsequent procedure will depend on whether (when the carbureter is correctly set for medium speeds) the mixture is:

A. Weak at low and rich at high speeds, or

B. Rich at low and weak at high speeds.

In the first case more, and in the second case less, air must be admitted at high speeds by the auxiliary valve. What springs will produce these results?

Some Spring Characteristics—It is a characteristic of all springs that their flexure is in direct proportion to the load imposed, up to the elastic limit of the spring. Thus, if the spring represented unloaded at *A*, Fig. 1, compresses 1-4-inch under a load of 2 ounces, it will compress another 1-4 inch under 2 ounces more, an inch under 8 ounces total load, and so on. This is the first, most important, and most easily remembered law.

It is apparent at a glance that if the spring in Fig. 1 deflects 1 inch under a certain load and has 8 turns, its deflection per turn will be 1-8 inch. If the spring were similar in every other respect, but had four turns instead of eight, that is, half as many, its total deflection for the same load would be only half as great. If it had sixteen turns its deflection would be twice as great, and so on. In other words, the more turns a spring has the less force is required to compress or extend it a certain total amount. The fewer it has, the greater is the force required for a given total deflection, simply because the needed deflection per turn is less or greater as the case may be. For this reason it is customary to reckon spring action in the amount of deflection per turn, and then supply turns enough to obtain the desired total deflection under the desired force. For example, suppose we want a spring similar to *A*, to deflect 5-16-inch under 4 ounces load. The deflection is 1-8-inch per turn under 8 ounces, or 1-16-inch under 4 ounces; consequently 5 turns will give the total deflection desired, namely, 5 times 1-16.

The second law of spring action is that the deflection per coil is proportional to the cube of the diameter of the coil measured to the center of the wire as in Fig. 2; that is to say, if we double the diameter of the coil using the same wire and same number of turns, the deflection per turn will be eight times as great. If we halve the diameter, the deflection will be one-eighth as great. This merely states the familiar fact that a large spring of a given wire is "soft," and a small spring stiff.

Third Law Deals with Diameter of Wire—The third law is that the deflection per turn is inversely proportional to the fourth diameter of the wire. If we double the diameter of the wire without changing the size of the coil we shall reduce the deflection per turn to one-sixteenth of its former amount.

These relations are expressed in the formula:

$$E = \frac{D^3 \times w}{d^4 \times K}$$

in which E is the deflection, D the diameter of the coil (see Fig. 2), w is the load, d the diameter of the wire, and K a constant depending on the units employed.

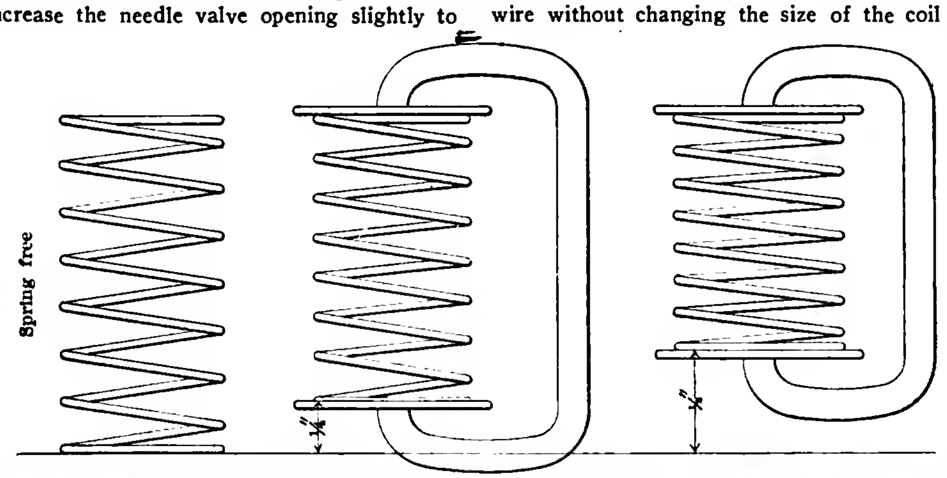


Fig. 1—Carbureter springs shown in three positions, first or A, free, second or B, partly closed, and third or C, compressed one-half inch

Now let us look at the carbureter. Instead of having the auxiliary air valve spring perfectly slack when the engine is at rest, so that the air valve opens on the slightest suction, we compress it so that a certain degree of suction is required to start the valve from its seat. Since the gas velocity is proportional to the suction, the valve will then open by equal amounts for equal increments of suction.

How is all this to be applied to the particular spring of the reader's own carbureter? Let us see. Suppose your carbureter is in the condition of *A*, noted above. You need a richer mixture for starting and a leaner mixture at high speeds. First examine your auxiliary valve to see whether there is room for wider opening, provided the adjustment of the stop is changed. If not, there is small hope that you can do much to improve it, though there is still a chance that you can help matters by enlarging both the primary air intake and the spraying orifice. It may be that you have a heater connection on the carbureter intake and that it strangles the air more than it should. Enlarge the heater, or disconnect it if the weather is not too cold. Then try running the car again. If the former intake was too small you will find that you can increase the needle opening somewhat on account of the reduced suction. This will give you both more air and more gasoline, and will help the performance at high speeds without impairing it at low speeds. Put the auxiliary air valve spring under tension so that it will not open till the motor gets up to speed, but be sure that it opens as much as needed at high speeds.

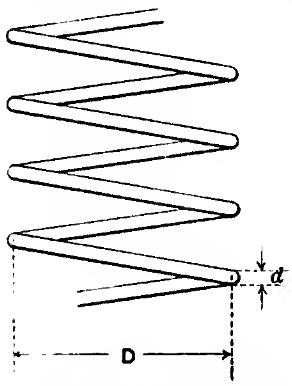


Fig. 2—Small coil spring with dimensions

To Improve Running at Low Speeds—Suppose, on the contrary, that your first examination shows a margin still available for further opening of the auxiliary air valve. To improve the running at low speeds, open the needle valve as much as required, and if necessary constrict slightly the primary air intake (if there is provision to do so). This will give a stronger suction or a freer flow of gasoline on starting. You may or may not find that simply slackening the air valve spring will give good results all the way from medium to high speeds. It may have the effect of letting the valve open too soon, giving a weak mixture at low speed. This indicates that the spring has too few turns, since when adjusted correctly for low speed its tension increases too rapidly with increased opening of the valve. Get a second spring with several more turns, winding it, if necessary, from brass wire or piano wire of the same thickness. Leave it with too many turns at first and shorten it one or two turns at a time. Stretching a spring is no substitute for added turns.

It may be that the spring, instead of being too short, was originally too long, and that over-richness at high speed has resulted, not from excessive spring tension, but from the necessity of substituting the stop for the spring, owing to the latter being too weak to hold the valve at high speed. Such a spring may permit the valve to open too early, causing weakness of the mixture at low speeds. Supposing that opening the needle valve has shown improved action at low speeds, restore the needle valve to its first setting and try tightening the air valve spring and slacken up on the stop. This is likely to improve matters up to a certain point. If, however, the valve still strikes the stop too early in the speed scale, cut one or two turns from the spring, stretch it or run the adjusting nut down, and try again. With the same tension on the valve when first opening, there will be an increased tension with maximum opening, and this increase may steady the valve sufficiently to permit the stop being run still further back.

Treatment of Too-Rich Mixture at Low Speeds—Now let us turn to the converse supposition "B," i.e., that the mixture is too rich at low speeds. This is invariably due to faulty selection of the auxiliary valve spring. The spring has too many coils, making it "soft," and to obtain sufficient tension to control the air valve at high speeds the spring is given an initial tension which carries beyond where it ought to be. It must be borne in mind that the permitted range of movement of the spring from shut to open of the air valve is very small. To correct the difficulty, simply cut off some of the turns, reducing the movement necessary to obtain the maximum tension.

The foregoing applies to all types of carbureters having spring controlled auxiliary air valves. In a few carbureters two such springs are used—a weak spring for low speeds and a stiffer spring for high speeds. The purpose of this is to correct an inherent tendency of the auxiliary valve to admit too little air at low speeds, and too much at high speeds. Its value will depend on the design of the particular carbureter. In some, all the air instead of a portion comes through the automatic air valve.

In case the spray orifice is not controlled by a needle valve, as in some carbureters having a fixed nozzle, the line of investigation must be altered somewhat. Unless these have a variable primary intake, all the adjusting must be carried out on the auxiliary air valve. If the primary intake is fixed, first adjust the auxiliary valve spring to give good results at medium speeds. Mark the spring adjustment and increase the tension to determine whether a richer mixture gives better results at low speed. If it does not, slacken the tension, confining yourself exclusively to low speeds during the test. Make a note of the setting which gives the best results, and try again in similar fashion for high speeds. You are now in a position to classify your case under *A* or *B* above, and to modify the spring setting intelligently.

Reducing Fixed Air Intake Reduces Suction—If the fixed air intake is variable, the rule to remember in adjusting it is that reducing this intake increases the suction in the mixing chamber, and thereby increases the richness at low speeds.

Of course, not all carbureters are equally good. A carbureter may be so proportioned that it is incapable of working well at low speeds when adjusted for ordinary speeds; less frequently it may show an incurable propensity for delivering an over rich mixture at high speeds. The former defect may be due simply to the carbureter being too large for the engine, which means that the air velocity through it is not sufficient at low speeds to atomize the gasoline properly; or it may arise from original bad design. For example, the "strangling passage" around the spray nozzle may be too large in proportion to the size of the auxiliary valve, or there may be no constriction whatever around the nozzle, as in certain types now obsolete. The latter defect—i. e., persistent over richness at high speed—generally indicates that the carbureter is too small for the engine, but it may arise from limitations of design, as a larger carbureter of the same model may not work well at low speed. In this latter case, the cause of the trouble lies probably in the auxiliary valve being too small even when adjusted for its maximum opening. The only thing to be done here is to insert a supplementary inlet valve in the intake piping between the carbureter and the engine.

Certain carbureters of what is known as the "puddle type" have no auxiliary air valves, but derive their automatic action purely from changes in the size of the puddle and from that fact that at low speeds suction is assisted by gravity in keeping the puddle filled. Carbureters of this type are very satisfactory in many cases, but they may be found to have a range not quite sufficient for the engine. This is easily determined by varying the needle valve setting as above indicated. It does not do to use a carbureter of this type too large for the engine; since then it will not work at low speeds. On the other hand, at high speeds the engine may not get sufficient mixture, and what it gets may be too rich if the adjustment is right for low speed. The remedy is to adjust for low speed and provide a small auxiliary valve between the mixing chamber and the throttle, with its spring under considerable initial tension, so that it opens only at high speeds. A large auxiliary air valve is unmanageable here because the slightest opening lets in considerable air, but with a small valve excellent results have been obtained.

KNOCKS AND NOISES THAT PERPLEX AMATEURS

By EDWARD S. KEOGH

ELUSIVE knocks and noises are the nightmare of the careful motorist and cause an otherwise pleasant journey to be an anxious, nerve-racking trip. It is a remarkable fact that every unusual knock or scrape is at once attributed to a defect in the engine; no doubt because the engine is the source of power and more in the mind of the driver than is any other part of the mechanism. Engine knocks also are to be feared, as a rule, more than knocks from other sources, as they tend to indicate loose bearings in shaft or piston, or loose cylinder bolts, anyone of which might result in serious injury to the motor.

But there are many noises which sometimes jar the ear of the driver and cause him to be anxious about his engine. These occur from other than engine defects, although from the rhythm of their occurrence one is positive that the engine is at fault. This, no doubt, is caused by the vibration of the engine jarring the loosened part and making the knock heard in accordance with its own vibrations.

Loose Oil Pipe Puzzled for a Long Time—The writer's car developed a knock at one time which seemed to come from the engine, but the cause was a loose oil pipe which ran from the dash, underneath the foot boards, to the transmission. This loose pipe rapped sharply on the bottom of the boards whenever the engine was speeded, giving all the symptoms of a very loose bearing until an examination revealed the actual condition. In another case a two-cylinder shaft-drive car developed a disheartening knock when on a long trip, which was laid to the connecting rods and the first garage met with was consulted for advice. The rods were examined by the garage man, who advised that they be tightened, which was done, although the driver hardly thought it was necessary. Soon after the trip was resumed, the knock again appeared, but the journey was continued to a certain garage where there was a mechanic in whom the driver had considerable faith as a troublefinder. This mechanic examined the connecting rods and said they were too tight and should be loosened and that the engine was all right. When the bearings were set to his satisfaction he proposed a short ride that he might hear the noise himself. The car was started and had not gone two hundred feet when he told the driver to stop and, getting down took up the foot boards and made an examination. It was found that the springs which held the forward end of one of the distance rods had broken and the rod was free to pound with the vibrations of the engine. An old exhaust valve spring was inserted and it has held better than the ones furnished by the maker.

Source of Trouble Usually Hard to Find—The same car developed an aggravating knock at one time which was extremely hard to find and which would show only when the engine was running free and on changing speed. It was found after many weeks that the crankshaft had too much end play and that the knock was caused by the flywheel hammering against the rear bearing. When the clutch was in, the flywheel was kept tight against the bearing and there was no knocking. This was more serious than at first appears, because the wear in the bearing caused the shaft to move forward, displacing the connecting rods from their proper line and causing undue strains on them and their bearings. In the same car an unusual noise or scraping occurred at the end of last season when the cold weather was approaching and made itself apparent usually at the beginning of a trip and disappeared gradually as the car warmed up. The cause of this was found to be that the cold weather had congealed the oil and grease in the gear case and that the gears cleared a path for themselves in the hard grease and then ran practically without lubrication until the heat generated softened the grease to a more fluid state.

The addition of some light oil cured the noise but did not improve the appearance of the garage floor under the car when it came in from a good run.

Now no noise or knock should be neglected, but the writer has found from experience that if you drive your car up a good stiff hill on high gear until the engine shows signs of laboring and no knock appears continuously with the explosions of the engine, you can be sure that your engine bearings and holding down bolts are tight and sound.

And if a slight knock does appear on such a severe test of the engine, there is no immediate necessity of the bearings being examined and tightened.

MOLECULAR WEIGHT OF DISTILLATES

The atomic weight of the elements entering into the fractions may be set down thus:

Hydrogen	1
Carbon	12
Oxygen	16

The molecular weight may be found as follows:

(a) butane, $C_4H_{10} = 4 \times 12 + 10 \times 1 = 58$;
(b) pentane, $C_5H_{12} = 5 \times 12 + 12 \times 1 = 72$;
(c) hexane, $C_6H_{14} = 6 \times 12 + 14 \times 1 = 86$;
(d) heptane, $C_7H_{16} = 7 \times 12 + 16 \times 1 = 100$;
(e) octane, $C_8H_{18} = 8 \times 12 + 18 \times 1 = 114$;
(f) nonane, $C_9H_{20} = 9 \times 12 + 20 \times 1 = 128$;
(g) decane, $C_{10}H_{22} = 10 \times 12 + 22 \times 1 = 142$.

In like manner the molecular weight of any of the compounds may be found, the rule for which may be stated as follows:

Multiply the atomic weight of each element by the number of atoms for each element and the sum of the respective products will be the molecular weight of the resultant compound.

In general practice it has been the custom to consider that gasoline was largely hexane, the molecular weight of which was taken in the further determinations. It is highly improbable that this method will serve, on the count that hexane is not now used to the same extent as formerly and the chances are that heptane and octane will have to be taken into account.

SPECIFIC HEAT OF HYDROCARBONS

In order to be able to estimate the losses in the exhaust of a motor it is necessary to know the specific heat of the elements and compounds determined by analysis of the exhaust, together with the range of temperatures, as well as the weight of the exhaust gases. The specific heat values are as follows:

ELEMENTS AND COMPOUNDS	SPECIFIC HEAT
Carbon	0.241
Carbon monoxide	0.2479
Oxygen	0.218
Hydrogen	0.244
Nitrogen (approximately)	0.240

Since over 80 per cent. of the whole weight of gas (mixture) will be nitrogen, it follows that much of the heat lost to the exhaust is taken away in the nitrogen. This fact, coupled with the absence of heat value in nitrogen, tends to the contention that nitrogen is an evil without a recompense. In the absence of nitrogen the fuel would be so quick-burning that the pistons would not be capable of receding rapidly enough to enable the functions to be performed, and it follows that some element has to be present the nature of which will serve to dampen the rate of flame propagation. Nitrogen is at hand in the right proportion and the cost of its provision is therefore nil, since, as exemplified above, it has no heat value.

PECULIAR POUNDING

Editor THE AUTOMOBILE:

[2,037]—I have a four-cylinder E-M-F "30" that has gone over four thousand miles without a particle of trouble that could be called trouble. I have nothing but praise for the car in regard to its keep-a-going and power qualities, but it has developed a knock that is very irritating and is something that I have been unable to fathom out. It seems to be something about the mixture as near as I can tell.

I will tell you what I have done and how the knock occurs: In starting up and getting under way everything runs smoothly and the motor seems to pull well, but when the car gets on a level road the knock commences. The knock synchronizes with the explosion in one of the four cylinders. Sometimes instead of knock there will be a pound, the sensation of which is one that you would imagine from a sudden and violent explosion in one of the cylinders. When there is a hill to climb, the car works like a charm, no knock or indications that she wants to knock, or in going down the hills when I use the motor to hold the car back. In brief, the knock only occurs on a level road or nearly level road, when the car gets up to the speed corresponding to the throttle opening. By first opening and then shutting the throttle down a little I can run the car without the knock. By putting more tension on the auxiliary air spring I can get more speed up before the knock begins, but if I continue to take up the tension, it consumes too much gasoline and soots everything up. I have had the cylinders off and cleaned all the carbon out of both cylinders and pistons. I examined all the bearings and can find nothing but moving fits, no looseness anywhere. If you can tell me where the trouble is and can suggest something to do to get this knock out I shall renew my subscription to "The Automobile" at once.

F. W. KAFER.

Lawrenceville, N. J.

There are a number of things which might, and, in fact, do cause pounding, but none of them seem to fit your case. The most obvious cause of pounding is that of a spark advanced too far. This, however, nearly always occurs upon hills, in deep sand or mud, or elsewhere, whenever the engine is laboring very hard. It could not be so in your case, as you distinctly state that manipulation of the throttle will cause it to stop and that it occurs only on smooth, level roads at rather slow speeds. In the case of too far advanced spark, manipulation of the spark would only make the pound worse than ever. So, too, if the spark was normally set too far advanced, it would pound more at high speeds than at slow, just the reverse of the actual case.

Preignition causes pounding, and is itself caused by overheated cylinder, piston or cylinder walls. Glowing points or deposits of carbon within the cylinder, as well as faulty or uncertain ignition also cause it. Leaks in the chamber are sometimes the cause of pounding, so too, are looseness of parts. Among the latter may be cited: connecting rod bearings, main bearings, loose flywheel, cracked flywheel, other lost motion. Beyond these things, the only other cause of pounding is that of some moving part which strikes as it rotates.

By listing these in a regular order and going through them one at a time, you will be able to run down the cause of the trouble, or incidental to your search, some contributory cause. Many of them may be eliminated at once, without wasting the time for a search, which will lighten your work. This is a kind of trouble of which we have never heard previous to this, and it doubtless is a combination of several things, some of which were not apparent in tbe searches which you made.

DIFFERENT KINDS OF PAINT

Editor THE AUTOMOBILE:

[2,038]—I have noticed in "The Automobile," issue of September 2, page 399, under the heading of "Information for the Man Who Drives," that you recommend for the brass and nickel parts of a car, a coat of man of war gray or oxidized bronze finish. What is this and where can it be obtained?

I. S. BOLES.

Shellsburg, Iowa.

Both of the finishes mentioned are but trade names for colors used in finishing cars, that is, they are nothing but paints. In buying a new car, these colors may be had for the asking, without extra charge, but it will be necessary to wait longer for the delivery of the car. If you have a car and wish to apply the color to it, buy it from any reputable paint maker, and it is applied the same as any other paint or color. If there is anything special about its application, the makers will advise you of that fact when the stuff is purchased. The use of paint like this is a very good thing, saving as it does many a long hour's work polishing up the readily-tarnished brass and nickeled parts.

BALL BEARING APPLICATION

Editor THE AUTOMOBILE:

[2,039]—Referring to Fig. 19 in the article on "Automobile Wheels and Rims" in your issue of Sept. 16, '09, we would like to ask, has this application of annular ball bearings been adopted with any degree of success, if so in what make of car? We believe such construction would be very near ideal with regard to friction and ease of application. If the bearing would stand up under the strains placed upon it due to peculiarity of this arrangement.

PETERSON BROTHERS.

Denver, Colo.

It is the impression that the arrangement spoken of is ideal, just as you have said, in that it does not represent an actual rear axle construction now in use. As a matter of fact, there are a number of firms now using the single row of balls, for the rear wheels, as well as a single ball for the front wheel knuckle bearing. From our present knowledge of ball bearings, we see no reason why this construction would not stand up, providing the bearing makers were consulted in the selection of the bearings.

You will note on looking at this figure again that it was used not for this purpose but to bring out another point, namely, the combination of the brake drum and inner flange, as well as the method of locking the bolts so that the nuts may be screwed up tighter or loosened at will, and that without dissembling the whole outfit.

WHOLE RANGE OF SUBJECTS

Editor THE AUTOMOBILE:

[2,040]—Will you please answer the following questions through your department, "Letters Interesting, Answered and Discussed"?

1. How shall I restore the coloring or recolor the inside of my pantasote top? The lining appears to be cloth. It was a purple but has faded. I want it black or very dark.

2. What is the best dressing for leather straps, etc., to keep them soft, pliable, and black?

3. Does properly proportioned alcohol and water have any injurious effect on the water system of a car? And is the cooling effect ample, as no doubt the alcohol boils at a lower temperature than water?

W. T. A.

St. Paul, Minn.

If the material of the inside of the top were cloth, as you say it appears to be, any ordinary dye would answer. In default of certain information relative to this, it would be advisable to communicate with the manufacturers, tbe Pantasote Co.

2. Without saying what is the best dressing, plain neatsfoot oil will keep the leather, or anything made of leatber, soft and pliable, if used freely. This may be obtained at any leather store. As for the color, it will have no effect on that, that is, if the color was black before using, it will remain black after use.

3. See another letter on this same subject elsewhere in this issue. A properly proportioned mixture is any old proportion, that is, there is no *proper* proportion. The only injurious effect is that the rubber hose at the joints is affected, but this is a very slow action and one that becomes lessened with the age of the mixture since the alcohol boils away gradually, leaving the mixture with a lessened proportion of alcohol, which constitutes the destructive part of the mixture. As the diagram of cooling effect shown in the other letter referred to above shows, a temperature of minus 30 may be obtained very easily. This mixture has to be watched very closely on account of the mixture boiling away as brought out above. The boiling point of alcohol at atmospheric pressure is 173 degrees Fahr., that of water at the same point being 212 deg. The mixture would have a boiling point somewhere between the two depending upon the proportions of each used.

To overcome this defect of the alcohol solution, many autoists use the alcohol-glycerine solution, with which the loss by boiling is reduced to a minimum. This is used by making first a solution of half and half alcohol and glycerine. The latter is then used just as any other liquid to make the final fluid. Glycerine itself lowers the boiling point very little, but the lessened quantity of the alcohol makes the boiling point for the whole solution much higher.

ANSWERED AND DISCUSSED

SHIPPING CAR TO 'FRISCO

Editor THE AUTOMOBILE:

[2,041]—Will you please give me some idea of the best way to ship a car from the East coast to the Far West coast, that is, from New York City to San Francisco? Is the all-rail route quicker or cheaper than the all-water route, or is the combined rail and water route the best? Is it better to ship in a special automobile car, or to crate and ship on a flat car? Will you also give me some idea of the time taken by a car to travel over this route, that is the shortest time upon which I may figure.

J. A. D. BYERS.

New York City.

While we cannot give you the best route, we can tell you something about the various routes and the conditions attaching to the shipment of a car over them, from which you may make your own deductions as to the best, or at least, the most advantageous. There are three routes by which you may ship: the all rail; the all water, and the combination route, part water and part rail.

The all-rail route presents the least number of difficulties, that is, you will only have to run your car into the New York freight depot and ship it, all other details being attended to by the railroad officials. By the all-water route, which is the longest, but to offset that, the cheapest per hundred pounds, it will be necessary to have the automobile crated, and then, the crate transported to the boat line dock. Then, you will have to have it uncrated at the western end after its arrival. By the rail-and-water combination route the same points offer, that is, it will be necessary to crate the automobile and parts.

For the all-rail route it is not necessary to crate, as the railroad company will furnish an end door or other special automobile car, and the railroad officials will block and otherwise fasten the machine in the car. In fact, shipping in this way, it would be foolish to crate as this only adds to the total weight, which is what you pay for. That is, crating only adds materially to your freight bill.

If you should crate and ship that way, it will be necessary to find out first of all, what total height the railroad will accept. Some of the roads have tunnels and low bridges, which limit the height of the crates which may be carried. Similarly, with the steamboat companies, most of them have a fixed maximum distance between decks, or in the hold, which would limit the height and probably the width of the crate.

As eighteen days is the ordinary time for the trip across by rail or rail and water, it is fairly safe to figure on the machine being there within three weeks. In figuring out the cheapest way to ship, it will be necessary to get an unbiased estimate of the weight of the crate, since you have to pay for this. The difference between the all-rail and the rail-and-water route is but $1.00 per hundred. If your crate weight times the lower rate was more than the saving per this route, the total to you would show a loss.

It is just barely possible that you may obtain from one of the numerous forwarding companies a more advantageous rate than the railroads offer. These companies ship many cars and place them so as to occupy less space than they would if placed by the railroad officials. In this way they are able to offer lesser rates. In a case of this sort, it is advisable to attend to, or at least inspect, the shipping of the car yourself to prevent careless fastening of the wheels in place. This might result in the car breaking loose in transit, with much consequent damage to it. The best way to handle the lamps and other small parts is to take them off and box securely.

OVERHEATING CYLINDER

Editor THE AUTOMOBILE:

[2,042]—I have a four-cylinder, four-cycle, forty horsepower car which has lately lost much power on hills. The car runs fine on the level, and even climbing grades. But after the throttle is opened about one-third of the way, the engine will knock, regardless of where the spark lever is placed. I have scraped the motor free from carbon, ground in the valves, and adjusted the carbureter in many different ways. Ignition (by magneto) is perfect as far as I can see. What is the trouble?

R. W. T.

Red Hook, N. Y.

Your pounding trouble may be due to overheating of the cylinders or piston, which, in turn, may result from poor design or from lack of ability in the water cooling system. If the interior of the cylinder overheats from any cause, pounding will result. The water is not always at fault, nor is this, as is thought by some, due to carbon deposits alone. A projecting fin, edge or knob of metal in the cylinder or on the piston will give as much knocking and be a great deal harder to find than the carbon. In fact, the latter is not hard to remove, while the former is.

Another little known cause of knocking, such as you describe, is a loss of compression through leaks. These latter may lie in the valve seats (not in your case though), in the valve caps, in the spark plugs openings and elsewhere. In looking up this trouble, investigate every opening into the cylinder. A similar though unsuspected source of trouble was described in a recent issue, under the caption, "Ingenuity in the Making of Repairs." You will find this on pages 353, 354 and 355 of the August 26 issue of THE AUTOMOBILE.

TO MAKE RUBBER CEMENT

Editor THE AUTOMOBILE:

[2,043]—Will you please tell me how to make a good rubber cement to use when vulcanizing tires?

A. L. C.

Webb City, Mo.

Rubber cement should always be similar to the mixed sheet of rubber upon which it is to be used. That is, it should contain the same percentage of sulphur. If care is not taken with this, strange and unexplainable results are attained in the vulcanizing process. Of course, you will not always be able to find out the proper amount of sulphur used in any one tire, but if the cement as made and used does not give good results, try adding more sulphur. If this should make matters worse, make some of the original cement over, using less sulphur. By keeping track of the various tires vulcanized, the composition of the cement used, and the results obtained, you will soon become very skillful in mixing and applying the proper composition.

Marine glue, so-called, is an excellent cement. This consists of one pound of caoutchouc to one gallon of coal tar naphtha and twenty pounds of shellac. Heat gently and pour on metal plates to solidify. When needed, melt. By using more naphtha, this is made thinner so as to stay liquid. The sulphur in this is in the caoutchouc, but if found insufficient in any one case, more sulphur may be added to the cement in the powdered form, when making it up, or if necessary, when remelting.

Another excellent cement is gutta-percha cement. The composition of this is two parts of gutta-percha to one part of common pitch. It is melted together, and well-stirred in the melting, the stirring being fully as important as the materials. When thoroughly melted and stirred, it is poured into cold water. This makes it into a hard brittle substance, which softens at a low temperature, and at 100 degrees is a thin fluid. Like the former recipe, this carries its own sulphur in the gutta-percha, but if more is necessary, it can be added as a powder. In this case, it is not advisable to add the sulphur during the remelting process, but it should be put in while making up a batch of the cement.

As a rule, as little cement should be used as is possible to make a good job. Moreover, all cement should be given plenty of time to dry. Rubber surfaces to be united should be thoroughly cleaned, either with naphtha or with a thin cement. When the latter is used, it is brushed over the surface very lightly, using a fine brush, and then the surfaces are heated gently. This helps the whole operation, because it both softens the rubber and evaporates the solvent, which is then unnecessary to complete the operation, having served its usefulness.

In addition to the various substances mentioned before for cements, it is very often necessary to have the cement dry very rapidly. In these cases, specific driers are added, and may usually be added to any cement at will, the quantity added being measured only by the required speed in drying. Then there are cases where certain degrees of tenacity are required. For these, other gums are added as rosin, mastic, gumlac, etc. These, however, should be used only when needed, and much discretion should be used in adding them to an already very satisfactory cement.

MILE-A-MINUTE FOR HIM

Editor THE AUTOMOBILE:

[2,044]—Will you please answer the following questions through "Letters Interesting, Answered and Discussed"?
1. Had I ought to have a complete knowledge of an automobile to become a racing driver?
2. Do automobile companies give inexperienced men a trial?

L. M. S.

Denison, Kansas.

Considering the unusual number of race meets which have been held during the present year, and the equally unusual number of fatalities attending the same, at least an average of one man killed per meet, it is surprising that anyone would have the temerity to want to take up racing as an occupation. However, to answer the above questions:

1. Yes, for this purpose you cannot have too complete and thorough a knowledge of not only the machine you expect to drive, but all others as well, and a very clear insight into the principles governing the action of all of the various parts. Not only should you be able to simply drive the car, but you should be able to assemble, dissemble, repair, machine, or do any other kind of work necessary to make any one of the pieces entering into the complete car, and to put it into place, or take it out under any and all conditions. That is, you should be an expert on engines, transmissions, clutches, and other components, as well as on driving. As far as simple driving is concerned, a man of ordinary intelligence can learn to drive in the course of a single day, granting only a car to drive, and someone to show him how. Beyond that comes the superlative skill to permit a man to get more speed out of any given car than any one else can. More even than personal skill, a cool head and steady nerves are required. Without the requisite nerve and coolness, necessary to drive, say at the rate of a mile a minute carrying your gasoline tank in your lap, any amount of skill in handling a machine is of no possible use. More than this, accurate judgment is required since the tight places in which a racing driver is sometimes placed require not leisurely consideration, but instant and immediate decision as to what is best to do, and equally fast work in doing it. An ideal way to prepare yourself for this work would be to go into some automobile factory and work at least six months in each and every department there, closing with about a year of outside testing work. In that length of time (it would doubtless run into three or four years), you would have proved that you possessed the requisite skill, judgment, nerve, and cool head. At that time you would find little trouble in obtaining a situation as a racing driver, since the supply is always less than the demand.

2. Nearly every firm finds it necessary to hire inexperienced men, who are not hired for the purpose of making racing drivers of them, but to learn the machinist's trade. The way for you to start in will be as an apprentice, then when you have had a little automobile shop experience, change to a position in which you would learn, for instance, to assemble engines, later one in which you would test them, etc. If money is no object, you may obtain a position in nearly any automobile factory in the country.

PROPER ALCOHOL SOLUTION

Editor THE AUTOMOBILE:

[2,045]—Will you please answer the following through "Letters?" What proportion of denatured alcohol and water is proper for an anti-freezing solution? Is there anything in this same line which you consider better than alcohol, and if so, what is it?

TRUMAN B. PEIRCE.

Providence, R. I.

As a matter of fact there is no proper proportion, as any one of a number of proportions will give satisfactory results. There is this to be said, however, that the weakest solution which will stand the climate in which you are located will give the most satisfactory results. The reason for this is that the alcohol evaporates out from the solution, and the stronger the solution, the more there is to evaporate, the easier it evaporates, and the greater the influence of this evaporation upon the solution left.

Accompanying this is given a diagram of the freezing points of various solutions of denatured alcohol in water. From this diagram select the lowest temperature which you are sure to meet and that will give you the strength of mixture to use. In making this selection, remember the advice given above. Since zero is seldom met with, you might try a 38 per cent. solution which will not freeze until that temperature, 0 deg., is exceeded.

Unless you are particularly desirous of using denatured alcohol, you will note from the diagram that wood alcohol gives a much lower temperature, the percentage mentioned above yielding about minus 22 degrees with wood alcohol. No particular one of these solutions is recommended and all of them have their drawbacks. So, the best way to do is to try one and if this does not suit you for any reason, try another. In this connection, see the letter of W. T. A. [2,040] elsewhere in this issue, as well as J. A. Rene [2,029] in the Sept. 30 issue, and that of E. W. J. in the Sept. 16 issue. Both of the two latter have tried various cooling solutions, and this winter are about to try the use of a light oil.

Do not think that because nothing has been said about other cooling fluids than the two kinds of alcohol and oil, that none of the others is as good. This is not the case; these were dwelt upon because you asked about the one, and the other was the subject of the most recent letter on this same subject. Calcium chloride, the curve of which was presented very recently, is very satisfactory to some, as is just plain salt to others. This latter, however, yields but zero degrees, so is not available where temperatures lower than that are common. Then the salts, which are not so well known as potassium carbonate, alone and in combination, are much used.

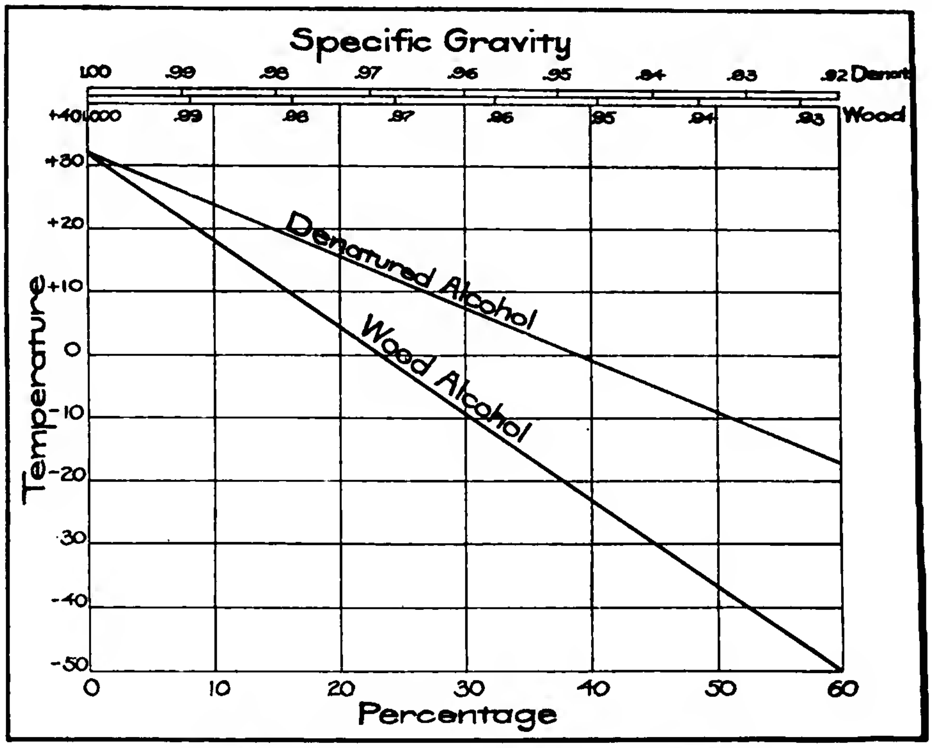
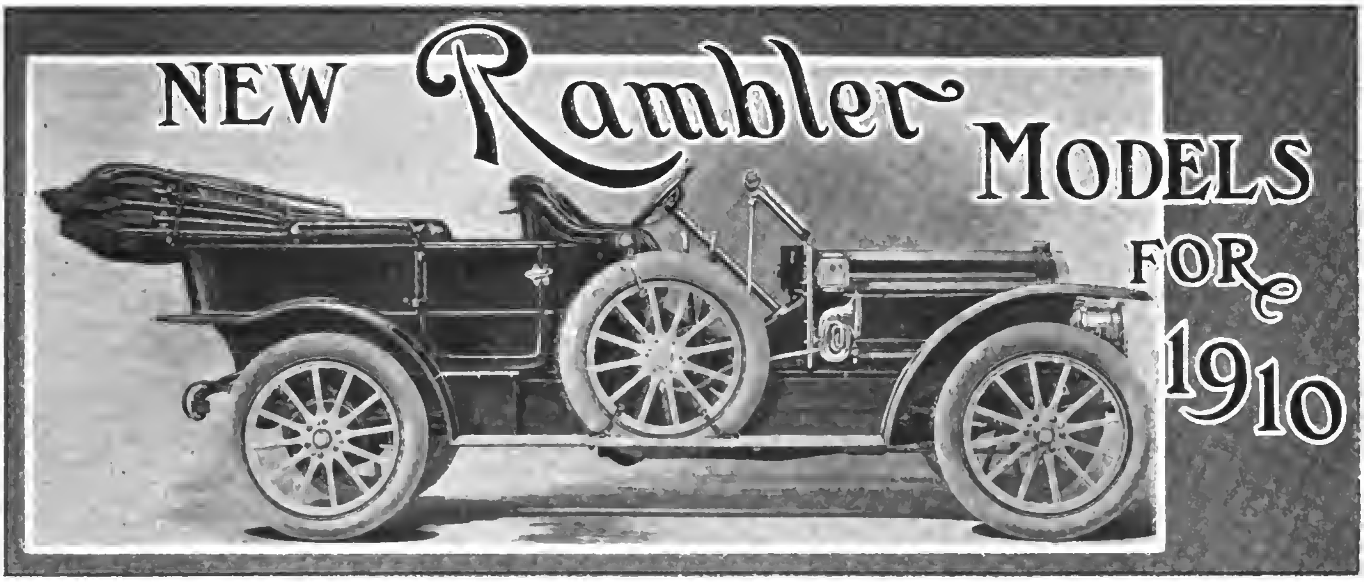


Diagram Showing Freezing Temperature of Alcohol Solutions

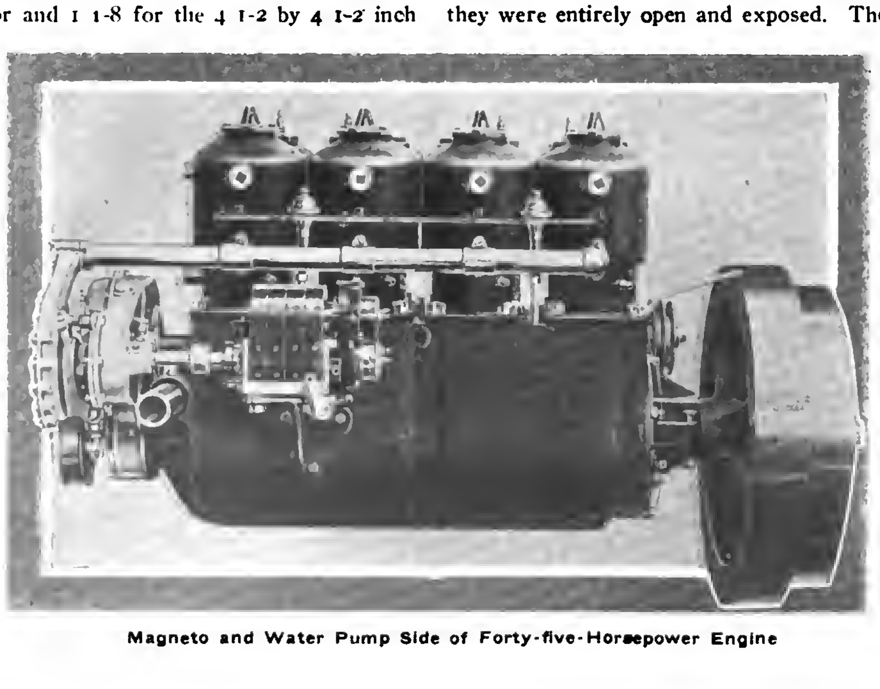


Model "Fifty-five" Is the Name of the Newest Addition to the Rambler Family

WITH the record of another year's successful culmination, and the satisfaction accruing thereto, many a manufacturer is now laying aside the season of 1909 and beginning to attack the problems of another year, that of 1910. This is particularly the case with Thomas B. Jeffery & Company, the features peculiar to whose Rambler car have attracted many. Among these may be mentioned the offset crankshaft, large diameter wheels, straight line drive, spare wheel, and engine accessibility. All of these features will be retained with such amplifications as another year of hard use has dictated. The accessibility idea, in particular, will be carried further, all adjustments having been made more get-at-able than before. This is an improvement which savors of common sense, since an inaccessible adjustment is about as valuable as no adjustment at all. All told there will be five models, but the number of chassis is limited to three, while the engines to be built total but two, and the transmissions, the same.

What the Engines Show—All of the engines are of the four-cylinder type. The cylinder castings are individual, with the valves located on the right, a la Renault. This construction makes the cylinder very simple, and correspondingly safer to use. The crankshaft is offset to the amount of one-fourth of the stroke in each case. This would be 1 3-8 inch for the larger or 5 by 5 1-2 inch motor and 1 1-8 for the 4 1-2 by 4 1-2 inch engine. When first brought out, this was a feature of doubtful utility and one that met with much skepticism. This fact makes its present universal acceptance of more than ordinary value. In fact, the question for argument to-day is not of the advisability of offsetting, which is granted, but, rather, the most advantageous offset. The Rambler manufacturers selected one-fourth as the proper proportion of the stroke after much expensive experimentation. After several years' use, no reason for changing it has yet appeared. The cylinders are of a close-grained gray iron, while the crankcase is also of cast iron. This latter is now in line with the most modern practice, which is taking account of the unreliability of lighter metals under severe stresses. The case is of the barrel type, that is, it is cast in one piece, with open ends. The crankshaft is put in through the ends, which are then closed by means of circular plates. These latter carry the end bearings also. Speaking of bearings, the individual cylinder construction allows of the use of a bearing on each side of each cylinder or five total for a four-cylinder engine. The many and various advantages of numerous bearings need not be repeated—they are too well known. The shortest, simplest and easiest way to explain it is to say that the result is longer life for the crankshaft and better service during its life.

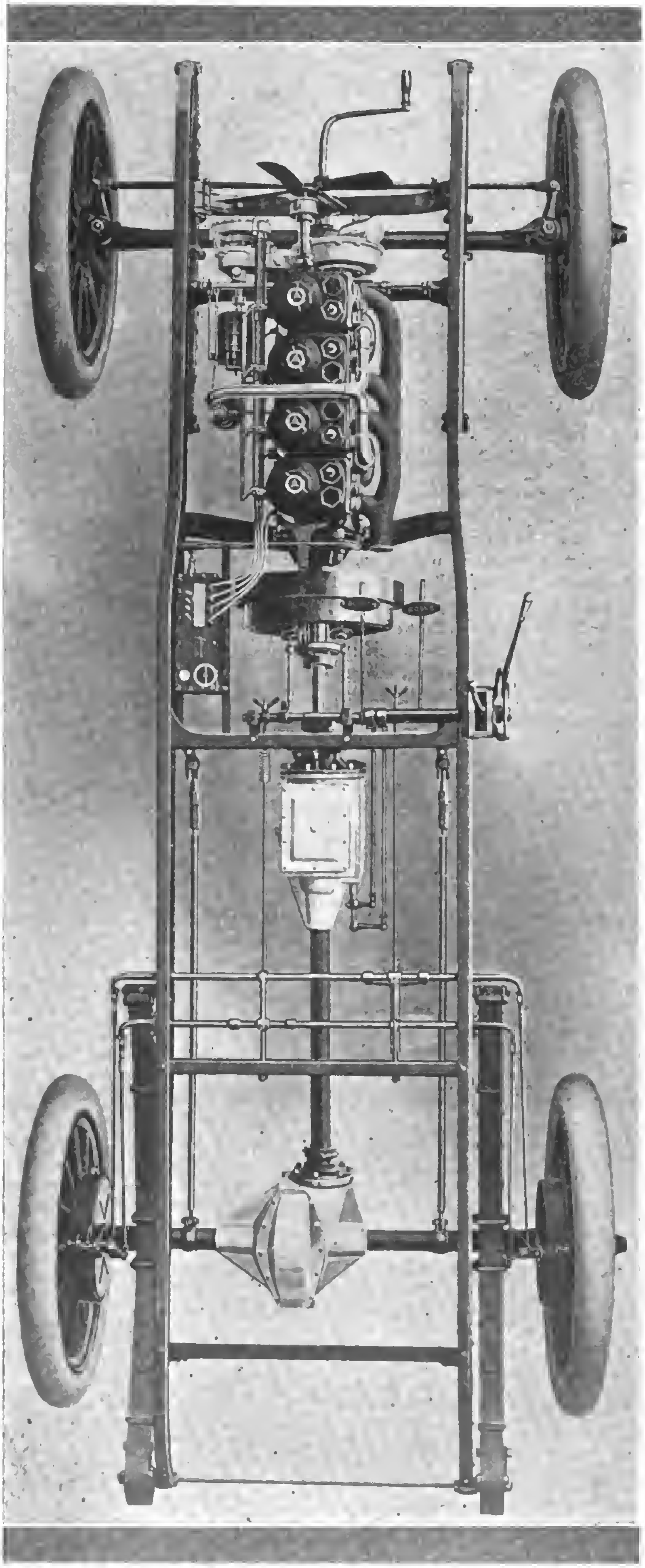
The barrel crankcase would result in the bearings being very difficult to adjust were it not for the fact that a special design of adjustment is used, and for the additional fact that the valve side of the case is made with a very large hand-hole plate. This measures 8 inches in width by 23 inches long, so that with it removed the whole interior of the case is as open and accessible as if there was no such thing as a one-piece case. Main bearings, connecting rod bearings, camshaft bearings and all parts may be inspected readily, and work done upon them as easily as if they were entirely open and exposed. The wedge method of adjustment of the main bearings is new, but possesses much of sterling worth, which will lead to extensive duplication. The upper part of the bearing housing is milled to a taper surface. This rests against a taper block which presses on the crankcase. To adjust, one tightens up the two bolts which move the block, the amount of motion of the nuts determining the movement of the bearing. The taper being slight, this can be regulated very accurately, even to thousandths of an inch.



Magneto and Water Pump Side of Forty-five-Horsepower Engine

Some Other Engine Features—In the 1910 model the pump has been moved to a position forward of the cam gear case. This change is to provide for a more accessible magneto location. It is now located on an extension of the pump shaft just back of the cam gears. It can be very easily reached for both inspection and adjustment. The magneto is placed on a shelf which is attached to the plain side of the crankcase by means of three studs. The magneto itself is driven through a slip joint, so that it may be lifted out of place for inspection, adjustment, or repairs. This may be effected as soon as it is released, which is done by taking out the holding bolts, four in number. The top or delivery end of the pump is carried over to the center and up, so that from the delivery end to the cylinder water inlets is a straight line, as soon as the right-angled turn has been passed. This makes the water-inlet piping very simple, consisting as it does of a single straight pipe, with the attaching cylinder flanges as the only projections.

Three-point suspension is effected for the engine by the use of a front supporting tube, which passes through the upper portion of the crankcase and forms the two forward points. The rear point is formed by the I-section cross member, which drops down from the level of the main frame so as to pass below the rear end of the case. The upper surface of this is milled out at the center, and the lower portion of the rear of the case has a circular pad at its lowest point, which is machined to match the finished surface of the support. The whole forms a sort of cradle upon which the rear end of the case rests. The front support, or tube, is carried by another I-section drop-forging, attached to the main frame at the sides. This, too, drops down so as to pass under the case at the front end. While actually unnecessary this makes an excellent stiffener for the forward end of the frame, so that its use is a good feature. The tube is not used as a support alone, the spark and throttle levers being pivoted upon it. This saves weight, as otherwise brackets would have to be used. These would require attachment to the frames, and the total weight of brackets, bolts, etc., would be considerable—enough at least to be worth saving.



Chassis View Showing Construction and Placing of Parts

In the interest of convenience and simplification, the compression cocks have been located in the side of the compression chamber, on the back or left side of the cylinders. In this position, a single bar connects the operating levers of all of them. This bar is prolonged, and may project either through the dashboard or forward through the radiator. In the former position, it is handy for testing the compression while running the car, and without leaving the seat. In the latter location, it is handy when starting, in that the slightest movement of the bar lessens the compression in all four cylinders, thus making starting much easier, and consequently less dangerous.

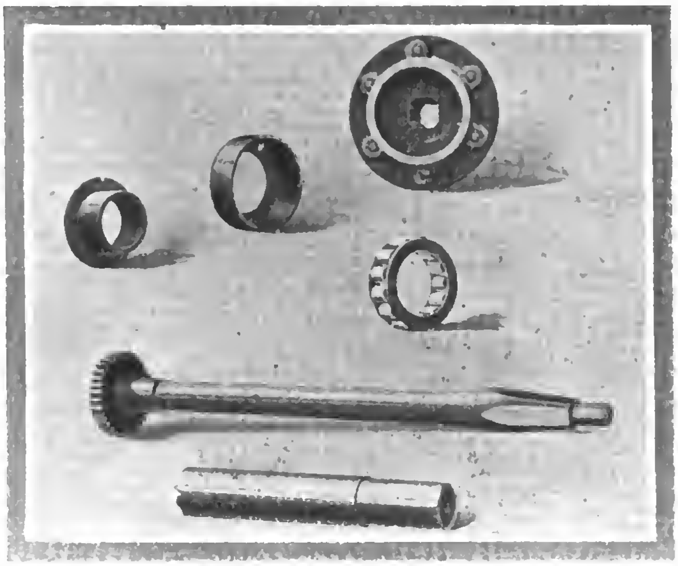
All of the accessories are driven from the engine either at the forward end or from the rear. The fan, for instance, is hung from a bracket attached to the front cylinder. In this position it is driven from the crankshaft extension by means of a large diameter pulley and through the medium of a wide flat belt. The fan is of large diameter and has four blades. The mechanical oiler is placed at the left side of the frame, just opposite the clutch and operating mechanism. This is the point where the frame widens out, and there is a considerable space there. To utilize this otherwise waste space, a short angle in combination with the main frame forms a small sub-frame upon which the oiler is fixed. This brings the forward end, carrying the driving pulley, opposite the end of the camshaft, from which the drive is by belt. The driving pulley is located on the rear extension of the camshaft, and drives across the car in a straight line to the oiler. The leads proceed to the various points to be lubricated, with the single exception of a sight feed located on the dashboard, in front of the driver.

A new feature which will be found on the 1910 models only is the provision against the usual dropping of oil from the crankcase ends. This consists of a combined shield and oil gutter attached to the crankcase at the rear of the flywheel and main bearing, which returns all surplus oil that may work through this bearing back to the crankcase. This eliminates the possibility of its dropping on to the flywheel and being thrown on to the other parts of the mechanism.

Wedge Adjustment of the Engine Bearings

Big Changes In the Clutch—In models Fifty-five and Fifty-four chassis the clutch has been changed from the cone type to internal expanding. This eliminates end thrust on the crankshaft and its design is such that it exerts the greatest pressure when fully engaged. With the average clutch, the spring is expanded when the clutch is engaged so that it then exerts the least instead of the maximum pressure. This clutch has been very thoroughly tested on a number of different cars, and has been found to be ideal in operation. It engages very gradually, holds positively, and disengages instantly. In model Fifty-three, the lowest priced car of the line, the clutch remains unchanged, that is, it is of the cone type, with readily accessible external adjustment of the coil spring.

Meritorious Features of the Transmissions—All of the gear boxes afford the same number of speeds, three forward and reverse. They are all of the selective type of sliding gear, also. The cases are of aluminum, closed at the front end by a cast-iron circular plate. These cases are of the barrel type similar to the engine cases, and large hand-hole plates located on the top correspond to the plates on the side of the engine case. This forward plate carries the stresses from the drive and is connected to the bearing at that point. This bearing is located on a cross-member placed there for the particular purpose of supporting the combined joint and drive bearing. The only change in the transmission is at the roller bearing which carries the forward end of the main drive shaft. This is a hinged bearing with a dowel fastening, retained in a steel case and provided with adequate means to compensate for all end thrust.

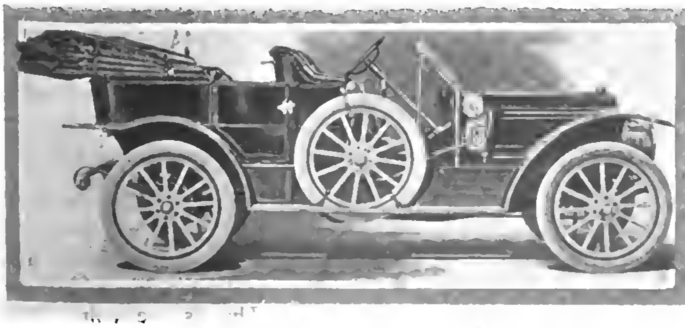


New Rear Axle with Roller Bearing and Other Parts

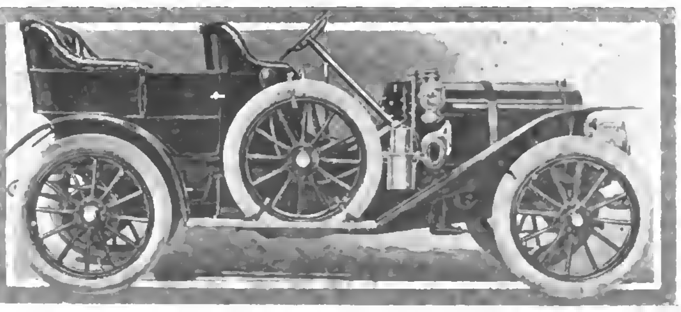
The rear bearing of the gear case is carried backward for quite a distance, while the forward end of the differential case is similarly carried forward toward the transmission. The two projecting ends carry the tube which houses the driving shaft, and the additional length renders the construction firmer.

Axle Changes Slight Refinements Only—The rear axle continues of the semi-floating type but the drive shafts are larger and a new method is used for securing the wheels. On the Rambler drive shafts, the differential gear is upset on the end of the shaft, making the drive gear and axle integral. Now, the wheel end of the shaft is also upset. This enlarged end is squared and tapered for the forged wheel hub. This method of upsetting or enlarging the shaft before squaring it makes it strongest where otherwise it would be weak.

To list the five models as concisely as possible, these are: Model Fifty-five with seven-passenger touring body and with seven-passenger limousine; Model Fifty-four in five-passenger touring style or four-passenger close-coupled body; and Model Fifty-three, which is only made as a five-passenger tourer. Fifty-five has a 45-horsepower engine, 36-inch wheels, 123-inch wheelbase and 4 1-2-inch tires for the touring car. The same chassis fitted with 5-inch tires serves for the limousine. Model Fifty-four also has a 45-horsepower engine, but the wheelbase is shorter, 117 inches. The wheels are 36 inches in diameter, and the tires, 4-inch. On the lowest priced car, Model Fifty-three, which is almost a duplicate of last year's model Forty-four, is used a 34-horsepower motor, 108-inch wheelbase, 36 wheels, and 3 1-2-inch tires, with 4-inch fitted as an extra at $20.



As Model "Fifty-five" Appears with Top and Windshield



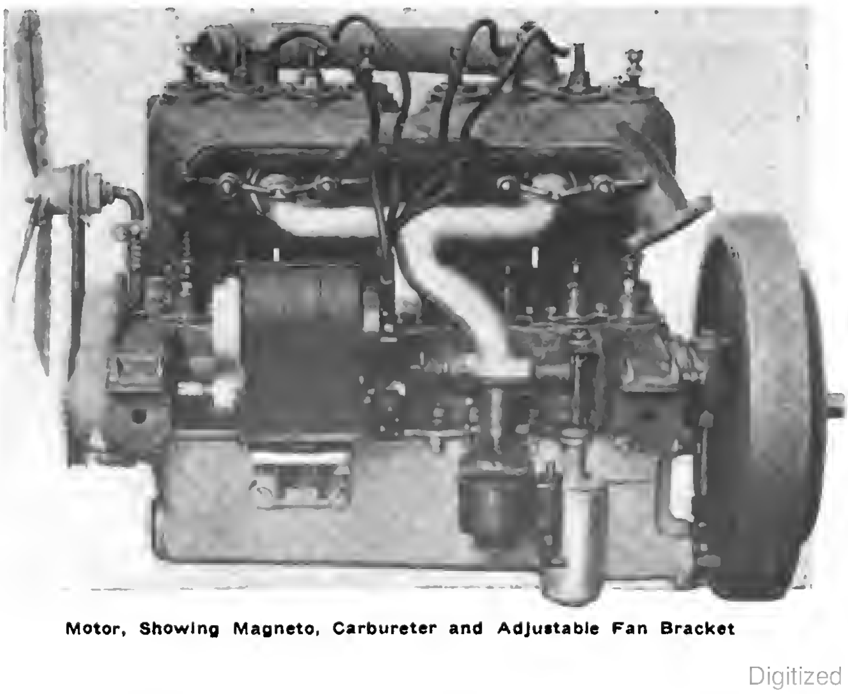
Rambler Model "Fifty-three" Five-Passenger Touring Car

STABILITY, when it is realized, is a readily recognized quality, and in the Regal 30 car, owing to the satisfactory performance of the 1909 model, only minor deviations were considered desirable, it being the idea to take advantage of experience gained in turning out 2,000 of these cars during the past year, and bring the model up to date in point of general external appearance as well as mechanical details.

External appearance of the latest model will best be gleaned by scrutinizing the halftone of a photograph of the car, and, in the doing, observe that the lines are in good taste and the side entrance is wide, due to the lengthened wheelbase, which was increased by two inches, making the same 107 inches. In order to improve further the appearance of the car, the dash is curved, and highly finished Mexican mahogany is used for the purpose.

It is not wholly the roomy body that makes the new car so pleasing, for in addition the spring suspension is refined to a high state of perfection, and full scroll springs in the rear take care of all longitudinal tendencies as well as the vertical bounce induced by road inequalities. Then, the wheels are big in diameter, using 32 x 3 1-2 tires front and rear, which selection also affords the advantage of reducing the spare tires usually carried to a single casing. This feature is well worth while.

The body is of metal, highly finished, due to twenty separate coats of "rough stuff" and finish, of a quality designed to afford permanence. The framing of the metal body is designed for lightness without sacrificing strength, and the metal work is so placed as to hold its shape, offering the additional advantage of not being susceptible to dampness, checking, etc. The body is stoutly ironed, all the fittings are good and particularly neat in appearance, and the upholstery is leather of selected grades, neatly tufted, and the cushions are in full accord with the usual best requirements.


Motor, Showing Magneto, Carbureter and Adjustable Fan Bracket

Mechanical Features of the Regal—Since the general view offers the advantage of depicting the exact appearance of the car, it is believed that all ends will be served if the design of the car as a whole and working drawings of some of the most important assemblages are presented at this time, with a view of discussing the details. The motor is of the four-cylinder, water-cooled type, with L cylinders, and the valves are located on one side. Cooling is by thermo-syphon; hence, in the list of accessories, there is no water pump, and the radiator, located on the center line of the front axle, is especially designed to prevent steaming, whether the car is running at any of its speeds or standing at the curb. The reason why the radiator does not steam will be understood by referring to the features of it. The force of any entrained steam passes into a pocket and there divides, part of the water passing downward, and the balance going up; but any entrained steam, instead of oozing out through the overflow, has its heat abstracted from it by the water it has to mingle with, and is therefore liquefied.

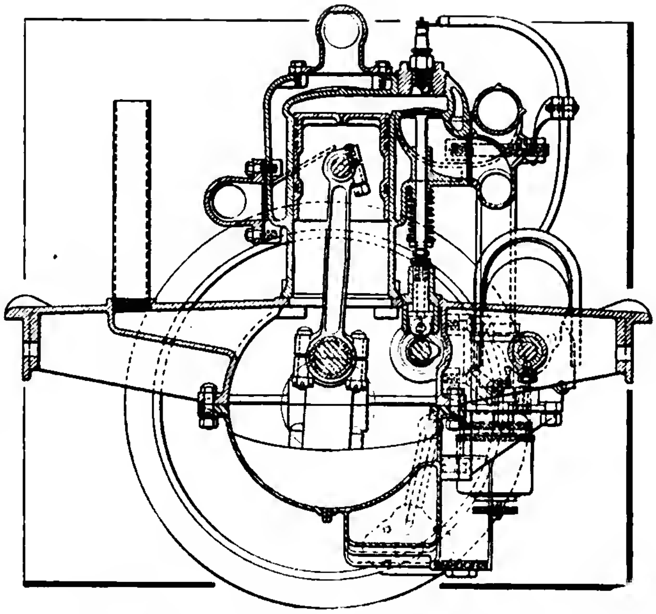
Exposing Details of the Motor—To understand the refinements in design, it will be better to examine a cross-section of the motor, cutting through the center line of one of the cylinders. The cylinder walls are of even thickness, with a generally symmetrical design and valves of adequate area to assure maximum power. The passageways are of even contour, free from obstructions, and designed to abort back pressure on the exhaust side, as well as to prevent an excess induction depression anywhere.

Compression space is calculated to afford the greatest amount of power, favorably influence conditions of ignition, and enable the motor to perform under severe conditions without laboring. The crankcase is of circular section and great strength. It is vented by means of a large "breather" tube, so placed and baffled that oil will not splash up and out, or silt drift in.

The pistons, which, like the cylinders, are of a fine grade of gray cylinder iron, are light enough to limit inertia troubles at high speeds and strong enough to sustain against maximum pressures. Four rings are provided, so made and fitted that compression leakage is prevented. This condition is permanent, owing to liberal bearing surfaces, machining close to limits, and low pressures, both as respects surface and in the fiber of the material. The piston pin is of heat-treated alloy steel, hardened and ground to exact size, thus assuring stability of fit, absence of lost motion, and kinetic qualities to resist the severe shocks of ordinary use.

Crankshaft and Connecting Rod—The connecting rod is of the I-section, designed for strength and light weight, has a take-up bearing at the piston pin, where it is suitably bushed and provided with a clamping bolt of ample proportions. At the crankshaft end, the connecting rod is very carefully designed to eliminate every fraction of excess weight. Brasses are lined with a fine grade of white bearing metal, and, in fitting, all bearings are blued and scraped by men of skill in this process, to assure perfect bearing and an even pressure at all points. The crankshaft is drop forged from a special grade of crankshaft steel, is heat-treated to render material highly kinetic and to improve the qualities of the bearing surfaces. The crankshaft sections at the different points are carefully designed to assure a low limit of the extreme fiber strain, and bearing surfaces are on a basis of safety.

Lubrication Is Positive—While the positive system of lubrication is used, it will be worth while to note that in this motor the oil level is maintained by means of an overflow system to a "sump," which shows in the bottom half of the crankcase, to the right. When the oil enters this space, it is lifted by a gear pump of excess capacity, passes up through passageways in the case, and is shot out against the bearings to be lubricated, which bearings are suitably provided with channels for the purpose. The result is, the lubrication is profuse. Since it is important to know how much lubricating oil there may be in a system, the motor is provided with a tell-tale so located that it may be readily seen, and is actuated by means of a float in the oil well, but it is so arranged that the glass will not coat over and hide the readings. The float is of cork, and operates much the same as the float of a carbureter. This is fixed at the lower end of a vertical rod, upon the upper extremity of which is attached the indicating disc. The latter thus moves up and down, with the float which marks the oil level, and registers the same on the gauge glass, the same being visible to the driver

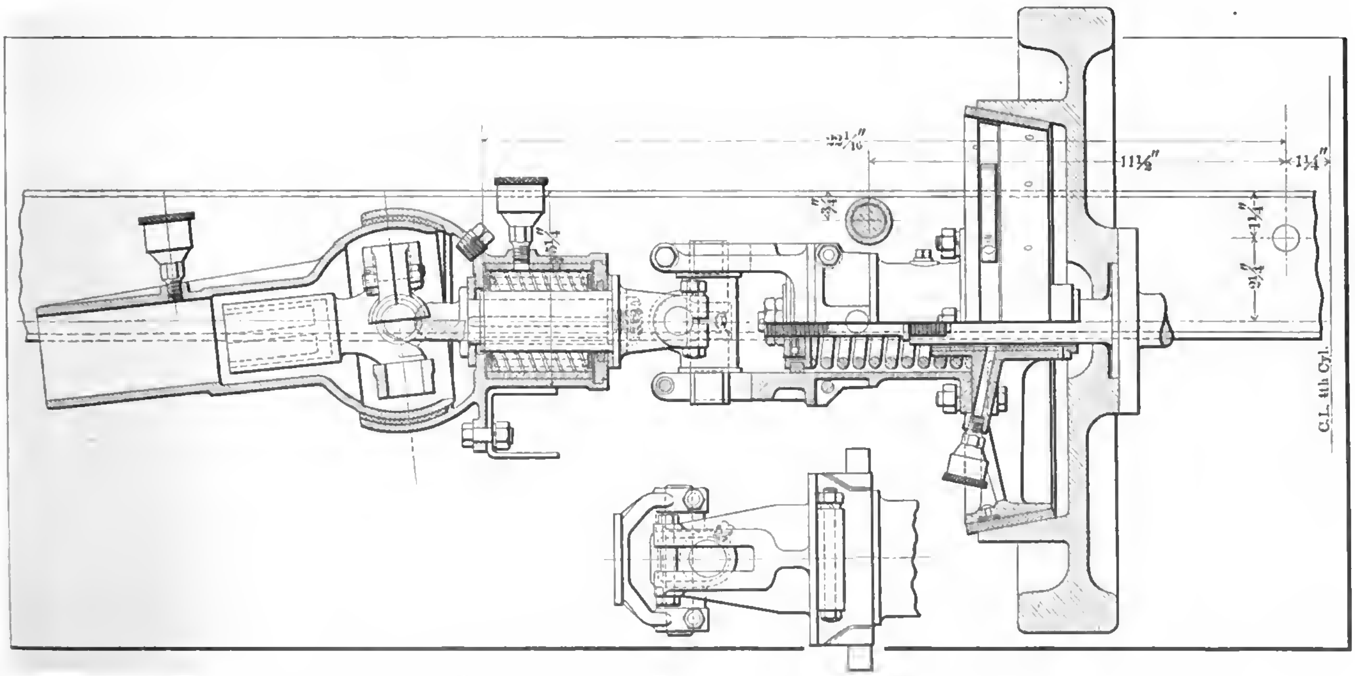


Cross Section Through Engine Displays Large Valves

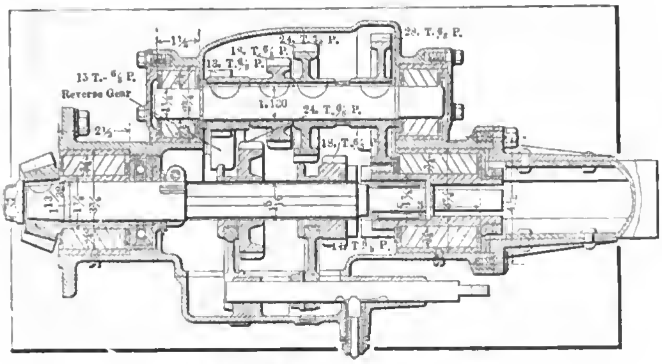
from the exterior. The fan bracket has also been changed, and is attached to the front cylinder with proper adjusting means.

Among the remaining important points to be noticed in the motor, attention will be diverted to the means for adjusting the lift of the valves, and since an integral camshaft enables the use of proper-sized rollers on the ends of the lifts, the actual clearance for the tappets is a minimum, and tappet-knocking is eliminated. The valves are of adequate area to do the required work and it was not necessary to make the lift pronounced, with the result that noise tendencies and hammer blows are not present. With ready means for adjustment, which consists of a nut and lock at the end of the lift, it is an easy matter to retime the motor.

Three-Speed Selective Transmission—Referring to the cut of the transmission—which lies in a direct line to the rear of the motor—this is suspended on the propeller-shaft tube, and the weight is borne by the chassis lateral stiffener and rear axle. The housing for the shaft between the clutch and the transmission is a large and stout tube, while the joint is not only capable of supporting thrust and tension, but it is free to respond to all road inequalities. The transmission housing is



Assembled Clutch with Universal Joint, Central Bearing, and the Relating Parts—A Very Neat Assembly



Regal Three-Speed Transmission, Showing Compactness

relatively small, of light weight, shaped for strength, and holds the gear set centered in Hyatt nickel-steel roller bearings of liberal proportions. The gear shafts, both direct and "lay," are short, of liberal sectional area, hence rigid in the extreme, rendered more so by the use of a selected grade of nickel steel, the gears, as well, being of this material.

Elsewhere in this article, a cut shows the leather-faced cone clutch of suitable diameter. The leather is pressed out by flat springs disposed around the periphery. The clutch spring is strong, and a ball-bearing takes the thrust. Just back of the spring, a joint engages a roller bearing, which, in turn, rests on a cross-member of the chassis frame, so that all stresses are transmitted to the frame just in front of the propeller-shaft tube, close to the axis of motion of the universal joint. All rear axle torsional moments are resisted by the large tube, relative motion is cared for, and the spacing between the axle and the joint is maintained in the same way.

Steering Mechanism Makes for Sturdiness—The steering gear, when cut through the longitudinal center, discloses a helical gear mounted on liberal bearings, with provision for taking thrust on both directions and means for taking up any lost motion which may be generated. The housing of the gear is grease-tight, of suitable proportions, and by means of a webbed foot, is bolted to an arm of the motor, thus affording a stable anchorage, which is a guarantee against lost motion.

Ball and socket joints of large diameter (one of which shows in the figure) are provided at every point, and the levers and linkages are made considerably stronger in all respects than would seem to be required. The steering wheel is of a most substantial design, holding the wood of the wheel in rigid relation, and the levers and rods for the spark and throttle control are enclosed within the steering post, connecting with the spark and throttle levers on top of the steering wheel. The "rake" of the steering column is 45 degrees in touring cars and 54 degrees in the runabout type.

With the power plant of the size used, so located that the moments are in closely-coupled relations, considering a low center of gravity, the adequacy of the spring suspension, and other design features to match, it is claimed by the Regal Motor Car Company of Detroit, Mich., makers of this car, that maintenance will be at a minimum, although, since the power for weight ratio is favorable, the speed of the car is above average expectations. Naturally, the reflections as to the future of this model are on a reasonably certain basis, due to the experience gained from 2,000 cars of substantially this design, which have uneventfully weathered over a year's service.

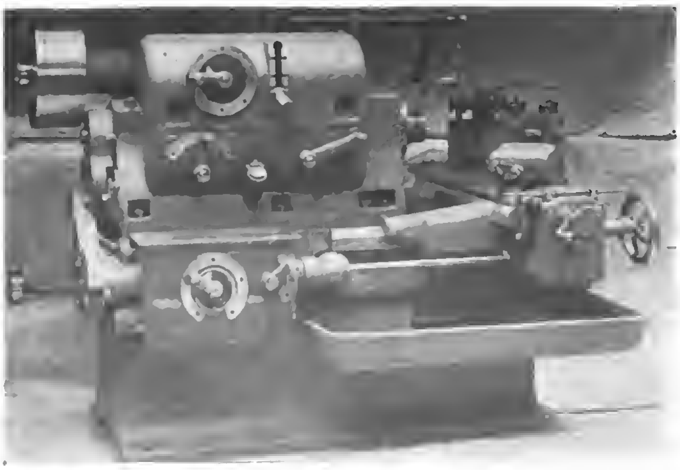
Besides the customary equipment—as lamps, generator, etc.—each power plant includes a Remy magneto, making a dual ignition system, in view of the auxiliary spark coil, battery, etc., furnished with every car at the price, which is $1,250.

BEVEL TURNING LATHE SIMPLIFIES SHOP WORK

BEVEL GEARS, which in automobile shop work are customarily turned on engine and turret lathes, can be more satisfactorily handled on a special machine recently brought out for this purpose by the Bridgeford Machine Tool Works, of Rochester, N. Y. This machine has been especially designed to turn simultaneously the face, front and back angles of bevel gears and pinions up to 18 inches in diameter. It will also handle advantageously the first operation of boring and facing the back.

The illustrations give a good idea of the general appearance of the machine. Drive is through a constant-speed pulley, 15 inches in diameter for a 6-inch belt, running at 440 revolutions per minute; twelve spindle speeds are provided, ranging from 5.8 to 214 revolutions. Three cutting tools may be used up to the limit. The carriage has a travel of 13 inches, and is provided with two cross-slides carrying angle-turning rests, that on the right having a turret tool holder. The feed box gives ten ratios of feed, ranging from .005 to .190 inch per revolution of the spindle.

For the first operation the blank is chucked in a universal chuck and bored with a tool in the left-hand rest, while the facing is done by tools held in the turret of the right-hand rest. For the second operation the blank is chucked either on a special hub or an arbor in the taper spindle hole. The left-hand turning rest carries a roughing and finishing tool for the face angle and the turret of the right-hand rest a set of roughing and finishing tools for the front and back angles.



Left-Hand View of Bridgeford Bevel Turning Lathe

Operating End of Lathe, Showing Angle Rest Hand Wheels

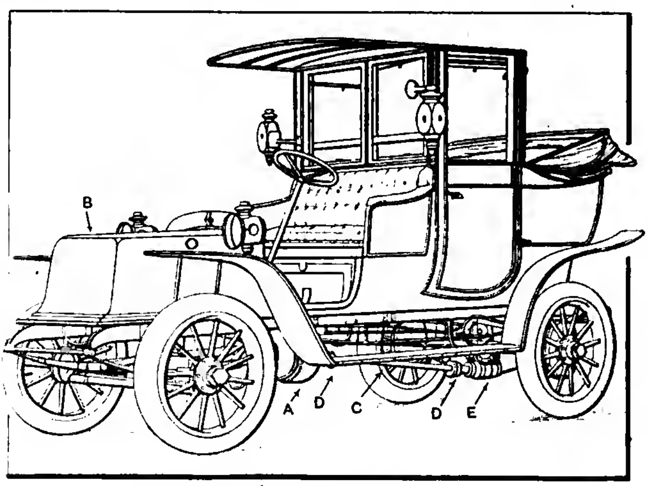
Babcock Electric Model 11 for 1910, Depicting a Town Car with the Landau Top

NOISELESSNESS is what designers are reaching for and it is one of the strong claims which has always been made by makers of electric vehicles for their products. In this, a certain amount of natural advantage is a normal expectation, owing to the absence of a power plant of the class involving the use of valves, reciprocating parts, and contrivances of a kindred nature, which make for unavoidable noise.

The natural advantage attending the performance of electric vehicles is not without a disadvantage, in that the very noiselessness of the electrical system accentuates every little sound, and the emanations which would not be noticed in other makes of cars become most annoying in electric vehicles. In going over this question, F. A. Babcock considered that his types of electrics would have to be so constructed that even the hum of the bevel drive in live rear axles would not be permissible. In order, however, to eliminate this slight source of noise, it was considered necessary to do away with the bevel gear, and so the Babcock Model 11 for 1910 is without a bevel drive.

Worm-Driven Rear Axle—In view of the excellent results obtained from worm-gear transmissions of the Hindley type, and realizing, of course, that this system is noiseless, the Babcock designers recognizing certain practical limitations, went into the matter of details at great length. The finished product shows the result of this special investigation and the modifications resulting, one result being the perfect "coasting" ability of the model 11 car, notwithstanding the fact that the average worm drive is nearly irreversible. Usually the worm will readily drive the wheel, but the wheel will not readily drive the worm.

The finished car, which is shown, was designed for town service, it being of the landau type. Referring to the other view of it, the car will be seen with the top down, and certain letters for use in ready reference to the design features as follows: A shows the electrical motor placed on the center line of the chassis, in the fore and aft plane, but with the customary ground clearance. B indicates the location of the electrical battery under the hood, which consists of 42 cells of 15 plates each, with a capacity of 140 ampere hours. C indicates a propeller shaft between the motor and the live rear axle, with double universal joints, D D, so disposed as to eliminate variations in the speed of rotation as well as to compensate for inequalities. E shows the housing of the live rear axle, just where the worn shaft enters and engages with the worm wheel.



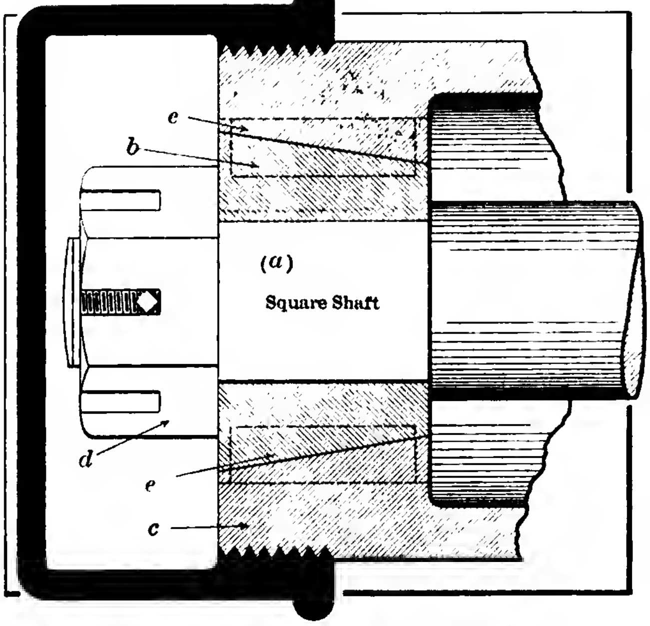
Diagrammatic Design of Babcock Model 11

The live rear axle, besides having a worm drive, houses a differential of the usual order, but there is one other new detail. The figure shows, in principle, the new idea, a represents the shaft, finished to a square, engaging a broached conical member b, which, in turn, engages a cone face in the hub c, due to the pressure of the nut d. Relative motion is prevented by the keys e, e. It is claimed for this drive, that it has all the advantages of floating, and that it cannot work slack, make noise, nor ultimately require repairing.

Annular Ball Bearings Used Throughout—To be consistent, and in order to carry out the plan of noiseless performance, it was decided to use a class of ball bearings which could not be adjusted. This idea assures that noise will not be the product of service, plus a "tinker" and a wrench, and the sizes of ball bearings were selected on a liberal basis.

Both front and rear springs are of the "Perfection" type, using Krupp special spring steel. The road wheels are 32 x 4 1-2 front and rear, and a trussed, laminated, wood chassis frame, imparts additional resilience to the whole body structure.

With a motor of great power; battery of ample output, it follows that good spring performance is desirable, and not only in order to please the purchaser by making riding enjoyable, but to eliminate battery troubles, by way of broken jars, loss of electrolyte, etc. In the meantime, in order to insure this performance under the most severe conditions, the Babcock designers, having located the most prolific cause of battery derangement, designed and adopted the plan of crating and holding the battery as shown. The oak crates, or trays, are in



Conical Drive in Live Rear Axle of Model 11

sets, and when the sets are put in place, the clamping device shown, delivers a uniform pressure on all the jars, independently of the crates, and prevents any relative motion at all.

Dual Method of Car Control—Referring to the wiring diagram, this shows a series motor five speed control, the connections, coming from the rear battery, lead to a drum type of controller, through the contacts numbered 7, 8, 9, and 14, and from the front battery to contacts terminals numbered 10, 11, 12 and 13. From 6, a lead passes to the motor armature, and thence, 1, 2, 3, 4 and 5 connect to the fields of the motor. Contact No. 1 also leads to the lever of the foot control, through resistances 31, 32 and 33, or evading resistance, when the lever 29 bridges to 30.

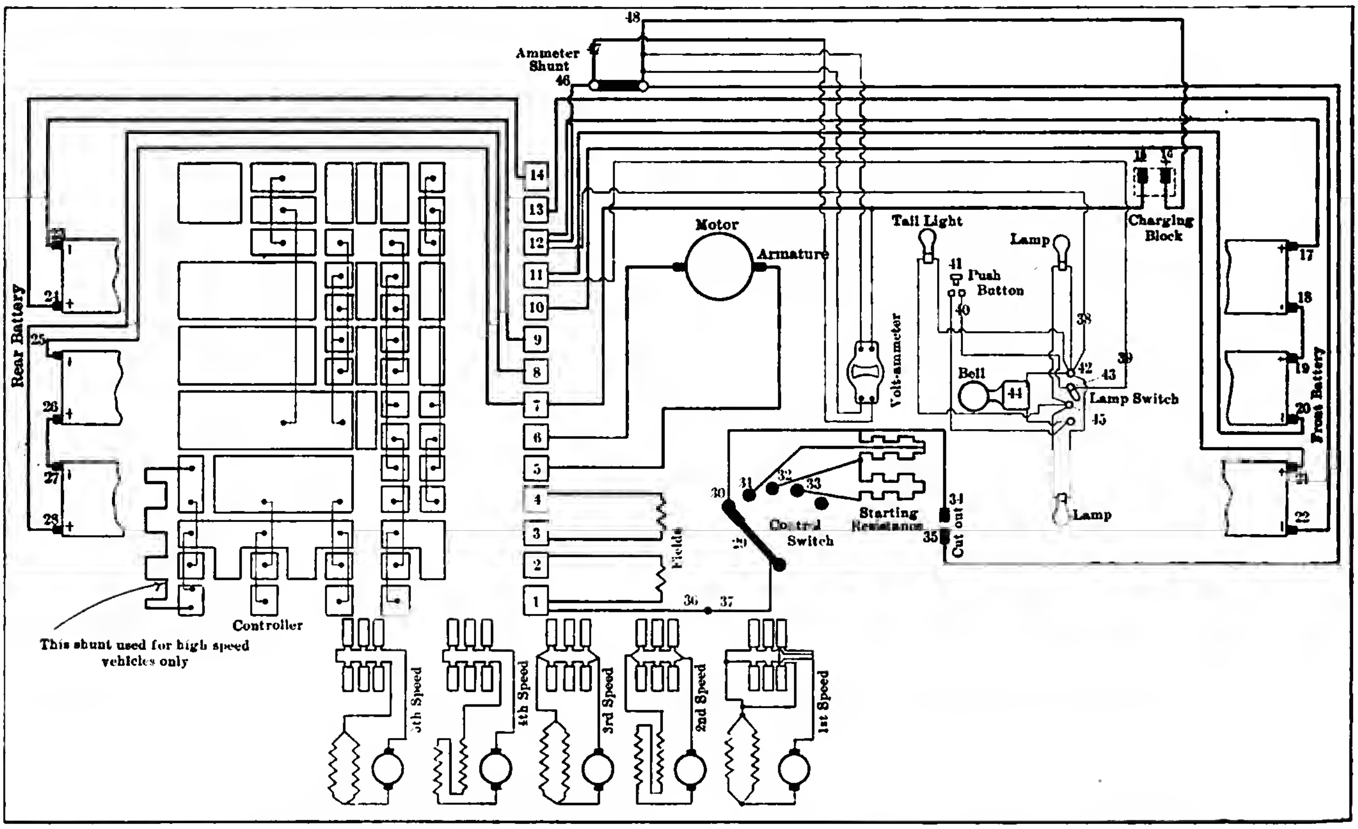
The several combinations required to give the first, second, third, fourth and fifth speeds, are shown at the lower part of the diagram, and remembering that the combinations may all be made in succession, by moving a single lever, the time will be propitious to divulge the use of the resistances as above referred to. It is obvious that the control might be made to serve without the resistance, which is but a matter of leaving the lever 29 in the position which bridges to 30, hence shutting off the resistances 31, 32 and 33.

Since the lever 29 may be worked independently of the drum control lever, the operator of a car has two choices, *i.e.*—the five separate speeds may be used by means of the hand lever of the drum control, without resorting to the foot lever 29, or with the drum control on any one of the five speeds, the foot lever 29 may be used to start, control, and speed the car, up to any limit fixed on the drum control. To go into reverse, however, it is necessary to throw the lever into the reverse position before the foot lever will be of any service. Of the remaining connections, little may be said, since they are for lighting, signalling, charging, metering, etc., nor would it seem to be necessary, at this time, to elaborate upon the advantages of electric lighting etc. The great question involves the principle of the use of separate resistances in the auxiliary control, thus rendering the operation of the car so simple and sure that ladies may drive with safety. Economical conditions obtain, since the resistances are merely auxiliary, serving to abort the consequences of forgetting how the controller may be set, and allowing free use of both hands in a tight quarter by substituting foot manipulation of the resistance lever.

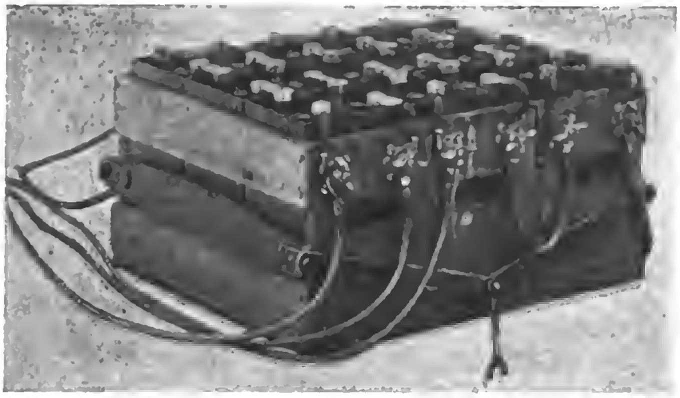
Details Are Worked to a Fitting Conclusion—The Babcock battery is of the type as originally brought out by Camille Fauré in 1881, but improvements wrought since that time, have reduced the whole to a wholesome basis involving qualities as follows:

(A) Considering a single motor drive, the greatest possible torque, and highest desired speed of the car. The torque realized assures that the car will negotiate deep snow, soft going, etc., while the speed on good roads is all that can be desired.

(B) The wiring system is protected at every point by the use of American Circular Loom, which is an insulator of permanence, and acid proof to all intents and purposes.



Wiring Diagram of All Models of Babcock Electric Carriages, Showing How Dual Control Is Carried Out



Babcock Clamping Lock for the Battery Cells

(C) All terminal connections are made of non-corroding Tobin bronze, sufficiently so to assure that bad contacts are not induced, and electrical troubles of this character are aborted.

(D) The sizes of conductors used are such that undue heating is not possible and the "drop" in the electrical system is therefore within economical limits.

(E) Speed combinations are as follows:

First speed: Three groups of 14 cells of battery in parallel, and motor fields in parallel.

Second speed: Two groups of 21 cells of battery in parallel, and motor fields in series.

Third speed: Two groups of 21 cells of battery in parallel, and motor fields in parallel.

Fourth speed: All cells of battery in series, and motor fields in series.

Fifth speed: All cells of battery in series, and motor fields in parallel.

(F) Flexibility of control, economy in the use of energy, insurance against mistakes of the operator, and absence of noise, without sacrificing harmony in any of the important relations, is the fitting conclusion.

Pedal control as outlined above renders the car more readily controlled, as, for instance, in the case of a woman driving, so that this method is bound to result in even greater popularity among the "weaker" sex, with whom it is already very popular.

AUTOMOBILE INVADES SOUTH AMERICAN HOSPITAL SERVICE

WHILE no one has ever set a limit upon the possibilities of the commercial car, it is generally supposed that it has a limit. What this limit is, is hard to ascertain, for every day sees some supposedly immune field invaded by the gasoline-driven car. Time was when the machines were noisy, but the silence of the modern car has done much to open up new opportunities for it. One of these is that of hospital service.

In this line, the superior speed and immunity to fatigue, give it at once a big advantage over the horse, as soon as the prejudice against the machine can be removed. This statement holds particular weight in warm countries, where the horses and other beasts of burden have their already small amount of usefulness still further reduced. The illustration below shows a car designed to replace the unreliable horse in a situation of this sort. It is the Pope-Hartford ambulance purchased by the municipality of Rio de Janeiro, Brazil. In this city, it supplanted several antique French cars. The body was mounted upon the regular chassis for commercial use, this being equipped with a 40-horsepower engine, three speed transmission, 130-inch wheelbase, standard tread, 34-inch wheels, 5-inch tires, and a special sixteen-gallon fuel tank.

Upon this chassis is mounted the body which was built after the specials plans by the Navy Department of Brazil. It is very striking in appearance, for instead of the dark colors generally used on ambulances, it is painted with a soft French gray. This makes it more appropriate for use in a warm climate. One of the features particularly distinctive of this ambulance is the top. Here an entirely new idea has been put into effect. Instead of the closed roof, devoid of any means of ventilation, usually employed, this ambulance has what is called the "trolley" top. In this the top is carried up a little way above the sides, giving room for four oblong windows on each side and two both in front and in back. This adds wonderfully to the comforts of those within and gives the machine a distinctive appearance.

Upon the interior has been spent even more time than on the exterior, for as a matter of fact, any old outside would do, if only the facilities for handling patients were adequate.

Its inside finish is in mahogany and is very roomy. There is every conceivable contrivance for the comfort of the sufferer. The details of inside equipment are as follows: Four beds with springs and mattresses made of best curled hair and covered with plain leather. These beds are arranged on slides and rollers so that they can easily be taken in or out of the wagon, and a locking device is provided so that they can be held firmly at any position. There are four stretchers of rubber cloth and four pillows similarly covered. Two medicine chests are provided with compartments for the physician's case, cotton, and splints. There are two folding seats for the nurses, surgeons, and attendants.

Long wheelbase, large wheels, large diameter tires and proper springing will go far toward making this car ride easy, as easy as would be necessary in a vehicle for transporting the injured, while a special gear ratio allows of high speed, as in the case of a hurry-up call, accidents, poisoning cases, etc.

Special Pope-Hartford Ambulance for Brazilian Navy Department

AFTERMATH OF THE LONG ISLAND STOCK CHASSIS DERBY

LONG ISLAND roads have been famous since the earliest days of automobiling, and have been made classic by the Vanderbilt Cup races, yet few, even of those who knew them best, supposed that they would yield such a marvellously fast course as that which connects in triangular fashion Riverhead, Mattituck and Centerville. There had been the usual advance reports of fast time made in practice, and these had been taken with the proverbial grain of salt. The awakening, however, came in the very first lap of the September 29 race, when the time of the three-year-old Mercedes formerly owned by W. K. Vanderbilt, Jr., was announced as 19:20, a speed of 70.5 miles an hour for the 22.75-mile course. Chevrolet and his Buick came not so far behind, with a record of 69.2 miles an hour. The same combination made the fourth lap in 17:40, a rate of 77.3 miles an hour, and finished, as everyone now knows, at an average speed just short of 70 "per."

The grandstand received the first notifications incredulously, and Announcer Prunty was requested to repeat them several times. After the race the Motor Contest Association gave out that the surveyor who measured the course had filed a sworn statement attesting that the length was really 22.75 miles, measured on the crown of the road, and that the steel tape used had been sealed by the supervisor of weights and measures. Thus the correctness of the measurement seems well attested. The timing was done by the Warner electric timing machine, presided over by the inventor himself, and supplemented by the New York Timers' Club, which obviates any possibility of error on that side.

Where Officials and Pressmen Performed Their Duties

Course Was Excellent
De Palma's Fiat in Flight

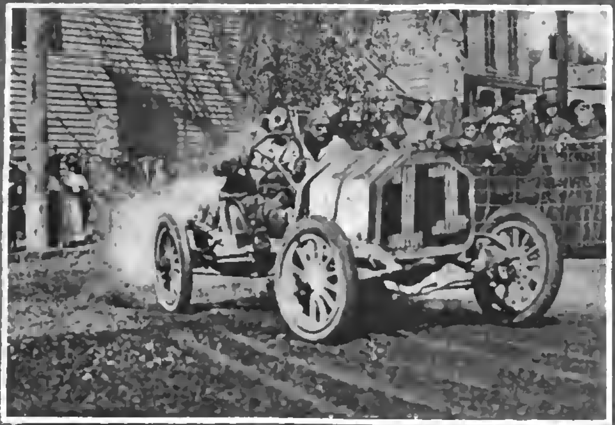
One explanation of Chevrolet's fast time is, of course, the shortness of the race, as the class he was in only went five laps, 113.75 miles. This enabled him to finish without having made a single stop, either for tires or gasoline. Many rumors have been afloat concerning the genuineness of the Buick's claim to be a stock car, but the Buick team has passed the scrutiny of several different technical committees without having been found at fault. Of course the A.A.A. rules for stock cars only specify that twenty-five of a given model must have been made, and it is easily possible for a concern which intends to go in extensively for racing to make twenty-five special cars, call them stock models, and not lose much by it.

Lytle on the Road to Recovery—Herbert Lytle, the plucky driver of the Apperson "Jack Rabbit," is reported to be practically out of danger. He is still in the Eastern District Hospital, at Greenpoint, L. I., but is expected to be well enough to leave in a few days. The surgeons say that he suffered more from shock than any other cause, and the internal complications at first feared have as yet failed to appear.

No authoritative explanation of the accident has been made. Some reports say that it was a plain case of skid. All, however, agree that the Apperson was going at high speed at the time, probably 70 miles an hour.

The American Hot Springs—The American roadster driven by Hugh Hughes caused some excitement in the grandstand when it stopped at the end of the fifth lap. A jet of steam over the radiator cap proclaimed that the engine had become overheated through some derangement in the cooling, and the mechanic, arming himself with a big bunch of waste, leaped to the ground the moment the car stopped and got busy with the cap. When he finally got it off a geyser of hot water, steam and mud shot up twenty feet high, sprinkling the onlookers in the nearby boxes. There was some shaking of heads when the mechanic immediately began pouring in cold water, and many predicted that the American would be put out for good by a cracked cylinder. No ill results became apparent, however, and the American was still running when the race was brought to an end.

Daring Work of Mechanic—Herbert Bailey, the mechanic on Disbrow's Rainier, pulled off a bit of work which marks him as a future driver of no little promise. At least he possesses the requisite agility and nerve. The most hardened racegoers gasped with amazement when the Rainier sped down the homestretch and stopped in front of its pit with Bailey clinging in some miraculous fashion to the radiator and the front spring irons, holding the steering gear together. On the sixth lap, just after leaving the grandstand, a pin came out of the cross-link of the Rainier's steering gear, leaving the left front wheel adrift. It was, of course, impossible to steer the car with control over only one wheel, so Disbrow and Bailey strapped the link back in place. The repair did not look very secure at that, and finally Bailey climbed on to the spring hangers to hold it in place. He



Chevrolet, Who Averaged 70 Miles Per Hour

Arthur See, Maxwellite, Small Car Winner

needed both feet and one hand to hold himself on the car, but with the other hand he got a good grip on the link. He maintained this precarious position for twenty miles. The Rainier made the lap in a trifle over twenty-six minutes, and Disbrow afterwards said that he did not even slow down for the turns.

The Sharp-Arrow Forgot to Stop—William Sharp's Sharp-Arrow was literally "in a class by itself," and had no trouble winning the trophy for cars selling between $2,001 and $3,000. It finished its specified six laps in 2:09:02, a rate of 63.6 miles an hour. Sharp liked the going so well that he kept right on after he had officially finished, and completed three more laps. Some of the spectators did not know that he had finished, and asked for his time, whereupon Peter Prunty informed the grandstand that the Sharp was "just touring." When Starter Wagner finally ordered it off the course it had a five-minute lead on De Palma and his Fiat.

Another Race Next June—It is unofficially announced that another race will be held over the Riverhead course some time next June. Certainly this new course is too good a find to be allowed to drop back into obscurity. Without doubt it is the fastest course in the country. The roads are of loam and sand, but rolled hard and smooth and plentifully oiled. They seem to be especially easy on tires. There is some doubt as to how the surface would stand the strain of some twenty heavy cars at full speed for ten or more laps, but for comparatively light cars and short distances it is certainly unexcelled.

Senator Morgan said immediately after the race that he would retire from participation in such events, but when assured that the accident was in no way the fault of the course he reconsidered his decision, and will probably have charge of the race next June. Many contingencies remain to be provided for; the consent of the county officials must be obtained, and another sanction must be issued by the A.A.A., but every effort will be made to give the racing teams another chance to show what they can do on the Long Island circuit.

Nearly All Cars Made Good Time—With remarkable uniformity nearly every car except those in the smallest class made at least one lap in excess of a rate of a mile a minute. The old reliable Mercedes scored one lap, the third, in 18:49; De Palma's best was the seventh, done in 20:56. Disbrow's Rainier made the second lap in 21:53, and his comrade Lund drove the sister car over the third lap in 22:00. By a coincidence Disbrow and Lund both made the second lap in 22 minutes flat. The Palmer-Singer, the only six-cylinder car in the race, made a record of 20:05 for the second lap, and the Sharp-Arrow, not far behind, covered the third in 20:56. Chevrolet made the fourth in 17:40, and Burman's best was the second, in 19:50. Most astonishing of all were the times recorded by the little Maxwells; See covered the course in the time of 25:03 and Costello in 25:43, both at the rate of about 54 miles an hour.

MANY CLUBS FORMED IN COLORADO

Denver, Colo., Oct. 2—There has been much activity in this part of the country in forming new clubs, and in this the Denver Motor Club has taken a considerable part. Among the organizations recently reported are the automobile clubs of Greeley, Ft. Collins, Boulder, Longmont, Colorado Springs, Pueblo, Trinidad, Canyon City, La Junta, Ft. Morgan, Julesburg, Rocky Ford, Florence, Las Animas, Grand Junction and Glenwood Springs, and those of Cheyenne, Wyo.; Tulsa, Okla.; Garden City, Kan., and Imperial, Neb.

Mercedes (Armstrong) Withdrawn Because of Accident

Herbert Lytle's Apperson After the Fatal Plunge

A Picturesque Roadway That Is Part of the Course

PHILADELPHIA, Oct. 4—The first gun of the coming contest for the honors in the Fairmount Park 200-mile stock chassis race next Saturday was fired this morning when the 7.8-mile course was opened at daylight to a dozen or more anxious entrants who were on the ground to try out their cars and become acquainted with the course. There are twenty-one entries in hand, with one, and possibly two, additional starters, which will be announced later. At a meeting of the contest committee of the Quaker City Motor Club last Tuesday evening, the entries of Bergdoll's 120-horsepower Benz and Barney Oldfield's car of the same make, which he entered as of 59.6 hosepower, were rejected, it being the opinion of the majority that the cars did not meet the official specifications of a "stock" machine.

The lineup will include some of the most famous track and road drivers, including Robertson, with a Simplex; Dingley and Lorimer, Chalmers-Detroit; Grant, Alco; Haupt, Thomas; Zengle and Parkin, Chadwick; Wallace, Palmer & Singer; Chevrolet and Burman, Buick; Lytle, Apperson (if he recovers from his recent injuries in time), and several others almost equally as well known.

An examination of the course Saturday showed that it was in 50 per cent. better condition than last year, when not a little new road had to be hastily constructed to round out the circuit. The stretch along the South Concourse is absolutely flawless, as is the combination hairpin-S turn on Sweet Brier Hill. Almost the entire stretch of three miles of the river road along the Schuylkill, which was the worst portion of the course last year, has been worked on until it is in nearly as good condition as the Concourse. The bad turn under the Chamounix bridge has been improved, too, but it is still somewhat lumpy for fast work. After practice hours a gang of men will be kept at work at this point all this week. City Line avenue, as usual, is in the best of condition, while Belmont avenue is being worked upon to get it into mile-a-minute shape. At a previous inspection of the course the committee induced the Park Commission to remove several telephone poles and fire-plugs located at turns, and which, in the event of a bad skid, might cause trouble. All in all, the course will be as safe as human ingenuity and hard work can make it. The main feature which makes for safety is the boulevard width of the roads throughout almost the entire circuit. Fast cars cannot be held up by slow ones, and in this respect alone the course is the fairest in the country.

That the largest crowd that has ever witnessed a similar contest will be on hand next Saturday afternoon is positive. The homes of a million and a half of people are within a five-cent carfare ride of the course, and the half-holiday will bring out every man, woman and child who can get on a trolley car. The police arrangements, as personally looked after by the Mayor and Superintendent of Police Taylor, are perfect. Fifteen hundred policemen, reinforced by miles of rope and wire fence, will keep the course clear, and additional guards and flagmen will be furnished by the Quaker City Motor Club. At dangerous turns, such as at Sweet Brier Hill, at Chamounix railway bridge and at the Catholic fountain, special care will be taken to protect the public.

Many parking spaces and grandstand boxes were disposed of at public auction last week, not a few of the former bringing 200 per cent. more than the regular price. Many of the boxes also brought good figures, and the expectation of the promoters that at least $20,000 will be turned over to the four charitable institutions which have been named as beneficiaries, seems in a fair way of being realized.

The main stand is ready for its decorations, and a large gang of carpenters is at work on the official and press stands and repair pits. The latter will be located above and below the tape, directly in front of the big grand stand, thus affording the spectators a fine view of the exciting features attendant upon quick tire changes, taking on of supplies, etc.

'Phone stations will be established at various points around the course, and the scoring arrangements have been under rehearsal for the past fortnight, to insure the prompt and correct recording of the work of the various contestants. The score-board itself will be a vast improvement over last year's crude affair, which came in for no little deserved criticism. A specially drilled corps of men will have charge of the board, while the Warner Instrument Company will supplement the work of the scorers with its patent recording device, which shows the relative positions of the three leading cars.

LIST OF ENTRANTS

No.	Car	Cyl.	H. P.	Bore and Stroke	Driver
1	Acme	6	60	5x5	Malin Leinau
2	Palmer & Singer	6	60	4 7-8x5 1-2	Wm. Wallace, Jr.
3	Simplex	4	90	6 1-10x5 3-4	J. F. Betz, 3d.
4	Apperson	4	49.2	Not over 600 cub. in.	Hugh Harding.
5	Lozier	6	50	4 5-8x5 1-2	Harry Cobe.
6	Benz	4	60	5 3-4x5	Chas. Howard
7	Welch	6	70	4 5-8x5	Al. Hall
8	Thomas	6	70	5 1-2x5 1-2	Willie Haupt
9	Thomas	6	70	5 1-2x5 1-2	L. J. Bergdoll
10	Chadwick	6	60	5x6	Jos. Parkin, Jr.
11	Chadwick	6	60	5x6	Len Zengle
12	Alco	6	60	4 3-4x5 1-2	H. F. Grant
13	Columbia	4	32.4	4 1-2x4 7-10	J. Coffey
14	Welch	6	70	4 5-8x5	E. R. Bergdoll
15	Chalmers-Detroit	4	40	5x4 3-4	Bert Dingley
16	Chalmers-Detroit	4	40	5x4 3-4	L. B. Lorimer
17	American Speedster	4	60	5 3-4x5 1-2	Robt. Drach
18	American Roadster	4	50	5 3-8x5 1-2	E. O. Hayes
19	Simplex	4	90	6 1-10x5 3-4	Geo. Robertson
20	Buick	4	30	4 1-2x5	L. Chevrolet
21	Buick	4	30	4 1-2x5	Robt. Burman

HOOSIERS ENJOY SOCIABILITY RUN

INDIANAPOLIS, Oct. 4—Local owners and drivers held a combined sociability run and hill-climb last Saturday and Sunday, which proved such a success that it is hoped to make it an annual affair. The run was to Mudlavia Springs and back, and a handsome silver trophy, hung up by the Warner Instrument Company, was to go to the driver who made the trip in time nearest a secret schedule. Twenty-three entries appeared at the start. The first car left Indianapolis at 7 o'clock Saturday morning, and was due to arrive at Mudlavia Springs in time for lunch. The others followed at one-minute intervals. The Marmon confetti car, driven by Bernard Saltzgaber, was ditched between Crawfordsville and New Richmond, and Mr. Saltzgaher was slightly hurt. The accident was not so serious as to affect the pleasures of the day.

Saturday afternoon a hill-climbing contest was held on Devil's Elbow, which was won by Carl G. Fisher, driving a Stoddard-Dayton. The return trip, by way of Lebanon, was 104 miles in length. After the return to Indianapolis it was announced that the trophy for the nearest approach to the schedule time had been won by Miss Katrina Fertig, driving a Premier. Her time varied but one minute three seconds from the schedule.

These guessing tours have been a prominent feature of the various Premier tours of the year, and have attained popularity.

Atlanta Will Supply Southern Hospitality

The New Auditorium-Armory Where the First of the Southern National Shows Will Be Held

ATLANTA, GA., Oct. 4—That the citizens of Atlanta are determined to live up to their famous reputation of Southern hospitality and make the Atlanta Automobile Show a record breaker and one to be remembered, is best evidenced by the manner in which professional and business men of the city are contributing to the fund to be used for entertaining the visiting manufacturers, salesmen, and others who attend the Atlanta Show. Already over $15,000 has been received by the executive committee, and by the time the guests begin to arrive this amount will be increased by many thousands.

Atlanta has been a little envious of her sister city, Savannah, ever since the latter city held the Grand Prix races last Thanksgiving day and took such good care of her visitors. Atlanta now sees a chance of outshining Savannah's hospitality and is doing her utmost to beat all records for entertaining those interested in the motor car industry. That she will succeed is admitted by those cognizant with the plans being prepared.

For a city the size of Atlanta it means a hard task to house the great influx of visitors who will attend the show, and to meet this exigency a public comfort department has been created with S. C. Dobbs, of Atlanta, as chairman. This department will find temporary homes for those attending the affair. A general call has been sent out to the citizens of Atlanta to open their residences to the guests, and hotel proprietors are making every effort to increase their facilities. A general renovation is in progress, and the hotels from now on will be in the hands of decorators and painters putting the Atlanta hostelries in the best of condition.

Invitations will be sent out to every dealer and garage proprietor in the District of Columbia, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Texas, Alabama, Mississippi, Louisiana, Arkansas, Missouri, Kentucky and Tennessee.

In addition these, which number about 1,100, will be issued invitations to all carriage dealers in the same States, swelling the number to about 2,000. The courtesies of the show will be extended to these dealers gratuitously. As is well known, the show is being held at the time of year when money is free in the South. The planters have harvested their crops and will receive about $120,000,000; banks have increased surpluses, merchants and store proprietors have done a good business, and, in brief, practically all the Southern higher class are in a position to, and will, buy motor cars and accessories. All this makes doubly sure the success of the Automobile show.

Racing on the Great Speedway—The great $300,000 two-mile automobile speedway of the Atlanta Automobile Association was turned over to the owners by the contractors on Saturday last. Monday morning the experts of the Standard Oil Company began their work of oiling the track. This work will probably consume one week's time, and then the track will be ready for the racing men, who will give it the first official test. The management of the Atlanta track is determined that there shall be no imperfections in the track if they can possibly be avoided, and it is with this object in view that they have secured the services of such noted drivers as Robertson and De Palma to visit Atlanta and make an inspection of the track.

The work on the grandstands is progressing to such an extent that they are to-day ready for occupancy, and the bleachers will be finished before the end of the present week. The garages—75 in number—are constructed of corrugated iron, and each one will be provided with all modern conveniences.

The star event of the great five-day meet to be held from November 9 to 13, inclusive, will be the 200-mile stock chassis race for cars from 451 to 600 cubic inches displacement. This race will be for the City of Atlanta trophy, valued at $10,000. In addition to the trophy, the winner of this race will receive $1,000 in gold; second prize, $500 in gold; third prize, $300 in gold; fourth, $200 in gold. In addition, there will be other races at shorter distances for various sized cars, together with special match races, pursuit races, etc.

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WHAT ABOUT OFFSETTING?

One of the stock questions of the past three or more years has been that of the most advantageous offset. Beginning at the time when the practice of setting the cylinders off of the center line of the crankshaft, that is, *de saxe*, as the French have it, there was much argument, pro and con, as to the merits of this practice. The result seems to have been that it won a certain place in the industry; that is, some manufacturers thought it worth while and took it up. Others, and they are numerous, granted the contention that the practice was all right, but would not and do not use it to-day. However, the advantages having been granted, the later question for discussion became the most advantageous offset.

New light has been shed upon this perplexing subject by the results recently published, for the first time, of a number of experiments made for the express purpose of settling the argument. The conclusions deduced from a number of tests of large gas engines, differing only in size and relative weight from automobile engines, are most interesting in that they seem to shed light not only upon this problem, *per se*, but also upon the equally perplexing one of the two-cycle engine. A statement of these conclusions will make this clear, as follows:

A. An offset cylinder may be employed with *least* benefit on a high-speed, four-cycle, vertical engine.

B. It may be employed with the *most* benefit on a slow-speed, two-cycle horizontal engine.

C. The maximum advantageous offset is limited by the side pressure near the beginning of the first stroke, regardless of cycle.

The italics are ours, put in to bring out the desired point; that is, the tests would seem to show that the practice of offsetting is of the greatest utility as applied to the two-cycle motor. From this it is a reasonable deduction that its use in that form of engine will increase the power output of any given unit. This will be of much benefit, since that form has been sadly lacking in this department, for, far from developing an excess of power over the corresponding size used four cycle, in the vast majority of cases there is a large and very noticeable lack of what might even be called equality.

True, the investigator has made the point that the most gain is found in the horizontal type of two-cycle engine, of which very few are built, but it is logical to deduce backwards from this to the statement that the two-cycle vertical would present the next best amount of advantage, using the practice of offsetting. This idea, taken at its full worth, in combination with some one or more of the other modern notions, such as the differential piston, the rotary valve, the slide valve, or fuel injection, should evolve a new and superior type of two-cycle power plant.

NEW YORK SEES WRIGHT FLY

Aviation had its first really public demonstration when Wilbur Wright circled the Statue of Liberty and flew from Governor's Island to Grant's Tomb and back. Other great aeroplane flights have been made on closed fields, or, if in the open, in comparatively secluded localities. Now, for the first time, an aeroplane has flown past a great city, revealing itself to the multitudes in the streets. Several hundred thousand people must have witnessed the flight. Crowds looked on from the Battery, from Riverside Park, and from the wharves on either side of the Hudson; other crowds saw it, at a greater distance, from windows and the roofs; ferryboats stopped in mid-stream, their decks black with passengers staring upward; the crews of the French, German and English warships, at anchor in the stream, lined the yard-arms and cheered.

Considered scientifically, the flight must rank as among the best yet accomplished. Bleriot's passage of the English Channel was longer, both in time and distance, but the course lay over open water; the French aviator's only difficulty lay in crossing the line of English cliffs. Wright, on the other hand, flew the whole distance in close proximity to New York's towering buildings.

TWO-CYCLE SHOWS UP WELL

Advocates of the two-cycle form of construction are elated over the showing made by the Elmore and the American Simplex in the Munsey reliability run. These cars won their classes, and the Elmore won, in addition, the cup for the best performance. It made the remarkable record of being the only car both to finish the run with a clean score and to go through the technical examination unpenalized. In France, too, the two-cycle engine is regarded with more favor than formerly. A car of this type held third place in the voiturette race at Ostend for nine of the twelve laps, being forced to retire by a broken wheel.

SOME COMMENT OF THE MOMENT

President Schurman of Cornell may or may not be an autoist, but he is something of a satirist, judging from a most recent utterance which found its way into print upon his return from Europe. During his travels abroad the distinguished factor in education observed that the aeroplane had produced evidence of its undoubted worth. "The possibilities of flying are so wonderful," said the Cornellian, "and the marked advances of the past summer so promising, that some day the rich young society youth may abandon his automobile for a flying car, thereby leaving the roads to the public again." Dr. Schurman said he looked forward to the time when the roads should be open to "you and me" again. When that day arrives the Doctor will find the great army of law-abiding autoists celebrating with him the disappearance from the roads of the small but inconsiderate contingent which hogs the highways in a criminally reckless manner. In the jailing that must take place there will be others besides rich young men of demoralizing leisure, for while this class is to be seen numerously, the guilty embrace all classes. Sky travel may help to lessen the offenders, but the most efficient remedy is to compel every driver of an automobile to obtain a license, the abuse of which may lead to temporary or permanent revocation.

But there is a natural sequence even for the rational autoist to add flying to his accomplishments, and the industrial phases of these two pastimes have much in common. A recent illustration is W. D. Gash, one of the John Wanamaker department store commanders. Once upon a time Mr. Gash had to do with the making of Orient bicycles, and then motorcycles. Next he figured as a sales manager of the Searchmont, one of the earliest American efforts in automobile manufacture. Subsequently he completed the arrangement whereby John Wanamaker undertook the selling of Ford cars, which idea did not assume the proportions anticipated. When the plan was discontinued, Gash remained in the Wanamaker employ, and now among his varied duties he is giving some attention to the flying machine exhibition at the New York store. Mr. Gash was one of the charter members of the Aero Club of America, and has attended all of its important functions, as in like manner he has continued to keep more or less in touch with automobiling by being present at leading social events and classic competitions.

The first cash prize ever offered in this country in an automobile race was over a year ago in a gruelling 24-hour race at the Brighton Beach track in New York City. Montague Roberts, the winner of the race, in a Thomas car, is still looking for the $1,000 which was supposed to go to the winning driver. In the meantime William H. Pickens, who vouched for the business integrity of one Joseph Gaites, continues to serve as the manager of the racing team of one of the most prominent concerns interested in racing. While the metropolitan club which officered the meet had no business connection with it, except to receive a percentage for its work, it would be an act calling for much commendation if it contributed the sum toward the meeting of the obligation. Pickens ought to be relegated to the side lines until either he or his theatrical ex-partner produce the unpaid prize. "Heads I win and tails you lose" is flimflam in whatever channel it is practised, and the payment of prizes only when sufficient money comes in at the gate is a thing not tolerated when sport has real government. The improved conditions since the M. C. A. became a factor should include a demand for the settlement of a prize the continued neglect of which is little short of exasperating to the man who should receive it. It speaks well of the winning driver, who did not win, that he has never made a "holler" for the money, nor stirred up a "fuss."

The old Porter House in North Cambridge, Mass., is to become a garage; here it was that the fame of the Porter House steak began. The husky eaters of Boston Town, when their vigorous appetites demanded substantial attention, journeyed to the old Porter House, and many a man—and woman, too—who has enjoyed this succulent cut of the beef will learn for the first time upon this reading the source of its naming. Bostonian chronicles tell not the name of the man who first carved this cut nor the fortunate one who ate it; but it is a matter of record that in the years following its advent the procession of patrons of the Porter House grew in great numbers, and in the ranks were men of note in the affairs of the commonwealth. And now the smell of gasoline is to replace the delicious odor from the grill, with resultant pangs of hunger to those who now will have to search elsewhere for a less historic source at which to appease their longings, for it should be said in the passing that the old Porter House had survived a century and a bit more.

A new wrinkle in the way of automobile persecution in England is the inclusion of the passenger when arrests are made for so-called overspeeding. In a recent happening in the tight little isle a passenger accompanying an arrested driver was mulcted to the tune of £4, which, in good American money, means nearly $20. In this revised method of apprehending offenders it is not improbable that good results may ensue, for the occupant of the tonneau, when time hangs heavily on his hands, might employ as much persuasiveness as he can summon, verbally and physically, in urging the man at the wheel to lessen his pace so that he will keep within the confines of the law. In some instances the plan might be an excellent one, though it is pretty good guessing that it will not be astonishingly efficacious as a general rule.

One of automobiling's phases is the gradual loss of the so-called "speed-fever" by the older drivers, who nowadays seem to drive quite slowly, even on a good road, instead of extending their cars to find out exactly what they are capable of when utilizing all their power. There are times when one may drive fast, and there are times when one should drive slowly. Discretion in both cases tells whether one is a good or a bad driver.

Automobiling Has Made the Road Signs of France Comprehensive and Concise

SELDEN DECISION BRINGS STARTLING RESULTS

(*Continued from page 591*)

To-day's Meeting of the Licensed Association

The A. L. A. M. has its regular monthly meeting to-day, and all these matters of great moment will come before the association. None of the officers of the Licensed body cared to be quoted in advance as to the probabilities, contenting themselves with the expression of an opinion that a broad view was being taken of the entire situation and that the general good of the industry was to be considered. This has been the open expression of Colonel Charles Clifton, president of the Licensed body, for some time past, though he encountered some difficulty in convincing others of the wisdom of his course. His advice is likely to be quite potential at the present moment.

Two Shows Are Still Assured

Believing that two shows are a necessity in New York City, it is probable, no matter what the outcome will be in clarifying the situation, that there will be no interference with the announced plans for the holding of the shows in Madison Square Garden and Grand Central Palace, the latter under the auspices of the A. M. C. M. A. One building could not possibly house all the exhibitors, and thus two separate shows become an actual necessity.

The National Association of Automobile Manufacturers yesterday held a meeting for the purpose of allotting space for the Chicago show, and to-morrow the A.M.C.M.A. will have its drawing for the Palace exhibition.

BAY STATERS TO HAVE AN ENDURANCE

Boston, Oct. 2—The contest committee of the Bay State Automobile Association has announced the preliminary plans for an endurance run to be held Friday and Saturday, October 22 and 23. The primary object of the contest will be to give the people of many of the principal cities of New England an opportunity to see the 1910 models in operation and to make comparison of their performances under uniform conditions. According to the plans that have been made, the run will cover approximately 450 miles, the contesting cars making half the distance on each of the two days. On the first day the cars will pass through the cities and larger towns to the south and west of Boston. The route includes Quincy, Holbrook, Brockton, Bridgewater, Middleboro, New Bedford, Fall River, Taunton, Providence, Pawtucket, Woonsocket, Fitchburg and Worcester. The second day the run will be to the north and east of Boston, the principal points on the route being Lowell, Nashua, Manchester, Concord, Dover, Portsmouth, Newburyport, Haverhill, Lawrence, Salem and Lynn. At the end of the road test the cars will be examined by a technical committee.

NOVEMBER MEET ON BRICK SPEEDWAY

Indianapolis, Oct. 4—The aviation meet which was to have been held at the Indianapolis Motor Speedway, Oct. 14, 15, 16, has been abandoned, owing to the inability to reach satisfactory terms with Glenn H. Curtiss, who refused to participate for less than $12,000. However, the speedway management has arranged for another automobile race meet for November 1, which will be the first held on the new brick course. The work of paving the course is proceeding rapidly.

WAGNER AND AMES BUY "HORSELESS AGE"

One of the pioneer automobile journals of the country, *Horseless Age*, has been purchased by Fred J. Wagner, formerly of *Motor Age*, and C. B. Ames, of *Motor*. Both are well known in the industry, and under their capable direction the property should receive the up-to-date attention of which it has been in need for some time.

PALACE SHOW HAS RECORD LIST

All records have again been broken in connection with the application for space in the Tenth International Automobile Show, which will open New Year's Eve in Grand Central Palace, New York. When the applications for space to participate in the first allottment closed 110,000 square feet had been applied for, which is about 5,000 square feet more than was applied for last year. With but 72,000 square feet at their disposal, Chairman R. E. Olds and his associates on the Show Committee will experience considerable trouble satisfying the demands of motor car and accessory exhibitors.

Members of the A. M. C. M. A. have fairly swamped the management with requests for increased space, and members of the Importers' Automobile Salon have taken every foot contracted for by that association. David J. Post, who represents the Motor and Accessory Association, is authority for the statement that members of his association have applied for 25 per cent. more space for the Palace affair than at any previous exhibition. The drawing for space will be held at the headquarters of the A. M. C. M. A., 505 Fifth Avenue, New York, at 10:30 o'clock to-morrow.

Opening the 1910 show season the Grand Central Palace as usual will be the first in which are exhibited the products of many new concerns, both motor car and accessory manufacturers. The great quantity of new exhibitors this year has impressed the Show Committee with the growth of the industry since the Grand Central Palace Show of last year.

PLANNING FOR A SHOW IN COLUMBUS, O.

Columbus, O., Oct. 2—At a recent meeting of the Columbus Automobile Club it was decided to hold an automobile show in this city some time next January or February, and a committee was appointed, consisting of Perin B. Monypeny, Fred H. Caley, Herman Hoster, N. O. Aeby and O. H. Perry, to make the necessary arrangements. All manufacturers will be invited to participate, and it is expected that the date will be arranged between those of the Cleveland and Cincinnati shows, so that manufacturers will not be forced to go to unnecessary transportation expense.

The "Old People's Day" proposed by several members of the club has been postponed till next year because of the lateness of the season.

"LUMMY" GOES BACK TO "LUNNON"

A. E. Lumsden, London representative of the B. F. Goodrich Rubber Company, sailed for home Saturday last on the *Cedric* after a two months' visit in this country. The success of the London branch of the Goodrich company is attested by the fact that it has now been in existence for several years under the able direction of Mr. Lumsden, who will be remembered as one of the old-time bicycle champions of America, his base of operations having been Chicago. It is like carrying coals to Newcastle to sell tires in Europe, and salesmanship enters into the proposition as much as quality of goods. Apparently "Lummy" knows how to sell things, and he has something good to sell. He was accompanied on his visit by Mrs. Lumsden and son, and part of the time was spent at Christmas Cove, Me., at the summer home of Mr. and Mrs. S. A. Miles.

NEWCOMERS IN THE INDUSTRY

Detroit, Oct. 2—The Sibley Motor Car Company has been organized and incorporated under the laws of Michigan to manufacture a popular-priced touring car and roadster. Plans are being developed for quantity production to begin early next year. The incorporators are: Frederick M. Sibley, Henry Wineman, Jr., John G. Utz and John B. Phillips. Mr. Utz and Mr. Phillips were formerly associated with the Chalmers-Detroit Motor Company as chief engineer and superintendent.

INDUSTRY AS VIEWED BY HEADS OF ONE BIG CONCERN

GREATER DEGREE OF CO-OPERATION DESIRED

By H. H. Newson, General Manager McCord Manufacturing Company.

The builder of automobile parts is no longer a manufacturer who blindly supplies whatever may be called for by the specifications and blueprints of his customer, but is in the position of an active department of the customers' organization, and consequently must often act in an advisory capacity. The result of this condition is shown by the testing plants and laboratories maintained by many of the parts manufacturers. For instance, the manufacturers of radiators to-day are no longer asked to build a radiator according to certain exact specifications, hut often are given merely the outline, the location of inlet and outlet castings and engine dimensions and asked to design a radiator to cool efficiently. I believe that a great deal of annoyance could be avoided if this idea were put more into practice, as it is certainly reasonable to suppose that an organization which spends its entire time on practically one subject should be better posted on this subject than the man who designs one or possibly two radiators a year. This calls for a full knowledge of not only the radiating efficiency of one's own type of radiator, but also of the various other makes in use as well as complete data relative to the entire question of cooling gasoline motors. The lack of information on these subjects even by the best posted automobile builders has been surprising, and now that there is a decided tendency toward the use of the thermo-syphon system of water circulation, the need for a thorough knowledge of the subject is greater than ever.

Another matter of great importance is the testing of the product by the parts manufacturers before delivery to the automobile makers, as nothing disrupts an organization and delays an output so much as the necessity for returning parts on account of defects, even though they may be minor ones. One of the greatest single items of expense in the production of such parts as lubricators and radiators is this item of testing, as the system maintained must be thorough and to a certain extent elaborate. A great many automobile builders would be very much surprised to know the expense of testing radiators, to make certain that they are absolutely tight before they are applied to the customer's car.

The ultimate result, of course, will be a greater degree of co operation between the motor-car builders and the parts makers, and it is plain to see that this is a most desirable condition. There are many parts which probably always will be made by factories independent of the automobile factories, as unquestionably the specializing induced by this condition permits of decidedly better results. The parts makers view the situation from this standpoint and are laying their plans and establishing their factories and organizations accordingly.

HEAVY CARS STILL MUCH FAVORED

Cleveland, Oct. 4—The growing popularity of light cars has failed to convince George J. Dunham, president of the Royal Tourist Company, that this type is superior to the heavy models, and this company will continue in 1910 to be one of the few in this country which has not brought out a car of light, or, at any rate, medium weight. The 1910 Royal Tourist, designated Model M, Series Two, will have a 5 1-2 by 6-inch motor, rated at 48.4 horsepower, and claimed to develop 65. There have been but few changes; the motor is the same, with the exception of the oiling system, which is of an improved circulating type. The hood has been lengthened and the dash is now square. Alloy steel is used for the frame, axles and gears, and by improved methods of construction it has been found possible to build a large seven-passenger car of comparatively moderate weight and capable of economical operation. Preparations are being made at the Royal Tourist factory to meet a heavy demand.

PARTS FACTORIES WILL BE ILLUMINATED AT NIGHT

By P. L. Barter, Sales Manager McCord Manufacturing Company.

The enormous and marvelously quick growth of the automobile business is a topic of interest throughout the whole country, but in Detroit the situation is more focused in the public eye than elsewhere owing to its increasing number of factories.

This situation provides a greater problem for the parts makers than for any one else in the business, due to the fact that a majority of the cars produced during the next year will be wholly or partially assembled, and that in very few cases will all the complete parts be built in one factory. There are, of course, many parts of an automobile that cannot be produced by inexperienced manufacturers, and so as a matter of fact the output of cars to a large extent will depend upon the output of the factories of the established makers of standard parts.

The ability to "deliver the goods" is the main factor in this business to-day, and it is reassuring to note that the leading manufacturers of parts have anticipated this situation by adding to their factory space and equipment to care for the increasing demand. That the "live people" are meeting the situation satisfactorily is undoubtedly true, and the wise and well-organized concerns are only taking on such business as they can actually produce.

That there will be any serious famine is doubtful, but that the parts factories throughout the country will be illuminated at night for the next twelve months is unquestionably a fact

On the whole, never has the outlook been as favorable as at present, and while there are murmurs of future disasters from the ever-ready pessimists, those who undoubtedly are closest to the great buying public tell us that the upward wave will not reach its crest for the next two or three years, and by that time the situation will have been thoroughly clarified and reduced to an ordinary basis.

The more the sane business side of this great industry is accentuated in the press and in the mouths of those composing the trade, and the less stress is laid upon its quick profits and spectacular features, the more quickly will come the result we all anticipate and desire. We believe that even the advertising should reflect a spirit of conservatism and careful business forethought, tending to more and more spread a belief in the stability of the entire industry

QUAKERTOWN'S P. O. EMPLOYS AUTOCARS

Philadelphia, Oct. 4—On Friday last the local post office authorities put into commission five Autocar motor trucks, to be used in collecting mails in the northern and western sections of the city. So promptly and thoroughly was the work done on the first two days that the postal officials are delighted. The new deal throws nine horse-drawn teams out of commission, and if the results of the first few days' operation are continued for a reasonable length of time, the motor truck collection service will be considerably extended. It is understood that the government is paying $3,000 per annum for each truck with its driver

POPE MFG. CO. REPORTS PROGRESS

Hartford, Conn., Oct. 2—The report of the reorganized Pope Manufacturing Company, of this city, shows that during the period from December 24, 1908, to July 31, 1909, the net earnings of the company have been $482,866. Under the heading of assets is listed real estate, equipment, plant and patents totaling $5,194,835. The total assets of the company approximate $6,910,414. Only the factories at Hartford and at Westfield, Mass., have been operated. A new branch of the business, the building of automobile ambulances, patrol wagons and fire equipment, has proved very profitable.

Pole Discoverer Cook Receiving Ovation in Boston

On the occasion of Dr. Cook, the successful Arctic explorer, visiting Boston to deliver his lecture at Symphony Hall, he was driven around in a Thomas car by C. S. Henshaw, manager of the Thomas Boston branch. Another Thomas followed with the reception committee. During the whole of Dr. Cook's week of lecturing he will be driven around in Thomas cars, arrangements having been made to have a car of that make meet him at each stop.

TO STOP JOY-RIDING AND RAKE-OFFS

PHILADELPHIA, Oct. 4—With a view of putting a stop to "joy-riding" and "rake-offs," a number of prominent local garage owners met last week and formed an organization under the title of Philadelphia Garage Association. Stringent by-laws were unanimously adopted, among them being one providing for a fine of $25 for any member who shall pay a commission to a chauffeur, failure to pay which subjects the offending garage to suspension from membership. Another rule provides that upon request a member will furnish to any patron a complete daily record of the movements of his car during the preceding month. An employment bureau, through which the clientele of members of the association will be furnished with competent chauffeurs upon the payment of a small fee, has also been established.

LATEST COLUMBIA SHOWS CLASSY BODY

Among the newer bodies and color schemes none shows more attractive lines than the newest product of the Columbia Motor Car Company, whose big plant at Hartford, Conn., is very busy in a quiet way turning out the rejuvenated Model 29. The latest form which this takes is the short chassis with toy tonneau, double or single rumble. All three of these are interchangeable, as the picture shows. This represents a toy tonneau, but beside it on the ground is placed a single-rumble, which may be substituted for the tonneau in the length of time it takes to tell it. This particular body was done in a light gray, striped a lighter green, and upholstered in dark green. The whole effect is very attractive, as are also all of the other color tones, most of which show a tendency towards gray and the lighter colors.

Latest Columbia is a Nattily Designed Runabout

TIRE OUTPUT WILL TOTAL THIRTY MILLIONS

"The tire output of this year will total nearly $30,000,000," declares H. S. Firestone, one of the best informed authorities on the subject, "and next year's production is expected to run between $45,000,000 and $50,000,000."

The rubber harvest has averaged an annual increase of only about 11 per cent. for several years, which is barely enough under normal conditions to keep pace with general business requirements. It is owing principally to the recent large demand and to local conditions in the rubber districts that fine Para rubber has steadily risen from 67 cents a pound in February, 1908, to the record price of $2.15 which now prevails for immediate delivery. There is very little to be had even at that price.

"Most of the rubber used comes from the Para district, up the Amazon River, where it is harvested wild, and from Ceylon, where it is gathered from extensive plantations. Some rubber comes from Mexico, Africa and parts of South America outside the Para district, but this is of inferior grade and the automobile world will eventually have to look to the rubber plantations to supply a large portion of the extraordinary amount required in the manufacture of high-grade tires."

DETROIT'S BIG LITTLE SHOW

DETROIT, Oct. 4—January 24-29 are the dates selected by the Detroit Auto Dealers' Association for the biggest little show in the country. This year, as last, the show will be held at the Wayne Pavilion, and it is planned to make it even more representative than in the past.

Those who witnessed last year's exhibition will realize that when the association announces its determination to make the forthcoming show bigger and better than ever it will have to go some. Manager E. LeRoy Pelletier last winter evolved a show that was an eyeopener even to New York and Chicago, and in point of beauty had no rival. Just what the dealers have up their sleeves is not disclosed at this time, but something new and novel is promised.

John Gillespie, one of the most active members of the local motoring colony, and well remembered by Glidden tourists and others as secretary of the entertainment committee that made life pleasant for participants in the big A. A. A. tour before leaving Detroit, will act as manager of the show.

STUDEBAKER MANAGERS CONVENE

SOUTH BEND, IND., Oct. 2—Twenty-four Studebaker branch managers spent the past week in their annual convention at this city. A tour of inspection was made through the carriage and wagon factory. This plant covers an area of two square miles and the trip covered a distance of about 24 miles. As it was impossible to make such a journey on foot, a number of Studebaker electric cars were pressed into service for use in the corridors of the buildings. In this way the trip was made in a single afternoon with ample stops for inspection. A trip was also made to Detroit to inspect the plants in which are made the Studebaker-E. M. F. and the Studebaker-Flanders and from there the party went on to Elyria, O., to see the Studebaker-Garford factory. It is said that the combined Studebaker interests will make and sell 40,000 cars during 1910.

LATEST NEWCOMER FROM DETROIT

DETROIT, Oct. 4—The Paige Detroit Motor Car Company has been organized, and it is announced that by December 1 the new car will be on the streets ready for delivery. Fred O. Paige, for some time identified with the Reliance Motor Car Company until its absorption by the General Motors Company, is president and general manager of the new concern; Willis Buhl, vice-president; Gilbert Lee, treasurer, and William B. Cady, secretary.

The company will manufacture runabouts selling for $800, and will introduce several revolutionary features. Chief of these will be a two-cycle three-cylinder motor.

Told in the Progress of the Industry

Oakland Increases Stock—Continuing the policy of the General Motors Company, as illustrated in the recent doubling of the capital stock of the Olds Motor Works, the capital stock of the Oakland Motor Car Company, of Pontiac, Mich., has been increased from $300,000 to $800,000. A question has been raised by the Secretary of State of Michigan as to whether the General Motors Company can legally do business in that state, and an investigation is being made by the Attorney-General. It is doubtful whether the laws permit holding companies to own the stock of Michigan corporations. At any rate it is contended that the state is entitled to a franchise fee from the company.

Needless to say, if this view is upheld it will have a far-reaching influence on future combinations, and this phase of the industry is of growing importance.

Tires in the L. I. Derby—Chevrolet's non-stop record in the Riverhead race was in some measure due to the performance of the Michelin tires with which his car was equipped. The first three cars to finish in the big car race, De Palma's Fiat and Disbrow's and Lund's Rainiers, were also fitted with Michelins. Only two Michelins were changed in the entire race, and those because of punctures caused by horseshoe nails. Ajax tires were used on the Maxwell cars driven by See, Costello and Doorly in the small-car class, finishing first, second and fourth, respectively. All three sets were in excellent condition at the finish, no punctures or other trouble having been reported.

Erie Hammer the One Used—In the description of the equipment of the new addition to the Rambler factory at Kenosha, Wis., in The Automobile of September 23, page 535, the name of the steam drop-forging hammer and its makers, the Erie Foundry Company, of Erie, Pa., was inadvertently omitted. This company, in addition to its extensive line of steam hammers and shearing machinery, traveling grates and stokers, makes a specialty of castings and finished automobile cylinders exceptional in character which are meeting with great demand from the manufacturing trade.

Stepney Now Makes Rims—The American Stepney Spare Wheel Company, of Chicago, is utilizing part of its new plant to turn out in quantities its improved standard clincher rims. These rims are copper-plated and are said to be considerably stronger than the usual type. A large supply is being carried on hand for immediate delivery, both in Chicago and at the New York branch, 1773 Broadway. Samples will be sent to the trade on request.

Osburn Foundries Reorganized—The Osburn Foundry Company, of Detroit, has been reorganized under the name of the Osburn Electric Company, but will continue to manufacture the same line of magnetos, batteries and coils. This move provides a broader plan, larger capitalization and better facilities. The assets of the old company have been included in those of the new, and its liabilities have likewise been assumed.

Change in Forging Company—The Lakeside Forge and Wrench Company, of Springfield, Mass., has acquired the plant of the Springfield Drop Forge Company, and began operations there with a full force of men on September 27. Eugene Childs, formerly connected with the Trimont Mfg. Co., of Roxbury, Mass., will be president and general manager of the company.

Studebaker's Foreign Log-Books—For the benefit of Americans who wish to tour in Europe, the Studebaker Automobile Company is publishing a log-book containing an illustrated description of the extensive trip recently made "on the other side" by Walter Hale. The contents include road maps, distances, and information as to taxes, passports, fees, etc.

Detroit Headquarters for "The Automobile" and "Motor Age"—H. H. Gill, advertising representative of the Automobile and "Motor Age," has opened up commodious Detroit offices in the Majestic building, which, in view of its central location, is the place of call for the fraternity at large when sojourning in Detroit.

Re-Financing of the Berkshire—The Berkshire Motor Car Company, of Pittsfield, Mass., which went into bankruptcy during the panic, has been reorganized with a capital of $120,000, and may locate in Hartford, Conn. John McQuade, the trustee, has been in that city looking over the Pope Mfg. Co.'s tube mill.

K-W Floor Space Doubled—Word comes from Cleveland that the K-W Ignition Company of that city has doubled the floor space of its plant and is preparing to manufacture its magnetos and coils in much larger quantities next season.

Inspection Tour of Studebaker Branch Managers of the Big Factory Plant at South Bend, Ind.

While apparently traveling over roofs, the cars pictured are carrying the Studebaker branch managers on a tour of inspection through the mammoth plant at South Bend, Ind. On this trip, a distance of 24 miles is covered through every floor and over a system of tramways, which run over the roofs and connect the various buildings. The cars are shown on one of the tramways.

IN AND ABOUT THE AGENCIES

New Moon Agencies—The following new agents have been appointed by the Moon Motor Car Company: Motor Sales Company, Washington, D. C.; Moon Car Agency, Tampa, Fla.; City Garage, Springfield, Ill.; Keller & Company, Edwardsville, Ill.; E. H. Wilson, Bartlett, Tex.; Duff & Company, Nebraska City, Neb.; Stearns Automobile Company, Los Angeles, Cal.; T. J. McConnell, Atlanta, Ga.; J. Wills, Des Moines, Ia.; C. L. Baker, Holyrood, Kan.; W. C. Ballard & Company, Oklahoma, Okla.; J. H. Monner, Aurora, Neb.; Hill Storage & Implement Company, Burlington, Vt.; Segerstrom Automobile Company, Minneapolis, Minn.; J. Pumphrey, Memphis, Tenn.; R. T. Jones, Ballinger, Tex.; C. Krumsick, Washington, Mo.

Oldsmobile and Oakland, Pittsburg—The Federal Motor Car Company has been appointed exclusive agent for the Oldsmobile and Oakland in Western Pennsylvania, West Virginia and Maryland, and has taken over the former quarters of the Oldsmobile Company at 5922 Baum street. J. H. McClarren is president of the company and A. M. Brown, manager.

More Hupmobile Agencies—The following sub-agencies for Ohio have been placed by C. Roy Cliugh, manager of the Columbus branch of the Charles Schiear Motor Car Company, State agents: Newark, G. D. Heisy; Springfield, L. E. Bauer; Greenville, Swope Music Company; Dayton, A. H. Pearsen, at the Central Garage.

Studebaker, Brooklyn, N. Y.—The interests of the Studebaker Companies will be looked after in this borough by the Carpenter Motor Vehicle Company, 1239 Fulton street. A number of changes have been made in the building to provide an attractive home for the Studebaker cars.

Hupmobile, Augusta, Ga.—"Ty" Cobb, the star of the Detroit ball team, has often been reported about to enter the automobile business, and this time the report seems justified. He will handle the Hupmobile at 647 Broad street.

Continental Tires, Pittsburg—The Continental Caoutchouc Company announces that its tires and rims will henceforth be handled in Western Pennsylvania by the Jos. Woodwell Company, 203 Wood street, Pittsburg.

Overland and Marion, Oakland, Cal.—Messrs. Tallman and Stephenson are to act as agents for the Overland and Marion cars, as well as for the California-built Sunset, with headquarters at 310 Twelfth street.

Pullman and Keystone, Houston, Tex.—The Imperial Motor Car Company has been organized to hold the Pullman and Keystone agencies in this city, and will locate at Prairie and San Jacinto streets.

Selden, New York City—In the future the Selden car will be handled in the metropolitan district by the Cloud-Marts Company, and a salesroom will be opened at 1871 Broadway.

Chalmers-Detroit, Burlington, Ia.—The local agency will in the future consist of John P. Sheagren and W. B. Hunt, who have also secured the agency for the Hudson runabout.

PERSONAL TRADE MENTION

E. M. West, known in trade circles as former automobile editor of the new York Times, and later as advertising manager of the Harry S. Houpt Company, has taken charge of the New York office of the H. L. Hornberger Advertising Agency, of Philadelphia. He is now located at 2010 Broadway.

Henry Goodman, for a number of years the Eastern traveling representative of the Waverley Company, has engaged with the Buick Motor Company. He will be attached to the commercial department of the New York branch.

C. C. Hildebrand, sales manager of the Stevens-Duryea Company, of Chicopee Falls, Mass., has started on a trip which will take him to the Pacific Coast. He will not return to the East until November.

R. B. Eifer, formerly salesman with the Flint Motor Car Company, of Providence, R. I., is now the Fall River, Mass., representative of Alvan T. Fuller, New England Packard agent.

D. T. Keenan has jointed the Hart-Kraft Motor Company, of York, Pa., manufacturer of commercial vehicles, as salesmanager, his appointment to take effect immediately.

George L. Bixby has entered the service of the Overland Automobile Company, of Indianapolis, as secretary to W. H. Brown, the manager of the Indianapolis factory.

Weldon A. Fosdick is now salesmanager of the Moline Automobile Company of Texas, located at Dallas. He was formerly connected with the Maxwell Company.

J. V. Carr has accepted the position of salesmanager with the Fuller Power Truck Company, of Delphos, O., manufacturer of four-wheel drive trucks.

RECENT INCORPORATIONS

Tate Gas-Electric Motor Vehicle Company, Jersey City, N. J.—Incorporated with a capital stock of $100,000, by J. L. Tate, C. E. Tate and J. L. Tate, Jr., all of Jersey City, to manufacture automobiles, motor boats and aerial machines.

The Leech Automobile Company, Trenton, N. J.—Incorporated with a capital stock of $500,000, by C. A. Bliss, of Toledo, O.; J. P. Le Fevre, Dover, Del., and C. H. Le Fevre, Smyrna, Del., to manufacture automobiles.

De Schaum-Hornell Motor Company, Buffalo, N. Y.—Incorporated with a capital stock of $150,000, by W. A. De Schaum, W. C. Paul, R. H. Lincoln and H. J. Hopkins, to manufacture gasoline motors.

Metzger Motor Car Company, Detroit—Incorporated by W. E. Metzger, B. F. Everitt and W. F. Kelly, with a capital of $500,000, of which $300,000 has been paid in, to manufacture automobiles.

Commercial Car Company, Keyport, N. J.—Incorporated by G. F. Smith, P. and W. Cherry and C. Russell, with a capital of $125,000, to manufaoture automobiles and motor boats.

Croxton-Keeton Motor Company, New York City—Incorporated by H. A. Croxton, J. P. Stoltz and W. D. Grand, with a capital of $60,000, to manufacture and sell automobiles.

Mono Motor Car Company, Elizabeth, N. J.—Incorporated with a capital stock of $300,000, by W. H. Wood, H. T. Eaton and Charles Roberts, to manufacture automobiles.

Warren Motor Car Company, Detroit—Incorporated with a capital stock of $100,000, by Homer Warren, C. R. Wilson and H. C. Walters, to manufacture automobiles.

Clark-Carter Automobile Company, Jackson, Mich.—Incorporated with a capital stock of $100,000, to manufacture automobiles.

Premier Agents, Thirty-two in Number, Representing Every Large City, Being Entertained on Sight-Seeing

GOODRICH COMPANY'S NEW YORK STORE

One of the most admirably equipped buildings for the handling of rubber products, especially tires, has just been finished by the B. F. Goodrich Company, of New York, at 1780-1782 Broadway. The structure is a notable addition to the business buildings of the neighborhood in which it stands, on Broadway next to the corner of Fifty-seventh street, and it has an ell of almost equal size at 225-227 West Fifty-seventh street, There are twelve floors and a basement. The latter is used entirely for the storage of tires. The rear of the ground or street floor is a receiving and shipping room. The front is a large salesroom. which has been very effectively done in mahogany, and green marble is also an element of the finish. It has been chosen for the counter tops and the heavy pillars that support the ceiling.

On the second floor, looking out on Broadway, is the reception room—a considerate provision for the comfort of customers who may be awaiting attention. There are large easy chairs, smoking tables and convenient writing desks. The finish here is fumed oak. A rear room is reserved for the solid tire storage and repairing. Here is a complete wheelwright and forge equipment, so that all tire fitting can be done, as well as the repair work.

The eighth floor has been given over mostly to offices for the manager and salesmen. The rear is a storeroom for the stock of mechanical rubber goods. Above, on the ninth floor, are the general offices for the clerks.

The next floor, for the company's use, is the eleventh—a large stock room for specialties such as druggists', surgeons' and stationers' rubber sundries.

On the top, or twelfth, floor are the most complete automobile tire repair facilities in the United States.

Throughout this building, seemingly, no mechanical device for the ready handling of the heavy stock has been omitted. There are special automobile elevators. One of these has the convenience of a turn-table floor. There is also a general freight lift. In addition, two passenger elevators are provided, and an electric dumbwaiter, adjusted to stop automatically at any floor.

Goodrich's New Metropolitan Home

The exterior of the building is white and green marble, with bronze capitals and decorations for the first two stories. Above this the material is pressed brick with white stone trimmings.

The combination is effective and distinguishes the building as a conspicuous achievement. W. H. Yule is general manager, with H. C. Miller in charge of the automobile tire department.

HAWS WINS RIGHT TO NAME PANHARD

In Part IV, special term of the Supreme Court of New York, Judge McCall has just rendered a very important decision. This was in the case of Geo. A. Haws versus the H. T. Alexander Company, both of New York City. The cause of the suit was the name of an oil, Haws having brought out an oil which he called Panhard. This, as brought out in the trial, was in 1901. In 1907, Alexander also brought out a Panhard oil, and was soon sued by Haws. After much litigation the case was finally settled by Judge McCall's decision, which was to the effect that Haws alone had the right to use this name in connection with lubricating oils. One very important point to the trade at large brought out by this suit is that a car manufacturer has no right to this same car name when applied to some other object or substance. This point was brought out when Judge McCall ruled out the testimony to the effect that Haws had a license from Panhard & Levassor. The judge ruled this testimony out as having no relevancy or effect. The ruling, in part, was:

"While some proof was offered on the part of the defendants to establish their prior use of the name, to say the least about it, it falls far short of the force requisite to give it any convincing power. and I believe the fact to be that the defendant did not use this designation until 1907, some three years after the plaintiff had been serving the trade with 'Panhard oil' and expending their energies and capital to establish it as a foremost factor in the trade. While I admitted the proof of the issuance of a license to defendant by the manufacturers of the Panhard car to use the name 'Panhard,' it has no relevancy to this case, and does not affect the question one way or the other. Judgment must, therefore, be rendered, granting the injunctive relief prayed for, and accounting must be rendered of the sales made by the defendant under the name 'Panhard.' Findings to be submitted."

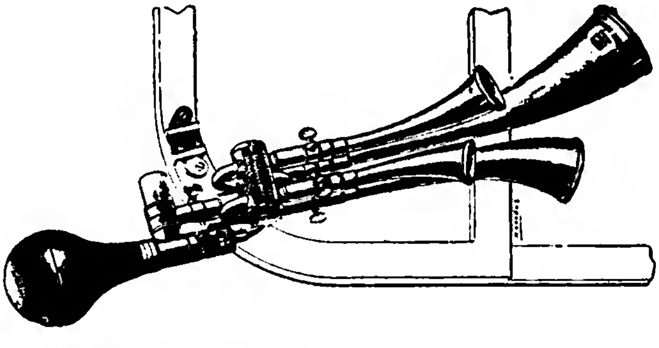
RECENT TRADE PUBLICATIONS

The New Era Gas Engine Company, Dayton, O.—The latest type of motorcycle manufactured by this company is an automobile in every respect except the number of its wheels. The bicycle pedals and saddle have been replaced by a footboard and a comfortable formed seat; the motor is started with a crank, and drives through a two-speed planetary gear. The gears and the brake are controlled by automobile-type push pedals on the footboard. The motor develops 3½ horsepower, its cylinder dimensions being 3¼ and 3½-in. bore and stroke, respectively. Wheels are 28-in. in diameter, with 2½-in. tires, and the wheelbase is 60 in. The merits of the New Era are set forth in a 16-page catalog, illustrated with clear half-tones of the machine, its motor and special features. which in turn are well explained by the text.

Trip to French Lick Springs, Ind., Upon the Occasion of the Annual Agents' Convention at Indianapolis

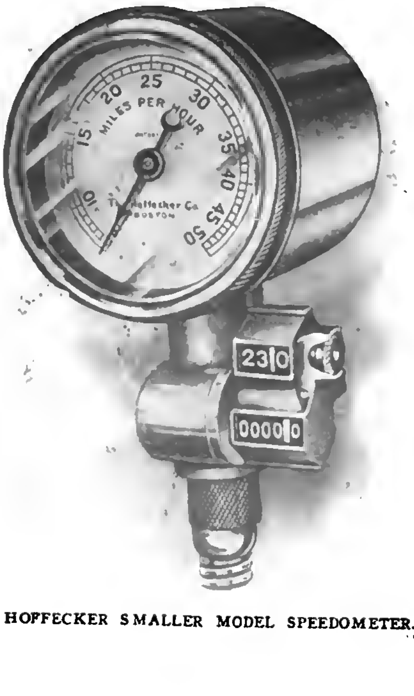
Information for Auto Users

The Musical "Testophone"—This French device is one of the latest ideas in the signaling line, and has the merit that, unlike most of the recent products in this line, its sound is really pleasing, and does not cause shivers to run up the spine of the inoffensive pedestrian. The Motor Car Equipment Company, of 55 Warren street, New York, which sells it in this country, says that it has made more friends in the short time it has been on the market here than any other device, and the friends are not numbered among the automobilists alone. Not only is it an effective warning instrument, but its bugle calls are novel and pleasing. It resembles an ordinary bulb horn in its operation, but has four reeds, each with its separate trumpet. Each time the bulb is pressed a piston arrangement actuates a ratchet wheel at the base of the horn, revolving a valve which directs the air to the various tubes in turn. The effect of pressing the bulb lightly a number of times in rapid succession is to give a fanfare closely resembling a bugle call, as the different notes of the group are sounded in sequence and sometimes in combination. The combinations can be controlled and varied at will by adjusting the valve. The horn is 26 inches in length and is finished in brass.



THE LATEST FRENCH MUSICAL HORN IS CALLED "TESTOPHONE"

1910 Hoffecker Speedometer—Still using for its watchword the phrase "The Steady Hand," the Hoffecker Company, of Boston, has brought out 1910 models of its speedometers, differing from former designs only in detail refinement. All the three styles use identically the same speed-indicating movement, which is that always known under this name. It is of the centrifugal, flying-ball governor type, in which the indicating hand is actuated through an irreversible device which prevents any movement save those caused by variations in the speed of the car. The smallest model has a 3-inch dial, graduated to 50 miles, and to save expense a Veeder odometer is used, carried beneath the dial; it registers to 100 and 10,000 miles respectively on the trip and season indicators. A larger and more expensive model has a 3 1-2-inch dial, graduated to 60 miles, and the odometer, of Hoffecker construction, is incorporated in the body of the instrument. On this the trip mileage is registered on a circular dial concentric with that indicating the speed, by means of a moving hand; the season register shows figures in the usual manner. This large instrument is also made in combination with a Chelsea clock, in a circular case similar in size and shape to that of the speedometer, and is provided with an electric light between the two dials.



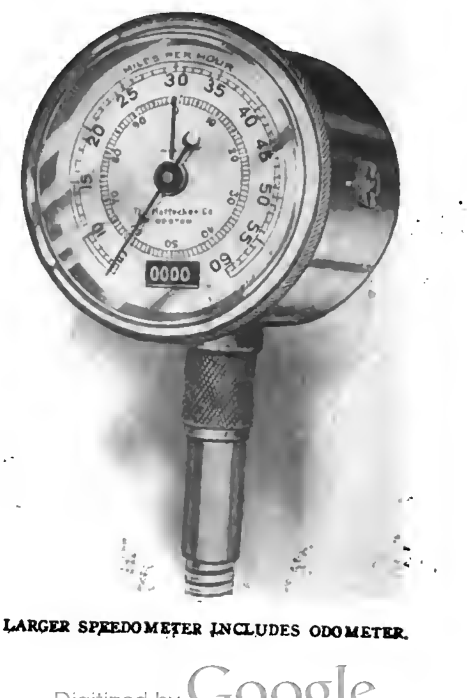
HOFFECKER SMALLER MODEL SPEEDOMETER.

Ronson Pocket Wrench—"Nine wrenches carried in the vest pocket" summarizes this clever device. With a length of 6 inches and a weight of 8 ounces one may have nine wrenches, ranging in size from 3-16 to 13-16 inch, a perfect substitute for a set which ordinarily would weigh 5 pounds and take up half a tool-box. The "Ronson" consists of four thin plates of steel, each, with jaws at either end, slotted in the middle and clamped together by a square bolt passing through the slot. By loosening a wingnut any desired member can be slid out into working position, leaving the other members to form a handle and give greater leverage. As the members must be very thin, they are made of plate steel, carefully heat-tempered. The center bolt and wingnut are drop-forged. The thinness of the members is in itself claimed to be an advantage, as it enables the wrench to be used in places where an ordinary type of wrench could not be applied. The finish is

RONSON VEST POCKET WRENCH.

nickel. Cryder & Company, Park avenue and Sixty-third street, New York City, hold the exclusive selling agency.

Carborundum Grinding Compound—Formerly carborundum powder has only been available in the dry state, and when used for grinding in valves it has been necessary to mix it with oil or grease. Naturally, the mixture was often done by guesswork, and the results were not always what may have been desired or expected. To obviate this objection the Carborundum Company, of Niagara Falls, N. Y., which makes carborundum powder, grinding wheels, etc., has brought out a ready-to-use valve grinding compound, which consists of a suitable grade of carborundum powder mixed in the proper proportion with a high-grade grease. The compound is put up in a handy little case, which contains two collapsible tubes, one of coarse compound and one of the finer grade, and also a package of carborundum cloth strips for cleaning vibrator and contact points, and a book of carborundum cloth for general use. For those who have acquired some degree of skill in the mixing process and wish to mix their own compound, another kit is offered, containing two quarter-pound cans of dry powder, coarse and fine, as well as the cloth strips and book. It is claimed that the work can be done with this material quicker than with glass or emery, and that a better valve seat is secured.



LARGER SPEEDOMETER INCLUDES ODOMETER.

Vol. XXI New York—Thursday, October 14, 1909—Chicago No. 16

THE AUTOMOBILE

Robertson Again Wins Fairmount Race

Robertson—Trophy—Smile

OFFICIAL ORDER OF THE FINISHING QUINTETTE			
Pos.	Car	Driver	Time
1	Simplex, 90 h. p.	Robertson	3:38:58-8-10
2	Chalmers-Detroit, 40 h. p.	Dingley	3:44:20
3	Apperson, 50 h. p.	Harding	3:52:17-7-10
4	Chadwick, 60 h. p.	Parkin	3:55:31-2-10
5	Isotta, 40 h. p.	Strang	3:56:54-4-10

PHILADELPHIA, Oct. 9—George Robertson is thoroughly at home in Fairmount Park. To-day, driving a 90-horsepower Simplex, he scored from a representative field in the 200-mile stock chassis race. A year ago, with a 40-horsepower Locomobile, the same intrepid driver appropriated honors which he appreciates with a characteristic modesty that adds to his widespread popularity. Robertson has become the American Nazzaro, and it would be most interesting if he were to meet the coolheaded Italian in a motor-driven battle for the world's championship. Such a race would be worth the watching.

True it is that in to-day's race Robertson had a Simplex speed craft possessed of twice the power of Dingley's Chalmers-Detroit, which finished second, but the fact remains that the pilot of the larger car did his work in a brilliantly capable manner.

Some five minutes behind Dingley came Harding with a well-driven Apperson "Jack Rabbit," while the Chadwick, with the younger and elder Parkin aboard, had a rattling good battle with Strang—once more on an Isotta—for fourth place, the six-cylinder from Pottstown proving the victor.

In addition to the honors which go along with an impressive win under such favorable conditions, Robertson annexed $2,500 in gold and the $1,000 MacDonald and Campbell trophy. Dingley captured $1,250 in gold and a gold chronometer for the most consistent work. Along with third place Harding gathered in $750, while the plucky work of "Joe" Parkin against a past master in the art of driving brought him in $500 in the yellow metal. This youngster was one of the race's surprises.

Robertson's victory is a great personal triumph, inasmuch as the Fairmount Park eight-mile circuit is what might be termed a "driver's course." There are no long straightaways on which a big, powerful car can be opened wide and thus mow down its less powerful competitors. Every car in to-day's race was

90-Horsepower Simplex (Robertson) That Won the Contest Had Speed in Plenty capable of a mile-a-minute speed or better, but such a clip, if maintained over the sinuosities of the Park roads that composed the course, would soon bring to grief the driver who attempted it. Robertson averaged about 55 miles an hour, but withal nursed his car so carefully that he was compelled to stop but once to remedy minor trouble and once for supplies. The fact that he guided a Locomobile to victory over the same course last year would seem to bear out the claim that it was a Robertson rather than a Simplex victory.

Philadelphia and the Quaker City Motor Club to-day set a mark in big race management which other promoters may aim to approach; they can hardly excel it. Eighteen hundred policemen, 120 flagmen and umpires, a big corps of doctors and nurses with all the paraphernalia of their craft, and miles and miles of rope made for the public safety. The whole problem of course-guarding was directly under the eye of Mayor Reyburn and the Department of Public Safety, with Superintendent of Police Taylor doing the action stunt. That they succeeded in their task was manifest, for the accidents in that mighty crowd, where accidents were to he expected, were few and far between, and even those that did occur were of a minor variety.

The only accident to a racing man came in the 8th lap when American, No. 12, Hayes, driver, was negotiating the combination S-hairpin at Sweet Brier Mansion. The car skidded to the right and then to the left, landing heavily against one of the ubiquitous telephone poles without which no course seems complete. Hayes shut off and held to the wheel, managing to stay with the car when the crash came. Mechanician A. H. Johnson went ahead when the car stopped and landed on his head and shoulders in the grass. He was merely stunned, however, and in a couple of minutes, with the aid of the Red Cross artists who were on the scene in a jiffy, he and Hayes were walking cross-country to the main stand.

Malin Leinau, driving Acme, No. 7, missed serious trouble at the same point by quick work and a little luck. His speed carried him so far to the side of the road that the car mounted the gently shelving bank, and ran on the grass for fifty yards, passing between the scattered trees and reaching the road some distance below. On a later lap the Acme shed a tire at the foot of the same slope, and had to stop directly in the path of the others while the crew fitted another to the wheel.

The Selden, No. 23, broke a wheel on the same S-hairpin on the first lap and lost over half an hour.

The Acme furnished a sensation on the 12th lap, when the right rear tire came off directly in front of the upper end of the long grand stand. The tire flew 30 feet into the air and in its descent struck a small boy who was watching the run from one of the pits in front of the stand. He was merely stunned, but was carried off by one of the official Red Cross cars in a jiffy.

It was a day for the four-cylinder car and one for the light-weight and small-horsepower machine. The "40" Chalmers, runner-up to the "90" Simplex, had scarcely half the latter's piston displacement, and it took a 710-cubic inch Chadwick to beat the 490-cubic inch Isotta by a minute. Both these cars also made wonderful average laps, the Isotta not varying over 29 seconds, while the Chalmers' greatest variation, barring the first two laps, was 50 seconds. Only fourth place was taken by a "six"; first, second, third and fifth went to four-cylinder machines. The following were the four and six-cylinder machines entered:

No.	Four-Cylinder	H.P.	No.	Six-Cylinder	H.P.
2	Simplex	90	2	Thomas	70
2	Chalmers-Detroit	40	2	Chadwick	90
2	American	60	1	Acme	60
2	Buick	30	1	Palmer & Singer	60
1	Benz	60	1	Alco	60
1	Apperson	60	2	Welch	70
1	Columbia	32	1	Lozier	50
1	Isotta	45			
1	Selden	36			
13			10		

The average speed of the first five cars was higher than that of last year's winner. No. 4 Simplex averaged 55.4 miles per hour; No. 5 Chalmers, 54.2; No. 8 Apperson, 52.2; No. 18 Chadwick, 51.4; No. 17 Isotta, 51.3. The Locomobile last year did 50.1.

Not only were the average speeds very much greater, but the lap speed of some of the cars was nothing short of wonderful, if the timing was correct. (Needless to say, the method used did not impress old timers as very satisfactory.) Zengle in the Chadwick made a lap in 7:41, or at a rate of 63.3 miles per hour, and with it came $100 in gold. Next came the big Simplex with 62.9 miles per hour. Following these closely came Dingley with a lap at 62.3. The fourth best was Betz with the other Simplex, 61.5.

This is only part of the story, however, for although the first two cars, Nos. 16 and 4, had the largest motors in the race, No. 5 had one of the smallest. The piston displacements were:

No.	Car	Driver	Cu. In.	Finish
16	Chadwick	Zengle	710	Out
4	Simplex	Robertson	672	First
5	Chalmers	Dingley	373	Second
1	Simplex	Betz	672	Out
8	Apperson	Harding	596	Third
18	Chadwick	Parkin	710	Fourth
17	Isotta	Strang	490	Fifth

This shows that the Chalmers, with 55 per cent. the displacement of the Simplex, was able to almost hold its own with the larger car. In addition, because of its smaller motor, it did not have to stop for fuel during the race. Because of its light weight it was not necessary to stop for tires—in fact, Dingley never made a stop during the race. The consistency prize, a gold watch, offered by the Autolight Company, went to this combination of man and machine. Robertson only stopped once, on the fourteenth lap, to replenish his fuel supply and change tires. There was some talk of protesting the Simplex on the ground that it was not stock. Later it was given out that the Chalmers-Detroit had decided not to force the issue.

To Strang and the Isotta should go the credit of making the most consistent run of all the cars. At no time during the race, except when he stopped for fuel on the eighteenth lap, did the Isotta's time vary over 29 seconds. His slowest lap was 9:31; his fastest 9:02. In all races in which Strang has piloted an Isotta car he has made just this consistent running.

The first five cars were equipped with Michelin tires. Robertson and Harding made but one change, and that when they stopped for fuel supplies.

HOW THE RACE WAS FOUGHT BY LAPS

Lap 1—It was evident that there was to be no waiting game played, for all the favorites let their cars out to the limit from the jump—Robertson in the Simplex, Chevrolet in the Buick, Drach in the American, and Zengle in the Chadwick, all doing the lap under 9 minutes—in 8.33, 8.40, 8.44 and 8.50 respectively—with Dingley's Chalmers third and William's Palmer-Singer fifth and sixth respectively. Selden, No. 23, threw a tire at Sweet Brier Hill, less than a mile from the start, and lost 35 minutes. Burman's Buick, No. 9, was not working right, and he finished the lap among the tail-enders. Haupt in the Thomas, No. 6, Leinau in Acme, No. 7, and Harding in the Apperson, No. 8, also had trouble with tires on the initial round, and lost valuable ground. Seymour, on the back stretch, near Neill Drive serpentine, broke his water pump and dropped out then and there, failing to complete first lap.

Lap 2—Chevrolet jumped his Buick into the lead, with 39 seconds advantage over Robertson, who was sharing third place with Drach in the American, and 32 seconds ahead of Zengle in the Chadwick, who had crawled up into second place. Reports of continued tire trouble came flashing in from Benz, No. 3, Willie Haupt's Chadwick and Leinau's Acme, the trouble occurring in each instance far from the pits, and resulting in additional delay. Dingley was still in fifth place, but by a closer margin, and Parkin has brought his Chadwick up into sixth position, displacing Wallace's Palmer-Singer, which dropped a notch.

Lap 3 saw Chevrolet still in the lead, but by the small margin of three seconds over Robertson, who had an advantage over Drach of 46 seconds. Zengle dropped back to fourth position, eight seconds behind Drach, with Dingley still fifth and his team-mate, Lorimer, in Chalmers-Detroit, No. 19, coming up rapidly from 9th place to 6th. Strang in Isotta, No. 17, first began to show prominently on this round, coming up from 10th to 7th position, and trailing the Chalmers pair closely. The Quaker brewers, Bergdoll and Betz, in the Thomas and Simplex respectively, were having a battle all to themselves, occupying 8th and 9th positions, and being separated by a margin of but five seconds. The former's brother, Erwin, in the Welch, No. 20, failed to register the third lap, having been reported in trouble with his engine on the Neill Drive; he later retired. Coffey's Columbia, No. 14, also developed a loose rear construction, and also withdrew.

Lap 4—Robertson came back to his own on this round, Chevrolet's engine misbehaving sufficiently long to relegate him to 15th place, while Drach and Dingley moved up into 2d and 3d places respectively, but with a margin of nearly 1½ and 3 minutes separating them from the leader, thanks to "Robby's" record 7.44 in the previous round. Amateur Betz, in Simplex, No. 1, crawled up into 4th place, the local man's effort being greeted with cheers.

kept grinding out laps that averaged around 8.35, a short stop in the 11th round, when Zengle came within 14 seconds of him, being followed on the 13th with a thrilling 7.31, which increased his margin of lead by over a minute. In the unlucky 13th round Zengle also opened 'er up and set the stands rocking with a 7.31 circuit; but he must have pushed matters too strenuously, for it was three-quarters of an hour before he reappeared at the tape, magneto trouble developing and delaying him continuously.

During this period Dingley kept ding-donging along at a most beautifully even pace, without a stop for anything, supplies and tires seeming apparently to be unheard-of things in the Dingley lexicon. The margin of time separating him from the leaders seldom varied more than a minute, and the Chalmers kept on in the "even tenor," etc., in a manner that boded ill for falterers.

The plucky driving of Amateur Betz during this period brought him a big hand every time he sent his big yellow Simplex past the stands. He tore off a 7.54 on the 11th round, just to show what he could do. At the end of the 13th round he was a trifle over 7 minutes behind Robertson, going like an electric fan. Strang kept his Isotta within striking distance, and if anything happened it was evident that he would have to be reckoned with.

Dingley's 40-Horsepower Chalmers-Detroit Which Finished a Convincing Second

Strang also improved his position, climbing to 5th place, Zengle dropping to 7th and letting Bergdoll, another local favorite, in ahead of him. Engine trouble was reported as the cause of Zengle's slow-down. Parkin, still another Quaker favorite, who had dropped to 11th on the previous round, moved up to 9th place, right behind Hayes in the American Roadster, who had also improved his position from 12th to 8th place. Haupt's Thomas, No. 6, was reported down and out with engine trouble.

Lap 5 saw Robertson still in the lead, but with Zengle, by virtue of a phenomenal round in 7.40, flashing into the place, with but a trifle over a minute separating him from the leader. Dingley was still third, by a similar margin, while Brewer Betz was ousted from his hold on 4th place by Strang, but by the margin of but one brief second. Bergdoll still occupied 6th position, with Drach, who had to stop at the pit, in 7th place as a result of the five-minute lay-over. Chalmers-Detroit, No. 19, was reported at the filter plant with a broken frame, and was later announced as withdrawn. The Parker Chadwick nosed out the American Roadster, No. 12, for 8th position, the latter leading Harding's Apperson by exactly one minute.

Lap 6—There were no changes in the relative positions of the three leaders, although Zengle had gained 24 seconds on Robertson during the round, with Dingley 2.01 behind the Chadwick. Betz regained fourth place from Strang and led him by 33 seconds at the wire, with Bergdoll's Thomas, Drach's American and Parkin's Chadwick retaining their respective positions.

Laps 7 to 13—For seven laps the positions of the leading quintet remained unchanged. With the regularity of clockwork Robertson

During these seven laps the Parkin Chadwick, Harding's Apperson and the Drach American were having a triangular battle for 6th, 7th and 8th places, the completion of the 13th lap showing them placed in the order named. On the 7th lap Hayes' American, No. 12, was eliminated by a telephone pole into which it skidded on the back stretch, breaking both front wheels and otherwise damaging the car. The following lap witnessed the departure of Leinau's Acme, after a series of disheartening delays due to engine trouble. The same cause was announced as being responsible for the disappearance of Chevrolet's Buick from the course in the 12th lap.

Laps 14 and 15—With Zengle's troubles in the 14th round came a move up for Dingley and Betz, this pair dropping into 2d and 3d places, about 6 and 8 minutes, respectively, behind Robertson. Parkin jumped ahead of Strang just here, and it was a peculiar coincidence that throughout the race, almost from the start, these two were within striking distance of each other, the margin separating them rarely being much more than a minute, except on those occasions when one or the other stopped for supplies. Both cars ran most consistently. Apperson moved up into 6th place on the 14th round and Wallace, in the Palmer-Singer, who had been going sweetly, swung in back of him on the 15th circuit.

Laps 16, 17 and 18—Nothing now apparently being able to dislodge Robertson and Dingley from their positions except serious trouble of some kind, interest in the race was centered in the struggle for 3d place between Harding, Parkin and Strang. The latter looked good to the crowd when he finished the 16th circuit in

Pressmen and Officials Found Working Conditions Somewhat Difficult in the Muchly Crowded Stand

the coveted position and retained his advantage in the next two rounds; but it was evident that the slightest delay for any of the trio would put the others ahead of him, and so it proved. At the end of the 16th round Zengle, whose plucky fight with the leader had won him hosts of sympathizers, finally withdrew his Chadwick, a broken water connection being the last straw. The 18th circuit also witnessed the withdrawal of the last hope of the Buick contingent, Burman's long delay in the 8th round having put him so far in the rear that it was evident that he hadn't a ghost of a chance. This left but nine cars in the race.

Laps 19, 20 and 21—Robertson and Dingley during this period opened still wider the gap separating them from the others, although neither of them took any chance which might dislodge him from his position, Robertson averaging about 8.40 and Dingley around 8.50, and playing 'em safe at all times. Harding and Parkin pried Strang out of his place in the 19th, but the Chadwick man was in turn dislodged by the Isotta on the 20th circuit, which advantage was retained through the next round, although Strang could not make up any of the nearly three minutes or more by which Harding led him at the end of the 19th. Betz's Simplex was taken out of the race at the conclusion of the 20th round for no apparent reason, for the car was moving sweetly.

Laps 22 to 25—At the end of the 22d circuit Joe Parkin dislodged Strang from 4th position, which was being fought for savagely, for it meant $500 in gold to the driver who landed it. The Chadwick man led by but 24 seconds, but in each succeeding lap to the end of the race he added a little to his lead until at the flag he had nearly a minute and a half on the Isotta. Robertson, Dingley and Harding were too far ahead for Parkin to care to do anything more than hold his own, and the race finished with the positions unchanged in the last four laps. When the crowd finally overflowed the track, Drach's American, No. 2; Howard's Benz, No. 3; Wallace's Palmer-Singer, No. 10, and Youngs' Selden, No. 23, were also pegging away, the latter having finished its 17th lap, the Benz its 21st, the American its 20th and the Palmer-Singer its 24th

RECORD OF EACH CAR'S FASTEST LAP

No.	CAR	Driver	Mechanic	Lap	Time	M.P.H
15	Chadwick	Len Zengle	Paul Dunlap	5th	7:41	63.3
4	Simplex	Geo. Robertson	Glen Ethridge	3rd	7:44	62.9
5	Chalmers-Detr't	Bert Dingley	H. E. Richard	2nd	7:48	62.3
1	Simplex	J. F. Betz, 3rd	Theo. Tompkins	11th	7:54	61.5
8	Apperson	H. L. Harding	W. W. Clifton	16th	8:07	59.8
9	Buick	Robert Burman	J. J. Grennon	2nd	8:07	59.8
13	Buick	Louis Chevrolet	Joe Nelson	3rd	8:19	58.3
10	Palmer-Singer	W. Wallace, Jr.	Chas. Nauber	23rd	8:24	57.9
3	Benz	E. R. Bergdoll	F. Johnson	11th	8:27	57.6
2	American	Robert Drach	Joe Kachline	*3rd	8:30	57.2
19	Chalmers-Detr't	L. B. Lorimer	Thomas Kirker	2nd	8:36	56.5
18	Chadwick	J. Parkin, Jr.	J. Parkin, Sr.	18th	8:50	55.1
20	Welch	Charles Howard	E. Stecker	2nd	8:59	54.1
17	Isotta	Lewis Strang	Leo Anderson	3rd	9:02	53.8
12	American	E. O. Hayes	A. H. Johnson	1st	9:03	53.8
15	Thomas	L. J. Bergdoll	Joe Turner	2nd	9:04	53.2
7	Acme	Malin Leinau	Robert Argue	6th	9:09	53.1
23	Selden	Charles Youngs	Joe Harrigan	17th	9:17	52.1
14	Columbia	John J. Coffey	John Kowalker	1st	12:47	37.9
6	Thomas	Willie Haupt	Thomas Wilkie	1st	14:59	32.4

*16th lap completed in same time as third.

HOW THE LEAD WAS HELD IN THE FAIRMOUNT PARK RACE — ROBERTSON IN FRONT EXCEPT IN TWO LAPS

No.	CAR	Driver	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4	Simplex	Robertson	1	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	Chalmers-Detroit	Dingley	5	5	5	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2
8	Apperson	Harding	17	14	13	10	10	10	10	8	8	9	8	7	7	6	6	4	4	4	3	3	3	3	3	3	3
18	Chadwick	Parkin	7	6	11	9	8	8	7	7	7	6	6	6	6	4	4	5	5	5	4	5	5	4	4	4	4
17	Isotta	Strang	11	10	7	5	4	5	5	5	5	5	5	5	5	5	5	3	3	3	5	4	4	5	5	5	5
10	Palmer-Singer	Wallace	6	7	10	11	11	11	11	9	9	8	9	9	9	8	7	7	7	7	7	7	6	6	6	6	
3	Benz	Howard	13	15	16	14	13	13	13	11	11	11	10	10	10	10	8	8	8	8	8	8	7				
1	Simplex	Betz	9	11	9	4	5	4	4	4	4	4	4	4	4	3	3	6	6	6	6	6					
2	American	Drach	3	4	3	2	7	7	6	6	6	7	7	8	8	7	11	11	10	9	9	9					
9	Buick	Burman	19	17	14	12	12	12	12	13	13	13	12	11	11	11	10	10	9								
23	Selden	Youngs	20	20	18	17	16	16	16	14	14	14	14	13	12	12	12	12	11								
16	Chadwick	Zengle	4	2	4	7	2	2	2	2	2	2	2	2	2	9	9	9									
15	Thomas	L. Bergdoll	8	8	8	6	6	6	8	10	10	10	13	12													
13	Buick	Chevrolet	2	1	1	15	14	14	14	12	12	12	11														
7	Acme	Leinau	16	16	17	16	15	15	15	15																	
12	American	Hayes	15	12	12	8	9	9	9																		
19	Chalmers-Detroit	Lorimer	10	9	6	13																					
6	Thomas	Haupt	18	19	15																						
20	Welch	E. Bergdoll	14	13																							
14	Columbia	Coffey	12	18																							
22	Lozier	Seymour	21																								

SECOND ANNUAL FAIRMOUNT PARK STOCK CHASSIS RACE, PHILADELPHIA, OCT. 9, 1909 (DISTANCE: LAP 8.1 MILES, TOTAL 25 LAPS, 202.5 MILES.)

No.	Car and Driver	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	M.P.H.
4	Simplex Robertson	9:18 9:18	17:40 8:22	25:24 7:44	33:55 8:31	42:25 8:30	50:57 8:32	59:31 8:34	68:09 8:38	76:55 8:46	85:31 8:36	94:17 8:46	102:52 8:35	111:23 8:31	120:00 8:37	131:45 11:45	140:30 8:45	149:08 8:38	157:52 8:44	166:32 8:40	175:04 8:32	183:41 8:37	192:19 8:38	201:07 8:48	209:55 8:48	218:58 4/5 9:03	55.4
5	Chalmers-Detroit Dingley	10:12 10:12	18:00 7:48	26:57 8:57	36:28 9:31	44:47 8:19	53:46 8:59	62:50 9:04	71:50 9:00	81:01 9:11	89:56 8:55	98:54 8:58	107:57 9:03	116:53 8:56	125:54 9:01	134:52 8:58	143:49 8:57	152:48 8:59	161:49 9:01	170:41 8:52	179:46 9:05	188:34 8:48	197:30 8:56	206:23 8:53	215:24 9:01	224:20 0:06	54.2
8	Apperson Harding	13:18 13:18	23:06 9:48	32:55 9:49	41:27 8:32	50:38 9:11	59:45 9:07	68:51 9:06	78:02 9:11	87:35 9:32	96:33 8:58	105:30 8:57	114:33 9:03	123:29 8:56	133:10 9:41	141:17 8:07	150:03 8:46	158:53 8:50	167:54 9:01	178:34 10:40	187:38 9:04	196:38 9:00	206:34 9:56	214:26 9:52	223:13 8:47	232:17 7/10 9:04	52.2
18	Chadwick Parkin, Jr	9:13 9:13	18:12 8:59	29:11 10:59	40:01 10:50	49:04 9:03	58:05 9:01	67:10 9:05	76:17 9:07	85:14 8:57	94:11 9:57	103:05 8:54	111:56 8:51	120 47 8:51	129:45 8:58	13853 9:08	153:08 14:15	162:00 8:52	170:50 8:50	180:06 9:16	190:39 10:33	199:38 8:59	208:33 8:55	217:33 9:00	226:30 8:57	235:31 3/10 9:01	51.4
17	Isotta Strang	9:30 9:30	18:38 9:08	27:40 9:02	37:00 9:20	46:29 9:29	55:39 9:10	65:10 9:31	74:25 9:15	83:45 9:20	92:59 9:14	102:16 9:17	111:37 9:21	120:45 9:08	130.09 9:24	139:27 9:18	148:38 9:11	157:53 9:15	167:01 9:08	180:48 13:47	190:04 9:16	199:33 9:29	208:57 9:24	218:00 9:12	227:30 9:21	236:54 4/10 9:24	51.3
10	Palmer-Singer Wallace, Jr.	9:28 9:28	19:18 9:50	28:28 9:10	41:30 13:02	51:05 9:35	60:20 9:15	69:41 9:21	79:18 9:37	88:49 9:31	98:24 9:35	108:15 9:51	117:28 9:13	127:23 9:55	144:20 16:57	153:39 9:19	162:32 8:53	171:32 9:00	182:37 11:05	191:31 8:54	200:20 8:49	209:09 8:49	217:59 8:50	226:41 8:24	237:15 10:34	Still running.	
3	Benz E. R. Bergdoll	10:36 10:36	23:32 12:56	51:06 27:34	60:54 9:48	70:46 9:52	80:28 9:42	90:47 9:19	100:41 9:54	110:37 9:56	121:06 10:29	129:33 8:27	141:04 12:31	150:31 9:27	160:31 10:00	170:30 9:59	180:24 9:54	190:22 9:58	200:20 9:58	210:19 9:59	220:25 10:06	230:31 10:06	Still running.				
1	Simplex Betz, 3rd	9:36 9:36	18:41 9:05	27:50 9:09	36:53 9:03	46:30 9:37	55:06 9:36	68:12 9:06	73:15 9:03	82:22 9:07	92:32 10:10	100:26 7:54	109:50 9:24	118:51 9:09	127:51 9:00	136:51 11:00	156:01 9:10	164:51 8:50	173:40 8:49	182:30 8:50	191:30 9:00	Broken pump.					
2	American Drach	8:59 8:59	17:40 8:41	26:10 8:30	35:25 9:15	48:37 13:12	57:51 9:14	66:57 9:06	77:06 9:09	85:11 9:05	94:18 9:07	103:25 9:07	115:10 11:45	124:22 9:12	141:54 17:32	189:49 48:55	199:19 8:30	208:46 9:27	218:10 9:24	227:30 9:20	231:01 9:31	Difficulties resulting from displacement auxiliary gasoline tank.					
9	Buick Burman	20:20 20:20	28:27 8:07	36:42 8:15	45:15 8:23	53:36 8:21	62:12 8:36	70:37 8:25	114:50 44:13	123:31 8:41	131:56 8:22	146:25 14:32	155:04 8:39	163:34 8:30	175:[illegible] 8:20	[illegible]6 [illegible]52	193:42 8:56	205:59 12:17	Leaky radiator.								
23	Selden Youngs	45:48 45:48	59:15 13:27	70:52 11:37	80:25 9:33	100:22 19:57	110:48 10:26	121:12 10:24	133:24 12:12	143:58 10:34	154:16 10:28	164:41 10:25	175:03 10:22	185:49 10:46	201:50 16:01	211:11 9:21	220:28 9:17	Still running.									
16	Chadwick Zengle	8:50 8:50	17:34 8:44	26:18 8:44	35:57 9:39	43:37 7:41	51:45 8:08	60:55 9:10	69:40 8:45	78:27 8:47	87:00 8:33	95:31 8:31	105:10 8:39	114:41 9:31	158:00 43:19	171:56 13:56	182:07 10:11	Still running.									
15	Thomas L. J. Bergdoll	9:24 9:24	18:28 9:04	27:45 9:17	37:16 9:31	46:59 9:43	56:27 9:28	67:13 10:46	82:15 15:02	92:39 10:24	103:04 10:25	147:52 43:48	164:21 16:29	Defective water circulation.													
13	Buick Chevrolet	8:40 8:40	17:02 8:22	25:21 8:19	67:56 42:35	76:59 9:03	86:12 9:13	95:19 9:07	104:25 9:00	113:30 9:05	122:35 9:05	131:40 9:05	Broken inlet valve.														
7	Acme Leinau	14:53 14:53	27:44 12:51	53:56 26:12	70:06 16:10	80:47 10:41	89:56 9:09	118:12 28:16	185:15 67:03	Engine trouble.																	
12	American Hayes	9:03 9:03	19:42 10:39	29:15 9:33	38:39 9:24	49:38 10:59	58:17 9:39	68:11 9:54	Hit telephone pole.																		
19	Chalmers-Detroit Lorimer	9:55 9:55	18:31 8:36	27:36 9:05	45:38 18:02	Broke frame.																					
6	Thomas Haupt	14:59 14:59	36:20 21:21	47:19 20:59	Engine trouble.																						
20	Welch Howard	10:44 10:44	19:43 8:59	Engine trouble.																							
14	Columbia Coffey	12:47 12:47	31:02 18:15	Injured in collision with another car.																							
22	Lozier Seymour	Broke water pump.																									
11	Alco Grant	Steering control injured in practice; did not start.																									
21	Welch Hall	Did not start.																									

NOTE—Comparing the winner's time and average with the time and average of the same man, winner last year, although driving a different make of car, gives some idea of the progress made in the last year by the various drivers. Just a year ago, Robertson, driving a Locomobile "40," went the distance, then 195 miles, in the time of 4 hours, 2 min. 30 sec., which was then considered very good. This averages to 48.27 miles per hour as compared with Robertson's time this year, which works out 55.9 miles per hour. The whole advantage of 7.63 miles per hour average cannot be ascribed to improvement in construction, as the past has been a year in which the majority of constructors have "stood pat." So, too, with the fastest lap. Last year, Seymour, driving a Lozier, completed his tenth circuit of the 7.8 miles course in 8:32. This year Zengle, at the wheel of a Chadwick, carried off the honors with 7:41 for the 8.1 miles. The assumption almost forces itself upon one giving this thought that the drivers are much faster than other and previous years.

Harding's Handling of the 60-H.P. Apperson Gave the "Jack Rabbit" Third Place

Parkin, Junior, and Parkin, Senior, Capably Piloted the Big Chadwick "Six"

Strang Looked Familiar at the Wheel of the Isotta, and Finished Fifth

SOME RACE GOSSIP

Robertson's one stop at the end of the 13th lap, gave the stands an opportunity to witness action. Robertson was not fairly out of his seat before the Simplexites were all over the car. There was system in the apparent confusion, though, and "Robby" was sent on his way with an encouraging cheer echoing behind him. But the "real goods" in quick action was afforded by the Appersonians, whose pit was almost directly opposite the press stand. Harding, for one reason or another, seemed to stop more often than any of the real contenders. At one stop a new tire was put on and tanks filled in a trifle over one minute.

No. 21, the Welch car that was to have been driven by Al. Hall, did not start, as Hall, who had been arrested earlier in the week for disregarding the signals of the "coppers" and assault on an officer, was disqualified by the contest committee of the Quaker City Motor Club for failure to live up to the practice rules. His $500 entrance fee was returned, and he and his pretty wife, who is the sister of the Bergdoll boys, who drove No. 15 Thomas and No. 20 Welch, and for whom Hall was formerly chauffeur, witnessed the race from the grand stand.

That Job of Starting — Thursday night previous to the race a movement was started by some one among the drivers to depose G. Hilton Gantert from the starter's position on the grounds of inexperience and trade alliances. A "round-robin" was circulated among the drivers, pretty generally signed, and presented to the race committee. As Mr. Gantert is the Q. C. M. C.'s official starter the club refused to impugn his integrity, especially in view of the fact that no representative of the cars he handles was in the race. "Wag," however, served as associate referee.

A big smoker in the huge banquet hall of the Hotel Walton wound up the festivities, at which Mayor Reyburn and all the celebrities were present, including the winning drivers, who were after their plunder. The possible filing of a protest by the Chalmers - Detroit people against the Simplex necessitated the calling off of the distribution, which was to have been one feature of the symposium. The prizes will be given out Thursday night at Keith's Theater, providing there is nothing further turns up to interfere with plans of the management.

Among the out-of-town automobilists who toured from New York to the race was a large contingent from J. M. Quinby & Company, which has recently taken over the Isotta Import Company of New York. The party came, hoping to see Louis Strang celebrate the return to his first love with a victory not unlike the four successive ones of a year ago. In the Quinby party were: President W. W. Ogden, Vice-President Emerson Brooks, Sales Manager Rockett, Claude Hamilton and Charles G. Percival, publicity manager.

WHY SOME CARS DIDN'T PERFORM BETTER

No. 9 Buick stopped at the pits on the second lap to change spark plugs and repair a badly leaking radiator. Large quantities of flaxseed were poured into the radiator in the vain endeavor to stop the leakage. Finally Burman withdrew on this account, it being impossible for him to continue in the race and make any kind of a showing.

Both Willie Haupt, driving No. 6 Thomas, and Chevrolet, driving the Hoodoo No. 13 Buick, broke inlet valves. Haupt replaced his, but Chevrolet had to drop out, as the broken valve punched a hole in the cylinder.

Bergdoll's No. 15 Thomas had such a chronic case of overheating that he finally had to withdraw, this being all that could be determined as to his failure.

Drach, driving an American bearing the same number as at Lowell, No. 2, while making good time for the first few laps, finally had mechanical difficulties which put him out of the race. His first stop was to replace a rear auxiliary air valve. This was followed by the loosening of his auxiliary gasoline tank. The feed pipe unions to the carbureter cracked because of the displaced tank and Drach had considerable difficulty in bringing the car to the pits. After another unsuccessful attempt to fix up the feed pipe the car was withdrawn.

The other American, driven by Hayes, met with disaster at Sweet Brier hill. Hayes stated that first one and then the other rear tire gave way when he set his brakes. The reaction threw the car into the ditch. As it was, Hayes experienced great difficulty to keep from hitting the telephone pole head-on.

This Photograph Was Taken Just as No. 12 American, E. O. Hayes Driving, Punctured and Swung Into a Telephone Pole

No. 10 Palmer & Singer made a good showing, considering that Wallace had to drive the major portion of the race with a broken universal joint.

No. 3 Benz broke an exhaust valve on the third lap and stopped at the pits to replace it. It continued in the race after making the replacement, although hopelessly behind.

The Acme was very unfortunate, having almost no mechanical trouble, but its slow speed was due to continuous tire trouble. The rims would constantly become loose, and the difficulty was finally found to be the use of 4 1-2-inch tubes in 5-inch covers.

Coffey, driving No. 14 Columbia, gave the reason for his accident. Parkin, Senior, also verified the tale. The big Chadwick made a bad skid when turning into City Line avenue, and Coffey, in order to avoid crashing into the Chadwick, tried to go outside between a tree and the car. His rear axle struck the tree and simultaneously his front wheels struck the right rear wheel of Parkin's car. The Columbia's rear axle was torn from the spring clips, so violent was the impact. On the other hand, Parkin's rear wheel was badly loosened up, but by running the risk and doggedly pushing the car along he finished fourth, ahead of the Isotta, which did not stop except for fuel.

Betz, the young amateur driver, after having third place well in hand with No. 1 Simplex on the sixteenth lap, was forced to withdraw on account of a broken pump and overheated motor.

Zengle, with the big Chadwick, which made the fastest time, literally shook his water pipes loose. The pipes on top of the cylinders were leaking badly, and finally, it was stated, his water-pump drain plug opened. The motor ran hot, and it was reported Zengle went down to the Schuylkill River to get water to replenish the empty motor. After this, however, he never was a factor in the race. At the time of this accident he was running second.

No. 22 Lozier was reported to have broken a pump shaft on the first round. Another equally definite rumor was that the after main crankshaft ball-bearing rod broke.

No. 19 Chalmers-Detroit on the fourth lap broke its frame and, of course, retired.

Perhaps the most exasperating incident to happen during the ray was to Harry Grant's No. 11 Alco. As he drew up to the grand stand preparatory to the start, the brazing on his steering column gave way, allowing the wheel to turn independent of the worm and rendering steering impossible.

VANDERBILT RACE PREPARATIONS ARE IN FULL SWING

RUNNING of the Vanderbilt Cup race this year was finally assured when the Board of Supervisors of Nassau County, Monday last, granted permission to use county roads to complete the course. The race is now positively scheduled for October 30.

The course is 12.64 miles long, including, in addition to 5.15 miles of the Long Island Motor Parkway, which is private property, the Massapequa road, the old Country road and the old Westbury road. According to the conditions imposed, the race must be run between 5 a. m. and 5 p. m., October 30, and the contestants are granted permission to use the roads for practice between 5 a. m. and 8 a. m. after October 20.

Further conditions are that the Motor Cups Holding Company, which is promoting the race, must sprinkle the Massapequa road with oil, repair and make safe the old Country road, and must guard and police the roads during practice and on the day of the race. A bond of $100,000 must be deposited to in-

A Lodge Entrance to the Long Island Motor Parkway

demnify the County Supervisors and Sheriff against any damage suits, and the sum of $500 must be deposited to put the roads in condition after the race. It is also provided that if any of the entrants are convicted of violating the speed laws outside of practice hours they and their machines are to be disqualified.

The Motor Cups Holding Association opened a bureau of information this week in room 212 of the Long Acre building, 1493 Broadway, New York City, on the northwest corner of Forty-third street. This office will be open daily from 9 a. m. to midnight, and on Sundays between 2 and 7 p. m. The association has prepared diagrams of the stand, boxes and parking spaces, and the sale of seats has begun. Several hundred applications for seats and boxes are already on file. Prospective applicants are urged to write or call as soon as possible, as it seems almost certain that the demand will exceed the supply.

The course promises an unusually fast race, and also a spectacular one. It will be noticed that the length of the circuit has almost been cut in half. This was done because it was found, from experience at Lowell, Fairmount Park, and elsewhere, that the spectators enjoy a race on a short course more than on a longer course, as the cars pass more frequently. There are no hills and no bad turns on the new course, and the few turns which do exist will have a four-foot bank, carried well around in the straight. The turns on the Parkway, of course, are banked in the most scientific manner. Expert drivers figure that the time should at least equal that made at Riverhead in the Long Island Derby.

Ample time for practice will be allowed the drivers, as they can let their machines out to full speed on the course for ten days before the race. This is not only giving more days of practice than was ever allowed before, but the limits of 5 to 8 a. m. give a longer time each day. The offer of practice should induce manufacturers to make early entries, as the more trials the drivers have the better, of course, will be their chances in the race. It should be noted that the course is open for practice to contestants only. No permission has been granted for private owners to use it other than in the ordinary way and at their own risk in practice hours.

Anderson Brothers, of Mineola, already have a large force of men at work widening the county roads, clearing out the gutters, filling in holes and rolling and oiling the roads. As in previous Vanderbilt races, a complete telephone system will be installed. At each point at which communication is likely to be necessary a station will be established and connected with the official stand by a direct private wire.

No official announcement of the entries can be made yet, as the entry blanks were only issued a few days ago. Enough favorable responses have been received, however, to indicate that at least thirty-five cars will start. The throwing of the race open to stock cars has proved a great incentitve to the manufacturers. Among those who have promised to compete are the Chalmers-Detroit Motor Company, with four cars; the Maxwell-Briscoe Motor Company, with three; the National Motor Vehicle Company, the Buick Motor Company, the Simplex Automobile Company, Marmon & Nordyke Company, the Dayton Motor Car Company, the Knox Automobile Company and the Rainier Motor Company, all with two cars each. There is a possibility of two Benz cars being entered if they arrive from Germany in time. In addition to those who will enter teams, Renault, Moon, Fiat, Isotta, Apperson, Columbia, Allen-Kingston, Alco, Mercedes, Sharp-Arrow, Cameron and Matheson will be represented by at least one car each.

Many familiar names will be found missing from the revised course. From the starting point opposite the grandstand, the route runs east along the Parkway for about two miles; the cars then turn north on a specially constructed cut-off to the Massapequa road, which leads to the outskirts of Hicksville. From here the cars turn west on the old Country road to Westbury, thence south to the Parkway at Meadowbrook Lodge.

Hudson "20" Tries Straightaway with No Speed Limit

FOR AND ABOUT THOSE WHO COMPETE

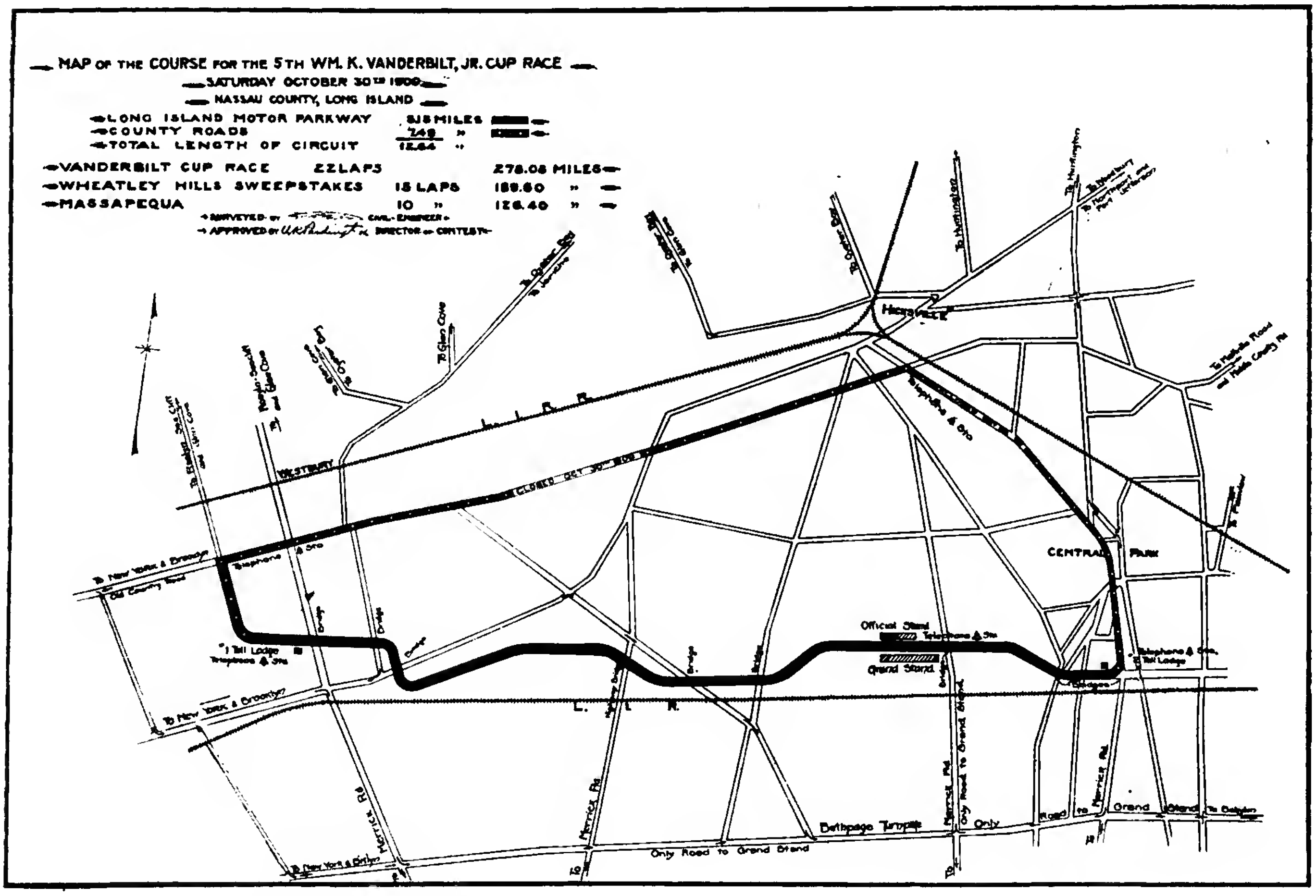
Ralph De Palma Injured at Danbury—The Vanderbilt lost one of its most promising candidates last Saturday when Ralph De Palma, the winner of the Long Island Derby, was spilled from his car on the Danbury, Conn., race-track. The accident happened during the last lap of a five-mile free-for-all, which was contested by De Palma, driving his Fiat "Cyclone," Brown with another Fiat, and Wagner with a Columbia. De Palma had been having trouble with his machine, but overcame it and started after the others. He passed Brown and was overhauling Wagner, when a rear tire burst, causing the machine to crash through the infield fence and turn turtle. De Palma was thrown some twenty feet, landing on his side. He suffered a compound fracture of the left upper leg, and although out of danger, there is no possibility of his taking part in the Vanderbilt.

Race Meet in Lone Star State—The San Antonio Automobile Club is promoting a series of races to be held on the last four days of the International Fair, November 14 to 17, at San Antonio, Tex. Entry blanks have been sent out, and, in view of the attractions offered, should meet with a favorable response. A special automobile track is being constructed, which, although only three-quarters of a mile in length, is of ample width and has well-banked turns. Safety is provided for by a sloping wall of loose earth taking the place of the outer fence, which, in the event of a racer becoming uncontrollable, will bring it to a gradual stop. The program for the first day calls for five races, at distances of from five to 25 miles, for cars classified by price limits. On the second day will be held four races distinguished by piston displacement. The third day will see the free-for-all, a winners' race and record trials, and the conclusion, on the fourth day, will be a six-hour race.

Hill Climb of Ohio "Twin Cities"—The second annual hill climb of the Twin City Automobile Club, of Uhrichsville and Dennison, O., proved no small success, and the several thousand spectators who lined the course saw some keen competition. The hill, although but one-sixth of a mile long, is quite steep, having a grade of 12 per cent. at the bottom, increasing to nearly double that figure at the top. The crowds caused some trouble by getting on the course. The best time, 17 1-5 seconds, was made by W. Stuller, driving a 35-horsepower Jackson, who won in his class and also in the free-for-all.

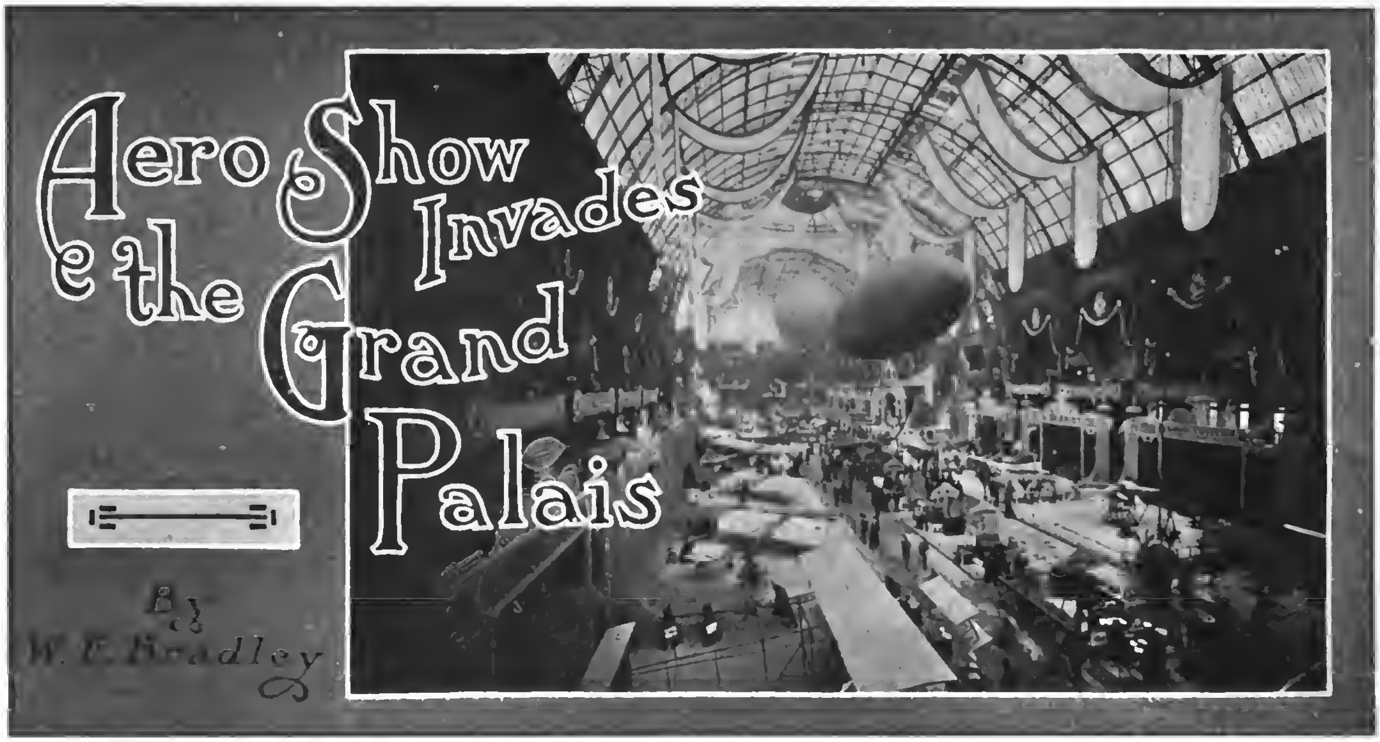
Jackson Wants the W. & S. Trophy—Word comes from Indianapolis that the Jackson Automobile Company has filed a suit against the Indianapolis Motor Speedway to force the latter to award it the Wheeler & Schebler trophy. This is in addition to the suit filed some weeks ago in which the company asks for $100,000 damages. In the 300-mile race for the trophy at the Speedway in August, Lynch, driving a Jackson, was in the lead when the race was called off because of accidents.

Bosch Prize Offer Still Holds—The Bosch Magneto Company says that the prizes it offered for the postponed Brighton Beach 24-hour race will hold in the coming race, October 15 and 16. The prizes, it will be remembered, were $100 to the winner, and an additional $50 if George Robertson's record for this year of 1,091 miles was broken, conditional upon the use of a Bosch magneto on the winning car.



Racing for Good Roads Benefit—A novel plan of assisting the good roads movement in Louisiana has been originated by the New Orleans Automobile Club, namely, holding a race meet, of which the proceeds are to be devoted to the cause. The meet will take place November 20 and 21, following the first annual meeting of the Louisiana Good Roads Convention.

France May Revive the Grand Prix—The sporting commission of the A. C. F. met October 6 to consider the advisability of offering the Grand Prix for a race in 1910. The secretary was empowered to find the sentiment among the manufacturers. If the race is held it will be without any conditions whatever regarding the construction of the competing cars.

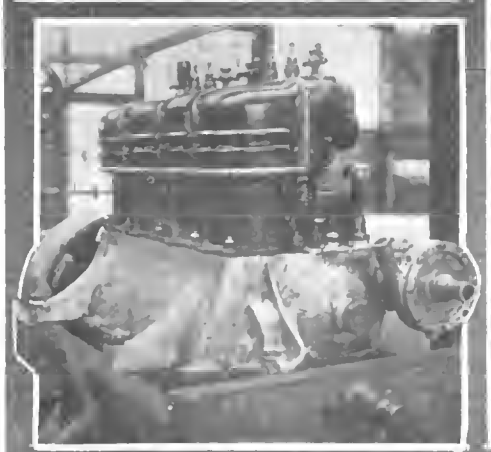


Interior of the Grand Palais Where the Great French Aeronautical Exhibit Now Holds Full Sway

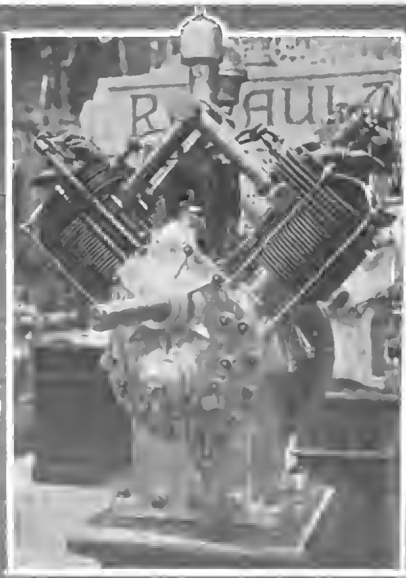
PARIS, Oct. 7—More inventive genius is shown in the motor section of the Paris Aero Salon than in that portion devoted to aeroplanes. With one or two exceptions, the aeroplanes are standard models which have been making flights all the year and are fairly well known to the public. The newcomers, for the most part, are neither convincing nor pleasing in their workmanship. One of the most obvious pieces of plagiarism ever seen is the Fernandez biplane, copied from the Curtiss, which was seen at Rheims. As the American machine only arrived in France toward the middle of August, M. Fernandez is to be congratulated on the speed with which he has produced his copy. Instead of suspending the motor between the planes, Fernandez has put it lower with a transmission by chain to the propeller shaft.

The Bayard-Clément Company has made its appearance in the aeroplane world with a remarkably good-looking biplane, which has not yet made flights, but which should have no difficulty in doing so. The machine is a compromise between the Wright, Farman and Curtiss, the main wings resembling the Wright without being flexible, however, the front elevation rudder is of the Farman type, as is also the tail, and the *ailerons* are very similar to those used by Curtiss. The aeroplane is driven by a four-cylinder Bayard-Clément motor placed behind the pilot, and transmitting to the propeller through a clutch, a spring-mounted shaft with a universal joint and inclosed reducing gear. Maurice Clément, the younger brother of the unfortunate Albert, killed at Dieppe, is now making trials with the new machine. The workmanship, both of the biplane and the engine, is fine.

Airship motors occupy a very large amount of place. Certainly the most interesting is one of the new four-cylinder, 200-horsepower engines about to be fitted to the monster dirigible balloon intended to be sent to England by the aerial way. As the airship's capacity is 6,500 cubic meters (about 270,000 cubic feet), it is possible to equip it with very large engines. The Bayard-Clément Company has selected the same type of motor



Bayard-Clément 45-H.P. Aero Motor

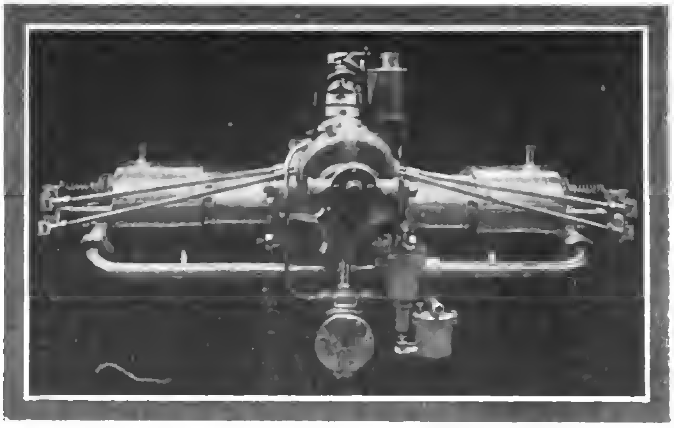


Renault Motor with Camshaft Drive

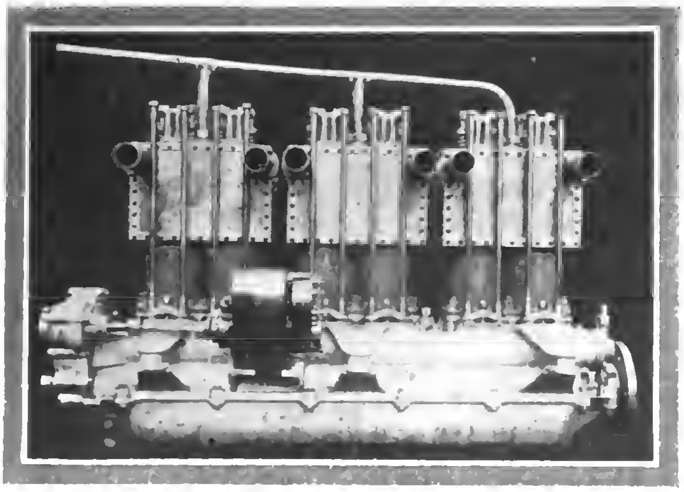
Compact DeDion Aeronautical Motor

as was used on last year's racing cars at Dieppe and at Savannah, but instead of a bore of 155 millimeters has adopted one of 190, or 7.4 inches, with a stroke of 9.1 inches. Each engine is rated at 200 horsepower. In the design only a few details have been departed from the racing-car model. The cylinders are cast in pairs with the valves inclined in the head and operated by an overhead camshaft running right down the center of the motor, exhaust valves being at one side and inlets at the other. A hemispheric combustion chamber is employed with very high compression. For starting, the compression is relieved through a special type of ball compression cock. The cylinders are fitted with rivetted-on copper jackets, through which the water circulates by pump feed. Double ignition is employed, both plugs being just below the inlet valve. The distributor is worked off the end of the overhead camshaft, which, by-the-by, is driven by inclosed gearing, vertical inclosed spindle and bevels. The base of the crank chamber forms the oil reservoir and oil is delivered under pressure to all the main bearings.

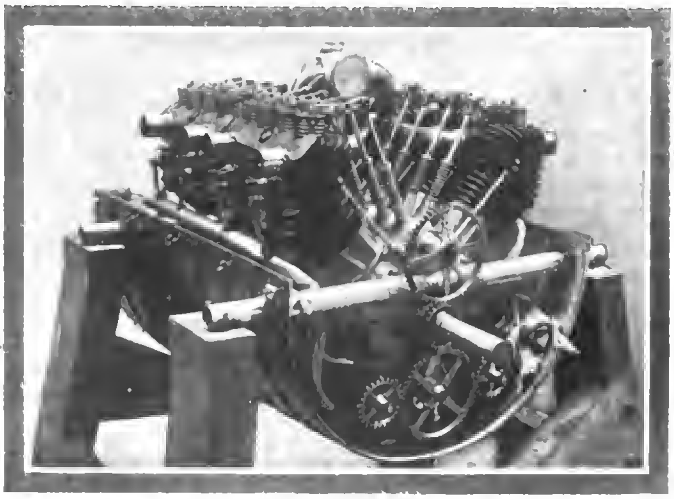
The engines will be mounted on an automobile type of chassis, side by side, each carried on short transverse springs. It is thus possible to disconnect the springs and lift out engine and chassis as one unit. A special type of band clutch is employed with connection by a shaft from this to a gear box, also carried on the chassis. The engines being side by side, lengthwise of the airship, the propeller shafts are at right angles to the engine shaft, projecting respectively to left and right of the steel car. Bevel gearing is, of course, employed, the propellers being mounted in the center of the airship, as on the Zeppelin and the ill-fated *République* Should one engine be stopped, it is declutched and its shaft between the clutch and gear box connected up to that of the live engine by means of a transverse chain. By putting in the low gear it will be possible to make progress. The propellers will be wooden ones built by Chauvière, designed to turn at a low rate of speed.



Darracq 30-Horsepower Two-Cylinder Opposed Motor



Operating Side of Buchet Six-Cylinder Aero Motor

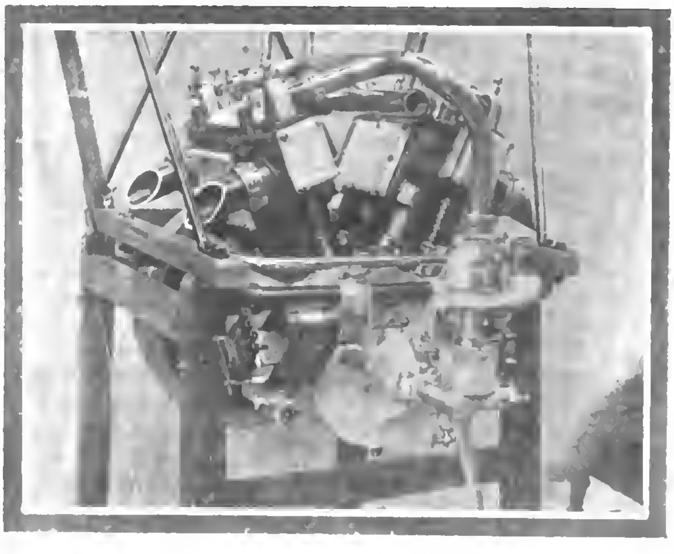


Flat Eight-Cylinder V-Type Aviation Motor

One of the largest motors is shown by the Wolseley Company, of England. Although not the most powerful, it is the largest in overall length, the eight cylinders, cast in pairs, being placed in Indian file. De Dion-Bouton shows several types of eight-cylinder "V" engines, the distinctive feature of which is the use of two independent magnetos mounted on a bracket near the top of the cylinders.

Panhard has had more experience in airship engine building than prohahly any other firm, having equipped all the military airships, including the *Patrie* and the *République*. On the new model, with four cylinders cast separately and fitted with copper jackets, the magneto is carried on the top of one of the cylinders, driven by bevel gearing and vertical shaft. The object is, of course, to give greater accessibility, the usual position being very inaccessible when the engine is of necessity carried on the floor.

There is an even greater selection of engines for aeroplane work than for dirigible balloons, the array comprising every model from the two-cylinder, air-cooled horizontal to the sixteen-cylinder, water-cooled "V" and the twelve-cylinder rotary. Renault has thoroughly gone into this field and has produced several surprises. His eight-cylinder, air-cooled "V" motor is well known, but it was somewhat of a surprise to find that he had also produced a four-cylinder of the same design. On both



Water-Cooled 45-Horsepower Mors Aero Motor these the propeller is carried on the reinforced camshaft. A light-weight, water-cooled model also figured on their stand, the cylinders being separate, with copper water jackets and valves in the head, side by side and operated by a single camshaft. The lower portion of the crankcase, of considerable depth, forms an oil reservoir, from which the lubricant is pumped.

An engine which attracted attention is the one with which Santos-Dumont made his fast cross-country flights. The motor is now the subject of litigation, the Darracq Company claiming that it is a special type loaned by them to the Brazilian aeronaut and Santos-Dumont maintaining that he ordered it and paid for it and can therefore do with it as he wishes.

The engine is of the two-cylinder opposed type, with copper water jackets. Its originality lies in the timing gear, a single cam operating all four valves, carried in the head, and only two gears being employed for the valve mechanism, pump and magneto. This suppression of organs has allowed a reduction of weight without any scraping away of metal in essential parts.

Mors has come forth with an entirely new engine of the four-cylinder "V" type, the cylinders being cast in pairs with their water jackets. This disposition allows the use of a two-throw crankshaft, and as the cylinders are offset in relation one to the other, the connecting rods can be attached side by side to the same crankpin without the use of forked ends. The exhaust valves are mechanically operated, two of them being at the front and two at the rear of the engine, with the inlets automatic and immediately above them. A special type of carbureter is carried with the float chamber placed so low that at whatever angle the motor is placed the level of the gasoline is not likely to be seriously disturbed.

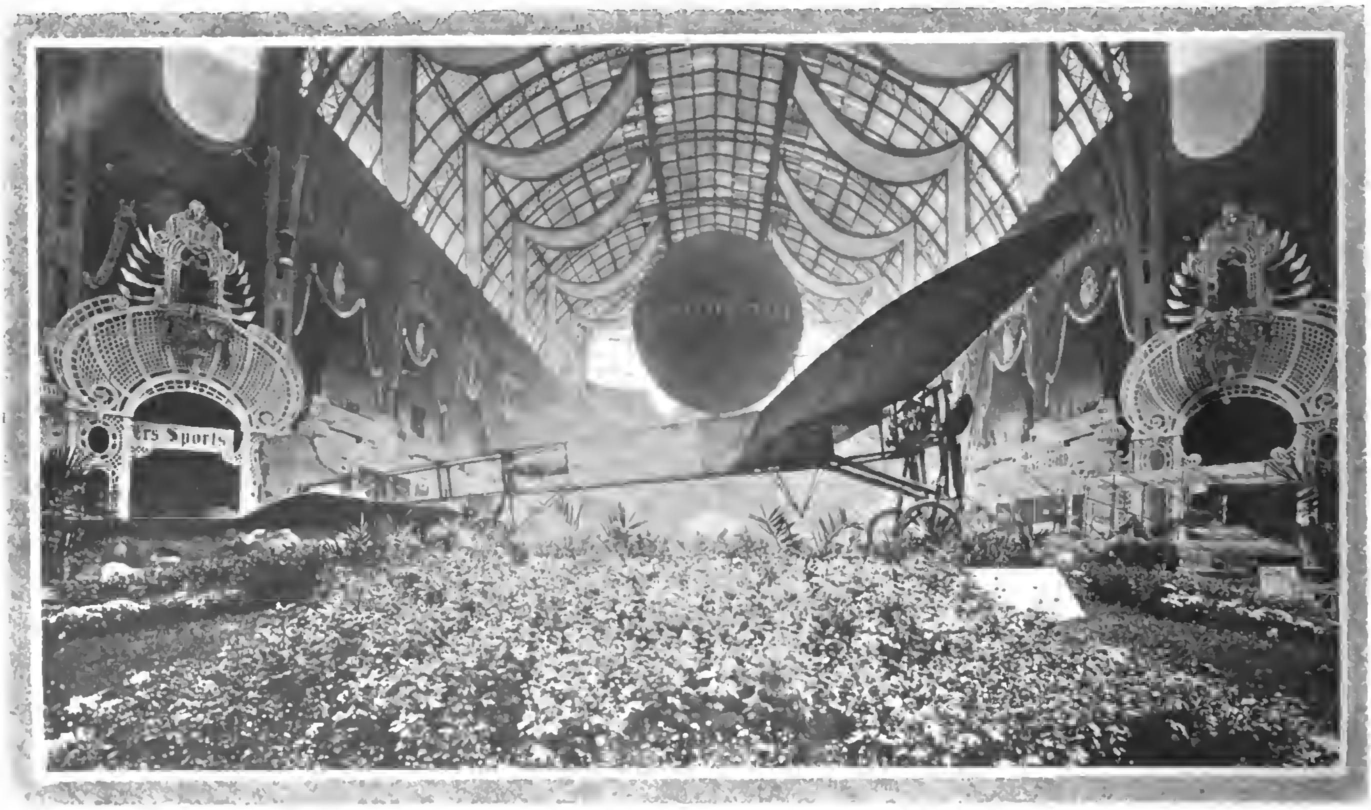
The general tendency among French constructors, however, is to produce an aeroplane engine on standard lines—that is, four or six vertical cylinders, saving weight in the water jackets, valve mechanism and certain portions of the crank case casting. It is the type of motor first introduced by Wilbur Wright. The changes that can be worked on this model are infinite.

Bayard-Clément, for instance, has produced a 40-horsepower, four-cylinder model with all valves on one side in an outstanding pocket. The engine is a single casting with all metal cut away between the second and third cylinders and the usual cast water jacket is replaced by a one-piece copper one. Thus to look at the valve side of the engine the impression is that it is a standard type of motor with valves in pockets on one side only.

Buchet has endeavored to make a saving of weight in a somewhat similar manner. His vertical six-cylinder engine has cylinders cast in pairs with but a framework cast around the two sides and the ends of the cylinders, and to this framework the aluminum flat plates forming water jackets are screwed on. The arrangement allows the thickness of the cylinder walls to be verified with accuracy and naturally decreases weight, for the aluminum plates are much lighter than a cast jacket. All valves are on one side, thus requiring but a single camshaft, and are in the head, side by side. One of the features of the engine is that the piston is bored with holes in all its lower portion.

Antoinette shows the first of the new sixteen-cylinder motors with the cylinders in V. The only respect in which this differs from the eight-cylinder model used by Latham is in the number of cylinders, the engine being practically two eighths on a crank case of double the usual length. The new model in both eight and sixteen cylinders has one-piece copper-deposited water jackets. This allows a cylinder with a fixed head, and as the only joint in the jacket is at the base of the cylinder the possibility of leaks is reduced to a minimum. Formerly the separate head was liable to allow leaks from the cylinder into the jacket, the water being driven out and overheating occurring. A very similar type of jacket is employed on the E. N. V. motor used by Blériot and on the new Brouhot eight-cylinder motor.

Gabriel Voisin, the maker of the well-known type of biplane, after fitting his biplanes with any type of motor selected by his clients, has now built an engine after his own ideas. It has four separate cylinders with copper jackets and concentric valves in the head. The cylinders are given considerable offset and are mounted on an aluminum crankcase, the sides of which are screwed on. The timing gears are contained within the crankcase and not in an extension, being reached only by taking down the sides of the crankcase. The high-tension magneto is carried on a bracket at the rear of the engine immediately above the crankshaft, its gears being within the case.



Court of Honor at the Grand Palais Aero Show—Bleriot Aeroplane that Crossed English Channel Occupying Post of Honor

Americans Plowed Best at Amiens

On the Field at Amiens During the Agricultural Trials Which Were Won by an American Tractor Plow

AMIENS, FRANCE, Oct. 5—France is seeking to encourage the use of the internal combustion motor among agriculturalists, both for work on the farm and for the transport of farm produce. The methods pursued are to hold an exhibition annually in different parts of the country and at the same time to put on foot various competitions.

The spot chosen this year is Amiens. But the northern Frenchman seems to be harder to convert than his compatriot of the center. Manufacturers appear to know of this, many of them who were present at the last exhibition held at Bourges being absent at this. The agriculturist comes in numbers to see the new-fangled notions, but he comes with his mind made up that they are not much good. Thus, before it is possible to sell him a machine, it is necessary to convert him, and the task is not an easy one.

The exhibition comprises two large halls with an open-air exhibition between them. Apart from the purely agricultural exhibits the hall contains gasoline and gas engines of various types, most of them driving agricultural machinery. The French manufacturer is convinced that the best type of motor for stationary farm work is a single vertical cylinder. The long-stroke, slow-speed horizontal motor so commonly employed in America for this class of work is not seen here.

The Ceres Company had one of the neatest outfits in this line, the engine being mounted on a truck and connected by belt to a countershaft with a series of pulleys from which the drive could be taken to the various machinery. The engine, which was of practically standard design, was cooled by a circulation of water contained in a circular radiator mounted on the truck, the center of the radiator containing a fan driven by belt off the engine. The entire outfit was protected by a galvanized iron roof. Small stationary engines for pumping water or driving light machinery were plentiful, most of them being mounted on portable platforms. Magneto ignition is employed on even the smallest of these outfits.

Instead of being shown in the exhibition hall, the automobiles designed for farmers' use were kept on the road giving demonstrations of their ability to do a day's work. Working with the three or four French trucks was an American buggyabout, the first of its kind ever shown in this portion of Europe. It was shown by the French branch of the International Harvester Company. French automobile manufacturers have made no effort to provide a vehicle for the farmer, for it cannot be maintained that the low-powered, low-built runabouts introduced at these exhibitions is an agricultural vehicle. As plowed fields are the same the world over, and even highly developed France has byroads that cannot be traversed by the standard type of automobile, there is no reason why the American buggyabout should not be adopted by the agriculturists of France.

Plowing without the use of horses was one of the most important features of the Amiens exhibition. Here honors fell to the Cima, under which title is hidden a tractor produced by the International Harvester Company. This machine worked with perfect regularity, plowing on the first day 3 1-2 acres of land in 5 hours 55 minutes, with a consumption of 8 4-5 gallons of gasoline and 4 1-2 gallons of water. On the second day the same machine worked 6 hours 35 minutes, plowing 3 3-4 acres, with a consumption of 9 3-5 gallons of gasoline and 16 gallons of water. The American machine was awarded the first prize of the Automobile Club of France.

Neither of the two French machines was able to get through a day's work. The competitors were of two entirely different classes, the Landrin being a tractor, like the International Harvester Company's machine, while the Bajac operated by winding drums. The Landrin had a standard type of four-cylinder engine mounted on a stout chassis, drove to the rear wheels through side chains, and at the rear had a revolving drum with plowing blades driven by chain from a countershaft on the chassis. As the ground in the neighborhood of Amiens was particularly rocky the blades did not last long; they first buckled up, then broke off altogether.

The Bajac, with its winding drums, was some time before it could be got into working condition. When it did start its furrows were not made with all the straightness demanded by critical agricultural eyes. A two-cylinder vertical engine provided the motive power to the winding drums, which were driven by an overhead shaft meshing with a large pinion on the end of each drum. A special type of plow was employed, an operator sitting on a bogey attached to it and directing its course and depth of operation. When the end of the field was reached the plow was swung round without the plowman descending from his seat and operation in the opposite direction was commenced. As this machine needed three men, one on the plow, one at the engine and another at the winding drums, it was obviously costly to work.

The American machine was the standard pattern operated by a long-stroke, slow-speed, horizontal single-cylinder gasoline engine. The plow was towed behind, the operation only requiring the presence of two men, one being on the tractor and the other at the plow.

A useful competition was held among mechanics and farm workers in testing their ability to repair motor and various types of agricultural machinery. A stationary engine was purposely put out of business in some artful manner and the competitors, some twenty in number, invited to find the cause of the breakdown and repair it as quickly as possible. Various farm machinery was treated in the same way.

A conference on the use of motors in agriculture was held during the exhibition period, the delegates representing practically all countries in Continental Europe interested in agriculture.

SALZER, MERCEDES, SEMMERING HERO

Berlin, Oct. 1—The Semmering hill climb, the blue ribbon of Austrian motoring, was held on the 19th over a distance of ten kilometers on the tortuous Semmering road. The course was in splendid condition and the entries, though not as numerous as last year, included drivers of international repute. such as Cole, Poege, Salzer, Lindpaintner, Joerns, Duke Ludwig Wilhelm of Bavaria, Prince Francis Joseph of Braganza (whose brother has just married Miss Anita Stewart), Count Kolowrat, etc.

The hero of the day was Salzer in a Mercedes, who beat the Semmering record in splendid style, covering the distance in 7 minutes 7 seconds, definitely winning the trophy for Anton Dreher, Vienna's prominent sportsman. The class he started in was for vehicles without restriction, and he beat W. Poege's Mercedes by 6 2-5 seconds, with Cole in the Benz third in 7 minutes 28 4-5 seconds.

Others who were placed were Joerns and Lindpaintner, both in Opels, while Prince Francis Joseph did not finish. In the section for cars from 35 to 46-horsepower, Joerns carried off the prize in 7 minutes 54 3-5 seconds, beating Cole in the Benz.

GERMAN CARS FOR 1910 GRAND PRIX

Berlin, Oct. 1—In the Grand Prix of 1910, which is said to be looming on the horizon, it is stated that three German firms have announced their intention of participating—Mercedes, Benz and Opel. There will be no voiturette tour in Germany this autumn after all, as the industry cannot see its way clear to participate in such an affair at this late date, and the event will probably take place next spring. The German victory in the last Grand Prix has greatly stimulated the racing spirit.

AMERICAN CARS POPULAR IN NOVA SCOTIA

The following information concerning automobiles in Nova Scotia is furnished by United States Consul Alfred J. Fleming, who is stationed at Yarmouth:

Yarmouth has only a trifle over 6,000 people, yet there is a great deal of wealth here, and this is revealed in a very pronounced manner by the number of automobiles owned. There are about 110 automobiles in Nova Scotia, and 36 of these are owned in this city, Amherst having 30 and Halifax 25. The 36 autos in Yarmouth cost $44,475, 32 being American make, 3 Canadian and 1 English. Of the $44,475 invested, all save $7,000 was spent in the United States, which is in itself an evidence that the American-made machine is popular in Canada. Of these 36 machines, 16 are runabouts and 20 tourist cars. Most of them are good machines and a few of them are first class.

Counting the 110 machines in Nova Scotia at the average price of the Yarmouth machines, makes $135,811 invested therein in this province, and if the same average as to place of make holds good as in the case of Yarmouth, nearly all this money found its way to the United States.

The roads in this province are exceptionally good for automobiling and are praised by the scores of American autoists who have visited Nova Scotia. One drawback to automobiling here is the law prohibiting the running of machines in the various towns and counties and municipalities on certain days. For example, automobiles cannot run in Yarmouth County, outside the city, on Saturday; Digby County has one or more prohibited days; Annapolis, Kings, Queens, etc., have days in which autoing is forbidden by local regulations, municipal and town ordinances

HAS AN EYE ON FUTURE BUSINESS

A Swiss hotel keeper, with the foresight that is characteristic of his race, has erected on the top of his garage a huge sign which reads as follows:

GARAGE

AEROPLANE STATION

The second line, which is intended to be easily deciphered from an elevation above the earth's surface, is addressed to prospective guests who may arrive by aeroplane or dirigible.

Bajac Plowing Machine at the Amiens Trials—Operated by Winding Drums at Each End of Field

Misfiring: Some Causes and Some Remedies

By Stillman Taylor

AMONG the little things which occur with more or less frequency to vex the driver of the automobile, there are none more troublesome than misfiring. Misfiring, or the failure of some part of the ignition system to perform its regular functions, may be caused by a number of things, many of which are likely to be overlooked owing to their apparent insignificance. When misfiring occurs, the autoist very naturally concludes that the fault lies in the ignition system, and as this is the most complicated and delicate part of the whole car, the supposition is often correct. Yet it often happens, however, that the carbureting apparatus is the real offender, and if the complete electrical plant has been systematically examined throughout and the trouble still exists, it is reasonable to presume that the trouble is in the fuel supply system.

Among the causes which contribute to misfiring may be mentioned ignition troubles, such as short-circuit in wires, exhausted battery, pitted or improperly adjusted vibrators of the coil, sooty or cracked plugs, loose connections or switch, dirty timer or commutator, punctured condenser, moisture in coil, wet wires or cables, water on distributing plate, dirt on contacts in distributor or wear there, or dirt or wear in timer.

Carburetion and Fuel—Faulty mixture, sediment or water in the carbureter, clogged gasoline strainer, leaky float, clogged spraying nozzle, bent float-valve spindle, stale gasoline, partial stoppage of fuel supply pipe, hole or obstruction in intake pipe or manifold. These are not all the things that might happen, but are the principal ones which the writer's experience has suggested as most likely to occur to cars in general. We will take them up in their proper order of classification, first dealing with those failures attributed to ignition, followed with a list of carbureter and mixture troubles likely to produce kindred results, and so cause misfiring.

Troublesome Short Circuits—Either a partial or a considerable leakage of the electrical current may be due to worn or frayed insulation, and the bare wire may possibly come in contact with some metal part, and so form the short-circuit to the ground. This may or may not prove a constant short-circuit, as it sometimes happens that the vibration of the car will cause the bare wire to shift about, and the "short" will occur only now and then, as the wire brushes against the metal at intervals. Trouble of this kind is generally due to poor and old-time connections, and will but seldom occur with modern terminals. Perhaps the easiest and best way of correcting this trouble is to wrap a little tape around both the ends of the damaged cable and its binding post, which will keep the loose ends together and at the same time make certain of a good contact at the post.

Failures of the spark plugs due to defects in material and manufacture are not so common nowadays as in the past, but modern plugs are by no means immune from trouble. It is well to test the plugs in the event that trouble is suspected. To do this it should be first ascertained which of the cylinders is misfiring by holding down all the vibrators but the one to be tested. This is inconvenient without assistance, but the vibrators may be cut out of action by simply inserting a bit of stout paper between the platinum contacts. When the missing cylinder is found, unscrew and examine its plug, and if the points are clean and everything looks all right, connect up the high-tension wire, lay the plug on the cylinder, and turn the motor over until the proper contact is made. In case no spark is forthcoming and the plug is clean and to all appearances in good condition, it is very probable that the porcelain has developed a crack sufficient to form a leak and cause a troublesome and elusive "short."

The reader should remember that this method of testing a plug is not infallible, since a minute crack in the insulation (not always visible to the eye) may not interfere with the production of a good spark in the air, but will cause leakage and so make a weak spark, or none at all, when called upon to overcome the greater resistance of the compressed gas. The electric current will always follow the path of least resistance, and as it is called upon to overcome considerable resistance in jumping between the two electrodes of the plug, it is obvious that a comparatively small defect in the insulation will prevent the production of a fat spark at the points.

Broken and wet wires are occasionally the source of misfiring, and although little trouble may be anticipated from the well made modern cables, the wiring of older cars—so largely seen in second-hand shops—is frequently defective. The writer has had some little experience in "tinkering up" these old sleds, and several times traced misfiring in the ignition system to a broken wire in the primary circuit. Where the wiring bears unmistakable evidence of having seen better days, the only satisfactory remedy is to put in new wiring throughout the car.

Wet wires are likewise the cause of considerable trouble in the older cars, as in many instances the high-tension cables are carried underneath the flooring and, being unprotected, are likely to get short-circuited through the water and mud splashed up by the wheels. In cases of this kind, the writer has often found it desirable to re-wire the entire system when possible. In some cars, where this is not convenient, an old length of rubber hose may be pressed into service to enclose and partly protect the otherwise completely exposed wires.

Worn and Pitted Contact Points—The platinum contact points of the tremblers of the coil should not be allowed to become pitted and uneven through neglect. If not properly attended to, the points will become rough and jagged and the poor contact will result in misfiring. The points should be examined occasionally, and, if uneven, they should be trimmed flat with a fine jeweler's or manicurist's file. The adjustment of the vibrator screw also plays an important part, and should be given its share of attention. A stiff tension is never necessary or desirable, as it will not only consume a greater amount of current, but will result in rapid wear and pitting of the contacts. The trembler should be adjusted with only sufficient tension to cause it to vibrate at a moderately high pitched buzz. This adjustment by ear rests altogether with the experience and judgment of the driver, which may or may not be good.

When the unit coil system is used—and this arrangement is now in general use—it is important for the best coil service that the vibrators of the several units be tuned as near alike as possible. This may be closely approximated by sound, but the only sure method is to measure the consumption of the current by means of a special ammeter. The exact amperage varies somewhat in different coils (from 1/2 to 3/4 amperes) and to obtain maximum efficiency the maker's directions should be followed.

Exhausted Battery—A rundown battery is a very common source of misfiring, and although the symptoms are plainly apparent in troubles of this kind, the difficulty is not always traced to the proper cause. The fact that a weak battery will not generally prevent starting, and only misfires after the car is well under way, is, no doubt, the reason why the real trouble is not at once suspected. And again, the motor may run fairly well at medium speeds, but when the throttle is opened to admit more gas, the spark is too weak to fire the heavier charge, and the motor commences to misfire, finally coming to a stop. In fact, when the battery fails to respond to the spark advance lever it may be taken as pretty good evidence that the voltage is too low, and a new set of dry cells should be connected up, or the battery re-charged if of the accumulator type.

If the two sets of dry cells are used, they may be made to give some little additional service by connecting up its series (carbon to zinc). If two storage cells furnish the ignition current, connect them up in parallel (carbon to carbon and zinc to zinc). To avoid the annoyance of a weak battery, each dry cell should be occasionally tested for amperage and the defective cell renewed. A storage cell should de charged regularly once a month, and should never be allowed to become discharged.

Switches occasionally work loose, and, while an uncommon source of misfiring, it will occur now and then. A loose switch generally provides such poor contact that the motor will stop completely, but it may also cause missing in but one or two of the four cylinders.

The timer or commutator should be washed out thoroughly with gasoline at least once a week, to remove dust or other substance which will likely interfere with a perfect contact. If neglected, and dust and oil allowed to accumulate, the contacts will be imperfectly made and the current being poorly distributed, misfiring will ensue.

Condenser and Short-Circuit in Coil—The condenser is not likely to cause trouble, and the most serious injury likely to befall this important part of the spark coil is a puncture caused by the use of a battery generating a higher pressure (voltage) than the coil will stand. In this case the coil must be sent to the makers for repair. It occasionally happens, however, that misfiring results from a broken connection to the condenser, or is due to the presence of dust or oil on the spring contacts. If trouble is suspected in the condenser, the contacts should be examined and cleaned with a bit of cloth wet with gasoline.

Water or Moisture in the Coil—Will form a short-circuit and produce missing in the cylinder, and will rapidly exhaust the battery current. A primary or single wound coil—such as is used in low-tension make-and-break ignition—may be dried out, but the only way to fix up the high-tension coil is to send it to the manufacturers.

In addition to those misfiring troubles which have just been mentioned, many of which are common to both magneto and battery systems, there are a few misfiring troubles which are confined to the magneto itself. Owing to the fact that many autotoists regard the magneto as a balky and mysterious machine, the reader may possibly find some meat in this somewhat desultory summary of the writer's experiences.

Perhaps one of the most common causes of magneto misfiring is due to the interrupter-contact-arm roller becoming worn. A fiber roller will often wear unevenly, causing the cam to slip over the worn flat spot without making a good contact. In case of steel rollers and fiber cams, the latter will sooner or later show signs of wear. The contact interrupter spring is also a common source of missing, as the spring loses its elasticity and becomes weak through constant use. Loose interrupter contacts are not quite so common, but will occasionally cause misfiring by working loose and so provide insufficient surface to insure a good contact.

Armature bearings work loose in course of time and cause misfiring by making too short a contact. Dust on the insulated face of the distributor is likewise conducive to missing, and the autoist should make it a point to keep this surface clean.

Carbureter and Mixture Troubles—Foremost among the several difficulties which may be called common misfires, is the lack of a proper mixture. A rich mixture containing a relative large proportion of gasoline in proportion to air is never desirable, inasmuch as it deposits considerable soot upon the piston, cylinder walls, and valves, and is, moreover, a waste of fuel. The motor will seldom run well on a rich mixture, and the carbureter should be so adjusted that no more gasoline is fed to the mixing chamber than is sufficient for the motor to develop its full power. The exact mixture may be found by experiment.

A very rich mixture will cause misfiring; the motor will have a tendency to choke at other than high speeds, and is likely to overheat. A lean or thin mixture will, on the other hand, lower the efficiency of the motor, and it will have a marked tendency to miss at high speeds, accompanied by a popping sound in the carbureter. This is due to a weak mixture, and the needle valve should be adjusted to admit more gasoline, or if due to an excessive supply of air, the auxiliary air-valve should be adjusted to admit less air.

Bent Float Spindle and Leaky Float—Either one of these will cause missing in one or more cylinders. The float spindle may become bent or it may become jammed into its seat by too vigorous priming. This may be discovered by unscrewing the cover and lifting out the float. Considerable care should be taken in straightening out a bent spindle, and the metal should be placed upon a block of hardwood, another block interposed, and the spindle gently tapped with a hammer.

A leaking metal float or a fuel-logged cork will cause missing owing to its uncertain and erratic action. A cork float should be thoroughly dried out and then given a couple of coats of shellac to prevent it from absorbing the gasoline. As a new float is not at all expensive, the reader will probably find it more convenient to put in a new one. A metal float must be soldered when it leaks, and as the copper is thin and easily damaged, only a very little solder need be used. Precaution should be taken to keep the hot soldering bit away from the metal.

A clogged gasoline strainer is often the cause of trouble, and this is about the first thing that the autoist should examine when the misfiring is apparently in the fuel supply system. The brass gauze strainer should be frequently taken out and cleaned of any dirt that may have been filtered out of the gasoline.

An Obstructed Spraying Nozzle—Owing to the small needle-like opening in the spraying jet, it is not uncommon for a particle of grit to lodge in the orifice and partially stop the flow of gasoline. The obstruction will not always interfere with starting, but as soon as the motor speeds up the amount of gasoline sucked through the nozzle will not be sufficient for the motor at higher speeds, and it will soon begin to misfire until the motor slows down to first speed. A leak in the intake manifold will cause misfiring in one or two cylinders, and is often mistaken for ignition trouble. The cause may be due to loosening up of the bolts securing the flange to the cylinder.

The inlet valve is often the seat of the trouble, and missing here is generally caused by a weak or broken spring, a bent stem, or a carbonized valve. If the valve spring has lost its temper and broken down, the tension will be insufficient to properly hold the valve on its seat and the gas will partially escape and so cause missing. The insertion of an iron washer or two will increase the tension of the defective spring and serve as a temporary road repair.

A broken spring may be similarly repaired by placing a washer between the broken ends. A bent valve stem should be taken out and carefully straightened by laying it upon a billet of wood with another block interposed between it and the hammer. Only a very little force is needed, and the stem should be repeatedly tried until it slides freely in its guide.

Oil on Garage Floors—As an indication of carelessness on the owner's part, nothing is quite as effective as a neat little puddle of oil in the mathematical center of the floor, directly underneath the car. When it becomes necessary to lie down under the car to repair or adjust some part, this cunning little puddle of lubricant helps a lot toward the comfort of the man doing the work. The method of fixing this in the public garage is well worth copying (?). When a pool of oil collects on the floor there, the preferred way of fixing it is to sprinkle sawdust over it. The oil-soaked sawdust pile will make a fine starting point for a fire as soon as some thoughtful friend supplies the match necessary to start it.

DIRECT FUEL INJECTION TWO-CYCLE MOTORS

By THOS. J. FAY.

DIRECT fuel injection, as an adjunct to two-cycle motors, represents one of the most promising features, and designers of acumen recognize the possibilities. If the fuel is induced into the crankcase with the air, the mixture, if the crankcase compression is maximum, becomes combustible, and with the usual arrangement of ports it is extremely difficult to (always) prevent crankcase shots. The prime source of this class of trouble is due to having fixed ports with the inlet and exhaust simultaneously open coupled with a variable terminal pressure. If the terminal pressure is for any reason unusually high, some of the products of combustion in a flaming state will enter the crankcase with the usual consequence, *i. e.*, a crankcase shot, so called.

If the fuel is directly injected, which is a matter of providing a suitable injector and placing it in direct communication with the cylinders of the motor, the crankcase compression will then reduce to the compression of pure air, which, being non-explosive, crankcase shots will be eliminated even though flaming products of combustion may still enter the crankcase.

If the air in the crankcase does become contaminated (fouled) it is not such a serious matter under the conditions of direct injection of fuel, since the compression in the cylinder may be established at a point so high that preignition would be assured were the fuel mixed with the air too early. By timing the fuel injection so that combustion will be propitious, the compression may be just as high as mechanical considerations will allow of.

Products of Combustion Will Not Defeat Power—That contaminated mixture can be utilized even advantageously is shown by the story of nitrogen in the mixture, which represents 11.8 out of 15.3 pounds of atmospheric air, as required to induce complete combustion of one pound of gasoline. In other words, all fuel is encumbered with a large proportion of inert gas, and this is the reason why it can be used. The compression must be regulated to suit the dilution of the fuel with inert gas. Products of combustion must be classed with nitrogen (as an inert gas) with the exception that they are superior to nitrogen for the purpose, due to the presence of a little fuel value in the products (which is not so with nitrogen) and to the further fact that the products of combustion are in a heated condition, which in itself is of more than a little advantage when account is taken of the specific heat of gas mixtures, ranging as it does between 0.20 and 0.24.

Correct Mixtures by Adjusting Fuel—If a certain proportion of fuel under certain conditions of compression, will induce satisfactory results, then, within certain limits, other proportions of fuel, under other conditions of compression, will be followed by substantially equivalent results. True, the amount of oxygen in proportion to fuel present must be adequate to propagate flame, but this is a limitation which may be readily realized even when a considerable percentage of spent gas is present, provided the compression is adequately increased, with one other proviso, *i. e.*, the fuel and the gases must be thoroughly intermingled to prevent stratifying.

If the fuel is projected into the gas body, as it will be when a suitable fuel injector is employed for the purpose, the mixture will not stratify, since the force of the sprayer will be spent in the process of distributing the minute globules of fuel to all parts of the gas body. In the presence of a suitably high compression the fuel (in view of considerable excess heat) will be rendered volatile at a high rate of speed and the logical conclusion is that two-cycle motors become at once practical under the conditions as follows:

(A) With a crankcase compression of from 5 to 7 1-2 pounds per square inch limited to atmospheric air, provided the transfer ports are suitably waterjacketed, free from undue bends, short and of adequate area.

(B) If the cylinder compression is so high that the rate of flame propagation will be adjusted properly despite the lack of complete scavenging.

(C) If preignition is aborted, which is a matter of timing the fuel injection.

(D If the fuel injector is so contrived that it will project a spray of fuel into the compressed body of air, etc., in sucn a way as to cause the fuel to volatilize quickly and defeat stratification.

(E) When the cylinders are maintained at a working temperature, which is a matter of properly jacketing and circulating a cooling liquid, as water, at a sufficiently rapid rate, with the understanding that the heat will be sponged out of the water as fast as it is taken away from the cylinder walls, through the use of a radiator of adequate capacity to absorb heat.

Commercial Examples Show Results—Fig. 1 depicts a motor of the two-cycle class, in which the fuel is injected in the stream of air as it rushes through the orifice of the transfer port from the crankcase. The fuel enters the injector at A, passes into the body B and is fed out through the supply pipe C to the nozzle D, which lies in the stream of inrushing air from the crankcase, which in turn enters the cylinder through the transfer port E which is short.

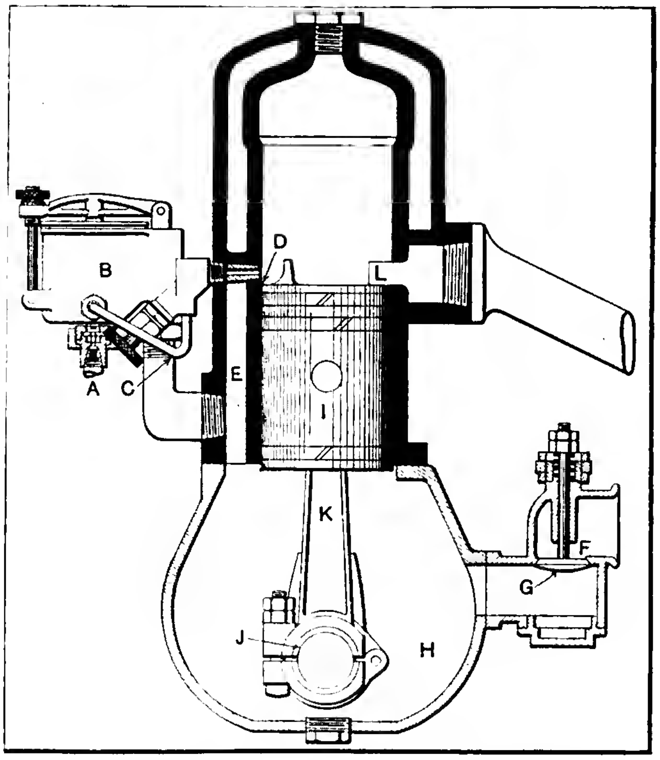


Fig. 1—Type of two-cycle motor with direct fuel injection

Atmospheric air enters the crankcase through the orifice F by the automatic valve G into the chamber H, where initial compression takes place, due to the displacement of the decending piston I in obedience to the stroke of the crank J interconnected by the connecting rod K. Compression takes place when the piston I ascends. On the down stroke following compression the charge, having been ignited at the proper time (just before the completion of the compression stroke) delivers up its energy and just before the end of the stroke the exhaust L is uncovered (in advance of the induction port) at the termination of the induction port E. Due to early opening of the exhaust port L, the exhaust rushes out at a sufficient rate to reduce the terminal pressure below the crankcase compression, so that when the induction port is uncovered the compressed air from the crankcase (picking up gasoline en route) is enabled to enter the cylinder in proportion as the exhaust products pass out.

The two-cycle relation is established since the action is such that a power stroke is induced for each complete revolution of the crank in each cylinder of the motor following the action as above indicated and a more continuous torque results.

In this motor the fuel is well mingled with the air, because it is forced in as a spray at the throat of the transfer port on the induction side, due to good crankcase compression.

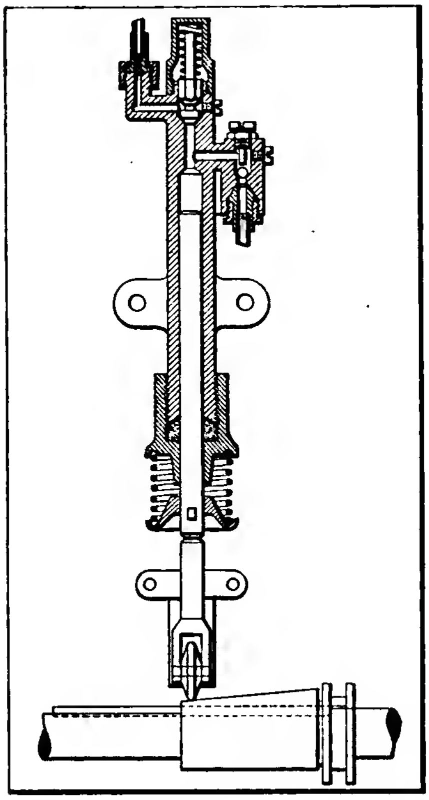


Fig. 2—Fuel pump showing sliding cam contrived to alter the stroke of the plunger at will

When a Timed Fuel Injector Is Used—There is further ground for experimenting, as when a timed fuel injector is employed, the difference being that the fuel will then be injected just before ignition with an interval of time sufficient to assure that the fuel will vaporize and mingle with the compressed air in such a way as to bring each molecule of oxygen in contact with its quota of hydrogen or carbon. Fig. 2 depicts just such an injector, and mechanically there are several ways of adjusting for time of injection, one of which, the sliding cam, as shown, seems to be the more simple.

The main reason for discussing this phase of the fuel-injection problem is to keep in mind the possible advantage attending the increase in compression which will be rendered possible if preignition is entirely eliminated, and this will be so if the fuel is timed so that if it does ignite without the aid of a spark it may be timed so that it will do useful work just as it would were the spark effective.

There is one other (possible) advantage attending the use of an adjustable pump, *i. e.*, the fuel will not be in the incoming crankcase charge, so that if some of this charge should "sneak" out with the exhaust it will not be at the expense of fuel; the fuel would be injected after the exhaust port closes on the up stroke of the piston.

It is not to be supposed that in a two-cycle motor (with given piston displacement) the mixture can be made so efficient for the purpose that the same amount of power per stroke will be realized as in a four-cycle motor of the same displacement. Were it possible to render the conditions of scavenging equal in both cases, then, and then only, would the strokes be equal as respects power delivered. In two-cycle motors the aim is to afford a rapid series of twisting moments and depend for result upon doubling the number of such moments, hoping that each power increment will be at least equal to one-half the ability of a single twisting effort in a four-cycle motor. If each twisting effort in a two-cycle motor can be made to exceed the turning moment unit in a four-cycle motor, then the two-cycle motor, size for size, will deliver more power. Two-cycle designers claim that this advantageous state is in evidence even when the two-cycle motor is designed in the most simple way.

LIGHTING EQUIPMENT DEMANDS ATTENTION

Much has been said about the ability of acetylene generators, and true to the story, they are of very excellent characteristics, taking them as a whole. There are one or two small matters, however, which do not always receive the maximum of attention even at the hands of builders of cars when they furnish generators. It is not uncommon to note that the generators are installed without a gas bag to take the fluctuations, and in the absence of the same, the light flickers. After a time if there is no water trap the presence of excess water in the piping leads to the same trouble and it is even possible to find cars in which no attempt is made to drain the water to a low point. The device here illustrated shows how this matter might be disposed of, although the principle may be incorporated in without going to the mass of detail as presented.

The piping should be well installed, and to place the same in a protected position would seem to be well worth while. The copper piping frequently used is both small and thin of walls, and unless it is annealed it is prone to fail in service. Any autoist who finds that the piping is brittle, which is a sure sign that it has not been annealed, may readily perform the operation by simply heating the pipe after it has been coiled up to render it easy to handle, and when it approaches a clear red quench it in water. Steel is rendered hard by quenching, but copper follows a reversal of the law, and is rendered soft.

Oil Lamps Must also Be Cared For—The following observations apply directly to oil-lamp equipment, they being somewhat revamped to suit automobile conditions, otherwise they are very old indeed:

(a) Keep the lamps scrupulously clean; this is one of the most important details.

(b) Select wicks that are the right size for the lamps; they should be a snug fit in the wickholder.

(c) The wicks should be just long enough to reach the bottom of the oil well and no more.

(d) The wicks should not be too tightly plaited; soft wicks will best serve the purpose, and when they get hard they should be discarded.

(e) New wicks should be dried out before they are put in the lamps.

(f) Before lighting, the wicks should be dipped in the oil.

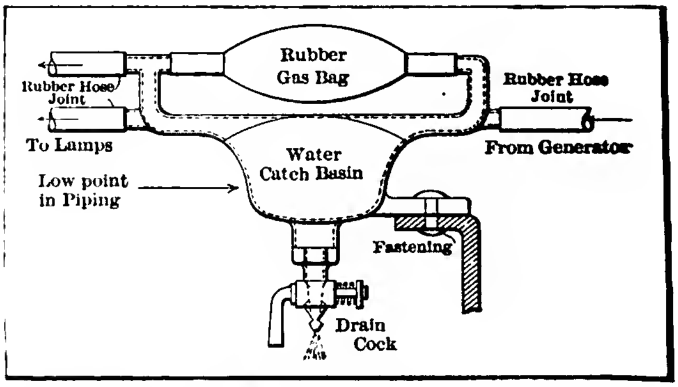
(g) The oil well should be kept full of kerosene.

(h) In properly designed lamps the wick should pass to the bottom, inclosed all the way by the wickholder or some other suitable means as a safety device and to keep the wick in place. The inclosing holder should be open at the bottom.

(i) After lighting the lamp, turn the wick down and then slowly raise it to the right height. The exact right height cannot be determined until the lamp warms up.

(j) The oil can in which the kerosene is kept should be closed in order to shut out water, which oil will absorb to a vast extent if opportunity affords.

In this state anything but a good light will be given off, and the lamps will snuff out readily.



Scheme for Holding Gas Bag and for Draining Piping System

How Warner Timing Device Does Its Work

Messrs. Baker and Warner Using the Timer

TIMING in automobile competition now requires more accuracy than can be had by even the most expert handling of stop watches, as the difficulties of this method increase in proportion to the speed of the cars. Realizing that the degree of accuracy required was beyond the attainment of human eyes and hands, E. H. Warner, of the Warner Instrument Company, and Walter Baker, whose connection with racing dates back to the Baker electric "Torpedo," co-operated to produce an electric device which would perform the duty of timing, and the Warner timing instrument was the result. At Indianapolis, Lowell and Riverhead this instrument kept account of the speed performances of the contestants, supplying automatically indisputable figures for each lap.

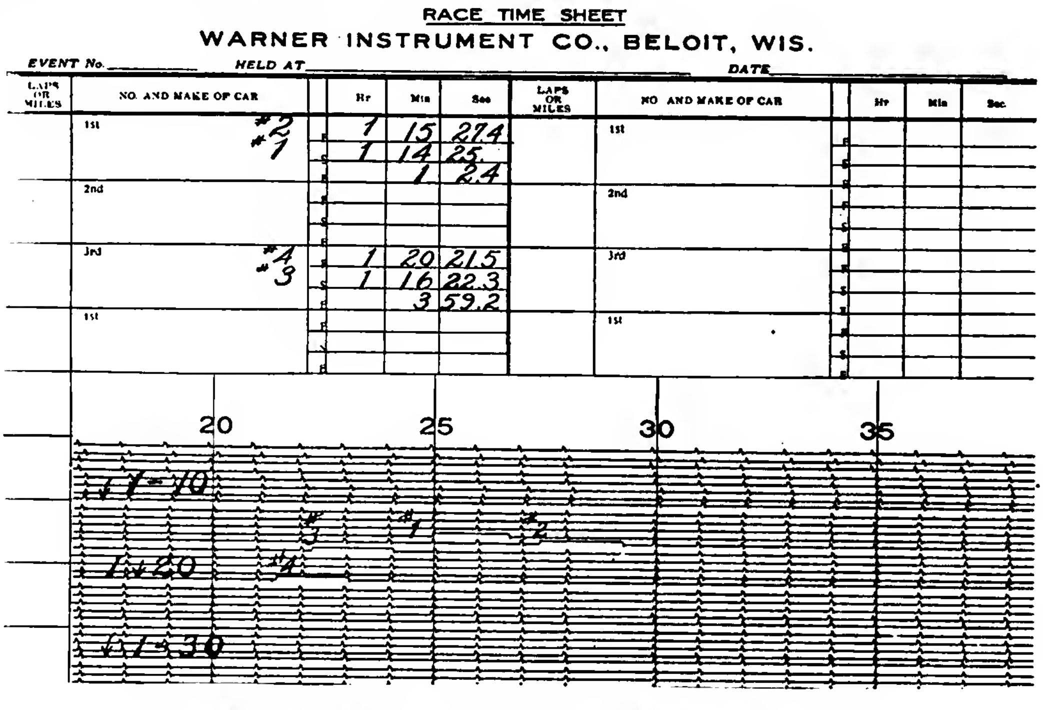
The Warner timing instrument consists of a revolving drum covered with a suitably ruled sheet of paper, on which a pen traces a spiral line. By means of an electrical connection with a wire stretched across the track the pen is jerked to one side whenever a car passes. The drum makes one revolution per minute, and the paper on it is ruled to mark every five seconds. In addition to this, the pen is connected with the clockwork so as to make a notch in its line every second. Every ten minutes, or ten revolutions, an extra wide space is left between the spiral lines, to minimize the possibility of a mistake in counting them. The wire across the track is not always connected with the device, but is put in circuit by a key handled by the operator whenever a car is seen approaching. This prevents any accidental tripping of the pen by the officials on the track.

Evidently, such an instrument can give an absolutely automatic record of the passages of a single car, as when a record trial is being made. In an ordinary race, as there are a number of cars on the track, and each acts on the recording pen in the same manner, it is necessary that the operator of the instrument mark on the record the number of the car that caused each movement of the pen. In practice two men are required to do the timing—one to operate the instrument, and the other to make the necessary subtractions to show the time of the cars for the laps and totals. The operator usually calls out the number of each approaching car at the same time that he presses the key to put in circuit the wire across the track. As soon as the car has passed he calls off the time as indicated by the recorder. The second man enters the number of the car and the time on a sheet provided for that purpose. and then figures the elapsed time of that car and its time for the last lap. These figures are then posted on the scoreboard.

When it is desired to take a record of the passage of a car at a distant point, another wire is strung across the track at that point and put in electrical connection with the instrument. The operator at this point has a key to put his wire in circuit, and also has a telephone connection with the head operator at the instrument, by which he announces the numbers of the cars that pass. These are inscribed on the record, with some distinguishing mark to show at what point they were taken.

Such an instrument is naturally capable of any desired degree of accuracy, as the recording pen moves at identically the same instant that the front wheels of the car press the wire. In the Warner device now in use the maker has been content with reading tenths of seconds. It will be remembered that the pen makes a small notch in the line every second; the distance from the nearest second notch to the deep notch showing the passage of a car is measured by a special scale to give a reading in tenths. The time could be measured in hundredths of a second, if it were desired, by using a larger drum and a finer scale with which to read the fractions. The paper record is preserved, and in case of a dispute or a mistake in posting the figures, provides an accurate record of just what actually took place. The whole instrument is as nearly as possible free from any possibility of human error.

In practice the Warner timing device has met with the greatest success, and in every contest in which it has been used its record has been accepted as final.



Specially Ruled Paper on Which the Timing Device's Record Is Made

VARYING COMPRESSION

Editor THE AUTOMOBILE:

[2,046]—I have a compressometer with a maximum hand for testing compression in cylinders of my six-cylinder car, 4¾ x 4¾. My six cylinders register as follows:

No. 4	58 lbs.
No. 6	58 lbs.
No. 5	60 lbs.
No. 2	60 lbs.
No. 3	48 lbs.
No. 1	82 lbs.

Now you will note that the compression in No. 1 registers nearly twice as high as No. 3, and, as far as I am able to judge, the piston rings and valves in both cylinders are equally tight. How would you account for the difference in compression, and do you think if all the cylinders were equally tight that the compression in each one should be as high as the highest, viz., 82? Also would the engine be more efficient if they were all as high as 82? I might say that if they were it would be very difficult to start the engine, as it is very hard now to start on No. 1.

AMATEUR.

Toronto, Can.

Such a large difference as your measuring device shows would lead one to question if it were right, since, as you say, the motor runs well. This latter would seem out of the question were existing differences as great as those between cylinders one and three above. So before going any further it would be well to have the instrument inspected and then make another trial as a check.

Granting that you find the instrument right, so that the figures given are reliable, it would seem as if the average pressure which the manufacturer intended to attain was 60 pounds. You will note in looking over the figures that, taking this as correct, but two cylinders, one and three, differ markedly from it. In fact, you could hardly expect to get and retain a closer agreement than that which cylinders 2, 4, 5 and 6 afford to this supposition.

Where the compression is high, as in the case of cylinder 1, some material will have to be removed from the piston head, combustion chamber walls, valve and valve caps, or some combination of two or more of them. In the ordinary case, the changing of the last is not advisable, so there remains but the piston, cylinder walls, or both. To reduce the piston head is the easiest, since it is done by taking out the offending piston, chucking it carefully in a lathe and turning off the required amount of metal. Figuring this out as carefully as possible, it appears as if the cylinder in question has over 8 cubic inches of space too little. That is, it lacks that much of being right for 60 pounds compression. This, based on a 4 3/4-inch diameter of piston, would mean a vertical height of 15/32 inch, nearly 1/2 inch, which you could not machine off with safety. The best plan will be to caliper the piston and see how much it will stand. Then take off that amount and see what effect it has had upon the compression. Then, if more is required, the rest will have to be taken off of the top of the cylinder walls, a hard task at best.

If you really attempt to fix the cylinders it will be well to attend to cylinder No. 3 at the same time, since that is an ever-present source of lost power. Figures appear to show this too large by the amount of over 7 1/2 cubic inches, which is equivalent to 7/16-inch height by 4 3/4-inch diameter. To remedy cylinder No. 3, then, you would add a plate to the piston head of the full diameter and 7/16-inch high, or, if the edges were tapered off, the height would have to be increased to correspond. In this latter case, see the article, "Ingenuity in the Making of Repairs," on pages 353, 354 and 355 of the August 26 issue of THE AUTOMOBILE. Upon the last page of this in particular is described the method of adding to the head of a piston, although the article is written from the standpoint of repairing a broken piston head.

The compression must be equal in all six cylinders, else the lessened amount of power developed in the one with lower compression will prove a drag upon the others. Similarly, increased power from any one would destroy the balance, which the six-cylinder is noted for, and which is the real reason for using it. If you are doubtful about your ability to fix it, or that of the nearest repair shop, communicate with the manufacturer of the car.

TO CURE BALKY STARTER

Editor THE AUTOMOBILE:

[2,047]—We have a ***** 1907 automobile that is very hard to start at first. After it has been started and has run five or ten minutes it is easy to start, if stopped. After it has run for a couple of hours it is awfully hard to start. The spark is good and we cannot adjust the carbureter so as to improve the starting.

HAYNES & SON.

Newkirk, Okla.

It is foolish to continue to crank a motor for five or six turns. In medium weather the modern engine should start on the first, or, at most, the second turn of the crank. If it does not do so, something is at fault, and should be corrected before cranking again. If the carbureter is adjusted perfectly and still the engine won't start, you should overhaul the ignition and wiring for something wrong. Look particularly for loose terminals, wires with the insulation worn off in spots, and similar small and hard-to-find sources of trouble. It sounds a lot like the second, insulation worn off. Many times this happens and does no harm when standing still or running slowly, so that the vibration is small. On the other hand, when running fast or when the vibration is very great, the bare spot rubs against metal or other conductors, with the result a short circuit. When the car stops, the bare spot pulls away from the metal, and the car will start at the first turn of the crank. Look the car over carefully for some little hidden trouble like this.

STORAGE BATTERY QUERIES

Editor THE AUTOMOBILE:

[2,048]—Will you please answer the following questions for me?

1. Can a storage battery be charged from a magneto, and if so, how?
2. Can a storage battery be charged from any source of direct current without using any additional device?

New York City. PERCY HEINEMAN.

Both questions cannot be answered directly; that is, by means of a simple yes or no, although in the case of the second question we can come pretty near it.

As to the magneto, if it is of the ordinary rotating armature or rotating sleeve type, it will generate an alternating current. This cannot be used to charge the battery without a commutating device, which will convert the current into a direct one. This may be done in a number of ways; in fact, it may be done upon the magneto itself. In other words, the magneto may be so constituted as to deliver direct current. In that case, it could be used, but much care would be necessary, as the plates of the battery could be buckled and spoiled by charging too fast. You will need a combination volt and ammeter for measuring the current, as otherwise you will not know how much current you are using and are liable to spoil the battery plates before you find it out.

The direct current may be used directly, but as brought out above it is dangerous, unless you have some means of cutting down the amount of current flowing, and some means of measuring the amount of current flowing as well. In this connection, you are referred to several excellent articles on this subject which have appeared from time to time in THE AUTOMOBILE, notably: "Operation and Care of Vehicle Batteries," August 12 issue; "New Nickel Iron Battery Withstands Tests," July 15 issue; "Pointers on the Care of Vehicle Batteries," May 20 issue; "Some Further Ignition Hints," May 27 issue; "Charging Storage Batteries," July 1 issue (letter).

Nearly every one of these excellent articles lays emphasis upon the care necessary in charging storage batteries, and the precautions which are necessary to attain proper results, and nearly every one of them, brings out the points brought out above, namely, that too rapid charging will destroy the valuable plates. That is to say, a peculiar and out-of-the-ordinary method of charging is to be discouraged, in that it might go wrong, and then you would be out the price of a new set of plates, in your particular case, the price of a new storage battery, a not-inconsiderable sum. The question arises, then, is this trying of a new method worth your while?

ANSWERED AND DISCUSSED

VACUUM AIRSHIP AGAIN

Editor THE AUTOMOBILE:

[2,049]—Your comments in the September 30 issue of "The Automobile," page 562, on the vacuum airship, which was described in the August number of "Machinery," are justifiable. We ask if you have seen the following article in the September number, page 39, by Professor Forrest E. Cardullo, which shows mathematically that no structure light enough to rise in the air (if the air were exhausted from its interior) could be made of known materials and withstand the pressure of the atmosphere.

Prof. Cardullo's demonstration gives a general formula that applies to all spheres, large or small. The fact that a sphere cannot be made to withstand the pressure of the atmosphere apparently demolishes the whole project, as surely a cigar-shaped vessel would not be as strong as a sphere.

We have endeavored to get Mr. McCready to publish details of the De Bausset design, but he has not complied, and we feel that the De Bausset claims are without sound foundation.

FRED E. ROGERS,
New York City. Editor "Machinery."

The article referred to should conclusively discredit the vacuum airship idea. Prof. Cardullo takes for the sake of convenience a sphere containing one pound of air. Such a sphere would be 2.93 feet in diameter. If the sphere itself is to weigh one pound, the thickness of its wall (made of steel weighing 480 pounds per cubic foot) will be about 0.0001 inch. The atmospheric pressure on it will be 14,270 pounds; the cross section of the shell will have an area of 0.1023 square inch, and therefore the compressive stress in this cross section will be 140,000 pounds per square inch.

Even more obvious is an illustration taken from Mr. McCready's own figures. The proposed airship was to be 150 feet in diameter and 750 feet long, and was to weigh 270 tons. Prof. Cardullo says: "If all this 270 tons were utilized as a 700-foot steel column, keeping the ends of the cylinder apart against atmospheric pressure, the stress in the column would be 163,000 pounds per square inch." He also disproves another theory which has long been upheld, namely, that the vacuum ship becomes more practicable as its dimensions are increased. Prof. Cardullo shows that the compressive stress in the wall will be independent of the diameter.

This should dispel for all time the old and well-worn vacuum "chestnut." Those interested are referred to the article.

LIST OF 1908 AUTOMOBILES

Editor THE AUTOMOBILE:

[2,050]—Have you on hand any publication giving a complete list of the 1908 models of American automobiles, with detailed description, price and illustrations of each?

A. B. CRAFT.
Cranford, N. J.

Just the matter you want will be found in the November 28, 1907, issue of The Automobile, on pages 792 to 796, inclusive. This is the tabular story of the American cars for 1908, published in advance. The whole range of cars is covered, these being divided into four main classes, namely, gasoline pleasure cars, electric pleasure cars, gasoline commercial vehicles and electric commercial vehicles. The first named, in turn, is subdivided according to price classification into: cars costing less than $1,000, costing from $1,000 to $2,000, costing from $2,000 to $3,000, costing from $3,000 to $4,000, costing from $4,000 to $5,000, costing from $5,000 to $6,000, costing $6,000 up. This makes ten complete and separate lists, which include no less than 400 cars. As for illustrations, you will find a few in that and succeeding issues. We know of no other publication which will give you as good or as complete a list as this one.

PLATINUM POINTS BLACKEN

Editor THE AUTOMOBILE:

[2,051]—What is the cause of an induction coil on a two-cylinder automobile becoming blackened (apparently oxidized) on the platinum sparker at contact point? Three new points have been tried with the same result; when they become blackened the sparker fails to work unless it is taken out and polished, when it is all right for a few hours, then the polishing has to be repeated The other coil never bothers in this way at all.

T. NELSON & SONS.
New York City.

This is a trouble which we have never heard of before, and are inclined to believe must have misled you. This is, the ordinary pitting of the platinum points of a coil is accompanied by more or less blackening of the metal. We are inclined to think that you have confused the real cause of the trouble (pitting) with one of the results (blackening). Some pitting is to be expected, and no method is known of absolutely preventing it but by having a proper adjustment of the points, so that too much current (and, consequently, heat, which means pitting) will not pass through the points. One way out of the trouble is to get a specially made two-cylinder coil, with but one trembler. This will reduce the platinum point trouble to a minimum, in that it gives but one point to be kept in good order. In polishing off corroded or pitted points, use the finest file obtainable or the very finest emery paper. In a recent issue you will find Nicholson's X F Number 6 Swiss file advocated as excellent for this. The use of even this, to say nothing of the heavier and coarser files, should have much care, from the viewpoint of the tremendously high value of platinum, even the small amount filed off having a value.

GARAGE FLOOR MATERIAL

Editor THE AUTOMOBILE:

[2,052]—In one of the early summer issues of "The Automobile" the address of a firm supplying a plastic material to be applied over old garage floors, to render them impervious to water, etc., was given. I cannot now find that number. Can you help me?

H. G. A.
Waterbury, Conn.

The substance to which you have reference is called Crown Sanitary Flooring. It is made in New York City, by Robert S. Keasbey Company, 102 N. Moore street. It was described in the July 15, 1909, issue of The Automobile. For the benefit of those who are interested in this material for garage use, and who missed that particular issue, a short description of it may not go amiss.

It is said to be an asbestos composition, and comes in the form of a paste. This may be applied to an old or new floor in any convenient manner, spread over in an even layer. The makers recommend a thickness of 1/2 inch in the ordinary case. Besides the advantage of being easily and quickly applied, it has the merit of being water, fire, and oil proof. It may be had in any desired color, from the method of laying it would have no seams, and similarly, when finished it will be practically indestructible. With this large number of features to recommend it, it should find wide use.

LIGHT STAND FOR GARAGES

Editor THE AUTOMOBILE:

[2,053]—Sometime during the summer I saw an article in "The Automobile" about a device for supporting electric lamps in the garage, in such a way that a chauffeur could work by them at night. It was a stand, and the lamps were hung on it in such a way that a person could move the stand anywhere. As I remember, it was quite light in weight. I cannot find the number of the paper in which it was described, and would like to have you let me know about it.

R. M. BURNETT.
Southborough, Mass.

The article in question will be found in the July 1 issue of The Automobile, under the heading, "Saves Electric Light Bills." The stand is there described in full. It is there called the Portland Wash Rack Stand, which is a misnomer, for the right name is the Portable Wash Rack Stand. It is made and marketed by the Brown Company, Syracuse, N. Y. As you say, a device of this sort is very convenient in and around a garage. Its lightness, compactness and low price render it a valuable thing in any sort of a shop.

ATTENTION MANUFACTURERS

Editor THE AUTOMOBILE:

[2,054]—I would like to contribute a short article to your publication with a view toward attracting attention of automobile manufacturers to the advantage of establishing branch factories in the Southern States, where the demand for motor cars is beginning to assume prodigious proportions. The stimulation that has recently been given good road construction has had remarkable effect upon the motor industry, and it is but a question of a short time when all kinds of motor vehicles will be in great demand, from the gasoline plow to the high-priced and luxurious limousine.

It is not fair nor is it logical that a greater portion of fine grade cars should be constructed north of Mason and Dixon's line, for it forces the southern purchaser to go into his pockets for the enormous freight rates or charges that unjustly add so much to the initial cost of his car.

We should have home factories to supply the home trade, and it is up to the progressive motor car builder to realize that the first on the ground in this promising, and well nigh virgin field, will reap the greatest harvest. The southern people are clannish and are loyal to "home industries," and would greatly prefer purchasing a high-grade car of home make to one built in another section of the country, especially so when they keep the $25 to $100 in their pockets that they are now forced to pay the transportation companies before their motor car can be delivered.

Now it is well known that within this part of Georgia there can be found abundance of raw materisl for motor car construction, and thousands upon thousands of hydraulic horsepower, in the present form of small streams, flow through the richly timbered and ore-imbedded hills of old Georgia, idly to the sea, that could be harnessed and made to furnish power for manufacturing enterprises at less than half the cost of artificial energy developed by costly boilers, engines and constantly increasing expensive coal.

Within this, Bartow County, Georgia, are found practically inexhaustible deposits of iron, manganese and asbestos. Beauxite also abounds, corundum, some lead and great quantities of the finest grade of yellow ochre. Hardwood timber of all kinds and pine of the best quality grows upon the hillsides.

I have no property to sell, nor have the slightest interest in any real estate or property of any description that could gain from the installation of an automobile plant in this section, but my patriotism for my city and county, and my desire to see the development of marvelous natural advantages, prompts me to make some effort to draw attention to the advantages to be found here by some progressive manufacturer.

The United States Government has a corps of surveyors now examining a site upon the Etowah River, four miles from this city, where between two gigantic bluffs a dam 190 feet high, which will develop more than 20,000 horsepower, will soon be built by Uncle Sam. This power will be for sale at low rates. The dam will back water over a length of 18 or 20 miles and will make an artificial lake that will rival in scenic beauty the famous Lage George, N. Y., and will make a new field for motor boats, as well as furnish a fine location for a factory for the construction of such pleasure craft.

It will be a big thing, and I would like to get it before the manufacturers, in order that they might investigate when they come to Georgia to attend the show and races during November in Atlanta.

S. P. JONES, JR.,
Advertising Committee,
Chamber of Commerce.

Cartersville, Ga.

SELF-STARTER INFORMATION

Editor THE AUTOMOBILE:

[2,055]—Will you kindly give me an article on the various schemes or contrivances for automatically starting gasoline engines or automobiles. The various methods employed, and the success or failure of the same? What were the reasons for any trouble that developed? I think that an article on this subject would be interesting to others as well as myself. W. T. K.

Nichols, Conn.

If you will turn back to Volume 20 of THE AUTOMOBILE, which you doubtless keep on file, you will find, in the April 1 issue, the very thing that you are looking for. This is an article entitled "Self-Starting Devices Attract Much Attention," and in so far as it was possible in three pages (542, 543 and 544) the whole subject of starters was covered. They divide naturally, as the article points out, into two classes, the mechanically operated and the fluid operated. In the former class are the strap, spring and similar devices, while under the latter head are grouped the compressed gas, compressed air, exhaust gas, and similar starters. You will find these described in the article mentioned.

RULE OF THE ROAD

Editor THE AUTOMOBILE:

[2,056]—Attached find photographic drawing explaining collision which occurred some two or three weeks ago.

The Green car coming up Broadway on the correct side of the road intended to turn into the Little Neck Road on a close turn (This is a notoriously bad turn). The Green car was traveling slowly on account of the chauffeur's knowledge on the bad turn and the condition of the road. The Yellow car was coming down Broadway in the center of the road. The Orange car was on the wrong side of the road, and seeing the Green car about to make the turn, applied his brakes. The chauffeur of the Green car also applied his brakes, but skidded into the Orange car, breaking a wheel on the latter. At this time the Blue car was in the center of Little Neck Road. The owner of the Orange car (which was on the wrong side of the road) sent a bill for damages to the chauffeur of the Green car. The latter had adhered to the rules of the road and kept to the right. Kindly state who is at fault.

COLLISION.

New York City.

Not being able to reproduce colors, it will be necessary to letter the cars. On the diagram of the two roads and the cars involved, as brought out above, everything is just as the original diagram showed, except that the green car has been marked A, the orange car B, the yellow car C and the blue car D.

Green car A was in the right, and therefore not to blame, and should not pay the damages asked. Orange car B, being in the wrong, should suffer whatever damages were inflicted as a penalty for not obeying the laws of the road. Yellow car C and blue car D have no actual connection with the case, as from your letter we take it that both of them were at some distance when the collision started and came up later on. They may, then, be eliminated from the case.

The proper method of procedure for orange B car would have been to slow down and apply brakes before actually reaching the turn and before he saw green car A. This was his necessity because he was in the wrong—"off side," to use a football term. In that case he would have had his car slowed down before he saw green car A, and as soon as he sighted the latter it would have been an easy matter to stop in time to avoid an accident.

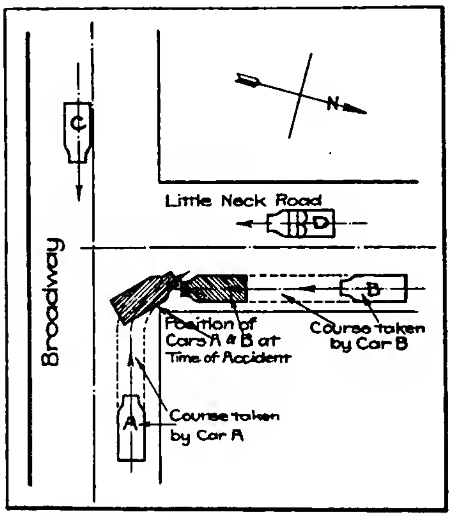


Diagram of Collision on Long Island

It is very plain that green car A was not at fault, and, as stated above, he should not pay any part of the damages incurred by another car which did not observe the law. The submitting of a bill by the latter was not at all surprising, as the road hog, who habitually uses the most convenient side of the road, regardless of others, is usually equally inconsiderate in laying the blame for an accident.

TO ELIMINATE KNOCKING

Editor THE AUTOMOBILE:

[2,057]—I have a suggestion for E. W. Kafer letter (2,037), whose mysterious knocking troubles are exploited in the Oct. 7 issue of "The Automobile." It is just barely possible that one of the valve tappet rods has become so worn in its guide that it has some side play; if this be the case, high motor speeds with well-opened throttle bring out the knock, as there is considerably greater pressure upon the valve, under such circumstances. This increased pressure resists the raising of the exhaust valve and therefore the tappet. The latter being urged by the cam, strikes the worn side of the guide a very hard blow in its endeavor to shirk its natural function. At least, this proved to be the solution of a very baffling knock in a car I owned, which, before I located it, caused me to tear down the motor completely five successive times only to find everything apparently beyond criticism.

K. R. MANVILLE.

New York City.

While the writer of the letter referred to in the above communication did not bring out the point that the trouble only disclosed itself at high speed, as Mr. Manville seems to think, the suggestion is a very good one, and Mr. Kafer's attention is called to it, as well as all motorists, who have, at one time or another, had trouble with a peculiar pounding which defied exact location, and which was omnipresent. It is the little troubles like this, which frequently pass by the notice of the shop or garage "expert," which every amateur is anxious to know. These little things cannot be "doped" out sitting in a comfortable office chair, but must come from actual, and sometimes painful, experience.

MAKE AND BREAK PLUGS

Editor THE AUTOMOBILE:

[2,058]—Will you kindly advise me where I can secure make and break spark plugs to work from a General Electric Company's magneto, made to use with make and break spark, that is, low tension. W. M. CASE.

Clarksville, Tenn.

By far the best way to obtain these plugs, if the makers of the magneto, the General Electric Company, Schenectady, N. Y., will not assist you, will be to go to companies now using, or which have used in the past this form of ignition. These companies will doubtless be glad to sell you an outfit, which you could use with a little adaptation. As a matter of fact, no such plugs have ever been manufactured for sale, each company using this system making its own plugs. Companies which now use or have used this system are: Locomobile Company of America, Bridgeport, Conn.; Gaeth Automobile Gompany, Cleveland; Studebaker Automobile Company, South Bend, Ind.; Ranier Company, Saginaw, Mich.

Fig. 1—Model D, regular $485 car, equipped with oil lamps, tools, tire kit, etc., and ready to run

SOMETHING of a sensation was experienced when the Brush first came into being, primarily because the price was low, relatively, and novelty was written all over the car. That merit also was a comparison seems to be borne out by the last year's performance, of which there are now so many cars in use that it is extremely difficult to stand on any prominent corner in Detroit for ten minutes during the day and not see one go by.

Under the circumstances it would seem as if it will be well worth the undertaking to investigate the car at some pains and ascertain just how it is made and try to tell why the maker deems it expedient to enlarge the line and turn out a vast number of the cars during 1910.

The prime idea of the Brush Runabout Company, of Detroit, Mich., is to make a standard chassis which will be available for use under a great variety of conditions and Fig. 2, representing a coupé, shows up one of the uses to which the chassis may be put to excellent advantage. Among the other selections, of which there will be eight all told, model D is the regular car, which represents a runabout type, as shown in Fig. 1, at the very modest price of $485. The remaining selections include a car with an ornamental tool box at the rear, another with a rumble seat and a third, in raceabout style, with an oval gasoline tank back of the seat of a capacity for a day's run.

The Brush from a Mechanical Point of View—The chassis frame is of wood, the reasons for which, according to the designer, is to afford lightness with strength and to attain a certain degree of flexibility and other qualities attributed to resilience. This is not a new idea, it being standard on such cars as Franklin, Panhard, etc.

The spring suspension is at variance with common practice, in that the chassis frame rests on helical springs placed just over the axles at the four points of suspension, and in order to induce a slow rate of vertical bounce following road inequalities attended by speed of the car, the distance rods are terminated at the chassis frame for the front and hind axle at both sides in friction disk members, so contrived that the friction set-up, due to vertical motion of the axles, will be enough to assure that the travel of the body in the vertical direction will be gradually snubbed and the rate of change of motion will be that described as agreeable riding qualities.

Some earlier attempts to use helical springs for chassis suspensions failed to come up to the expectations of designers, primarily because the snubbing action of the friction members was not taken advantage of and the axles were very heavy indeed, considering the things to be accomplished. The Brush plan does not end with placing friction members to limit vertical bounce, for the axles are made of wood in order that they will not be heavy, although it is recognized that they must be strong.

At first thought it might be considered that axles of wood in an automobile is an innovation not to be taken seriously. Let us have another look. These axles weigh but a few pounds; regular live rear axles weigh nearly 200 pounds. The difference is the story of energy of impact and the influences of acceleration. Were the axles heavy, as they would have to be were they made of metal in the usual way, there is small chance that the friction members on the ends of the distance rods would be capable of snubbing the motion of the rapidly bouncing axle at high rates of road speed and with rough going.

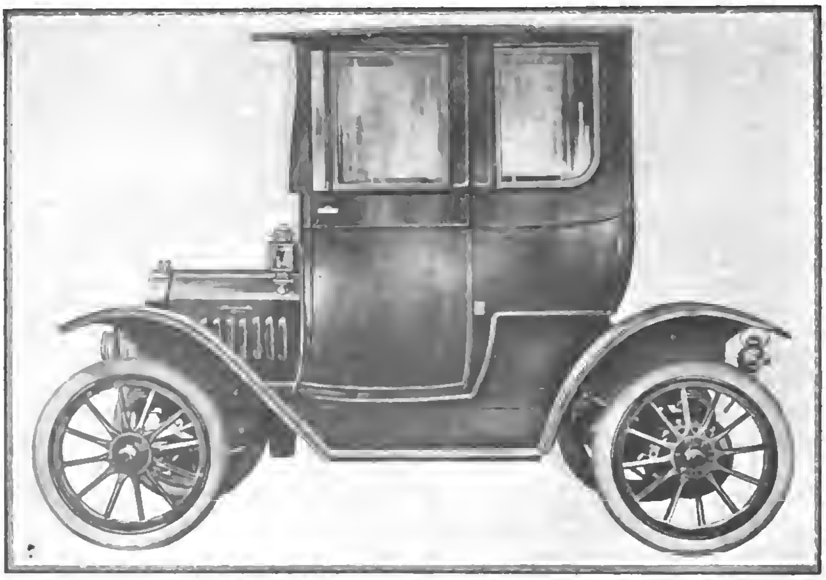


Fig. 2—Brush chassis, equipped with coupé body

By making the axles so that they weigh but little, the featherweight impact component is not enough to overcome the "damping" ability of the shock absorbers, and the body rides on an even platform even when the speed of the car is quite high and when road inequalities are pronounced. There is one point in favor of helical springs aside from the fact that they are practically unbreakable, and that is, they are capable of recovering at a more

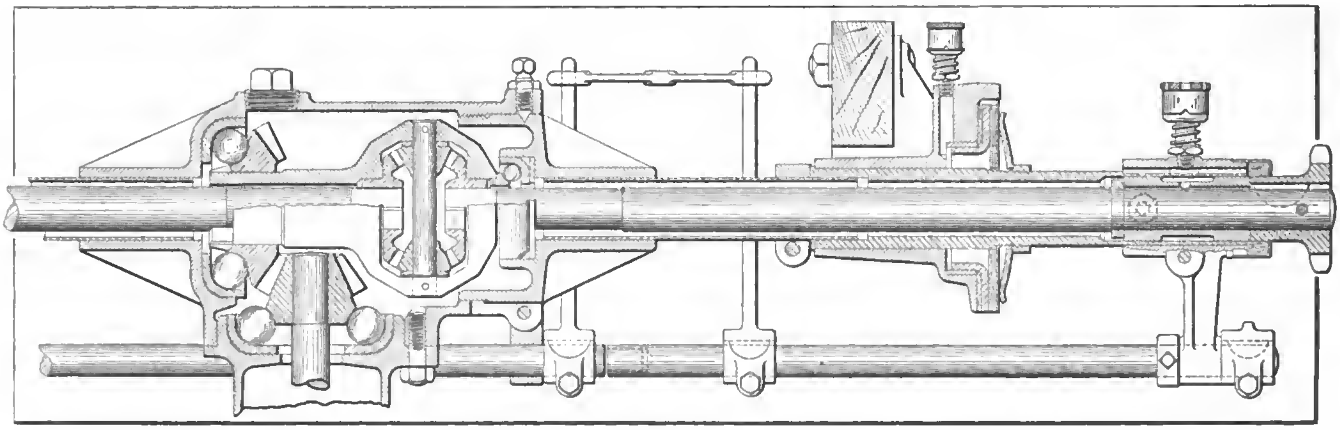


Fig. 3—Depicting jackshaft in section with differential and large ball bearings for the bevel drive

than usual rate when a wheel drops into a rut, and the general performance is very satisfactory, simply because the weight of axle is not enough to disturb the otherwise good relation. As to the strength of wooden axles, it is not necessary to go into detail; they were used in every wagon in the land before steel came into vogue, and the history of wagons does not disclose that they failed in any particular. Four thousand Brush cars add to this favorable historical fact, and this phase of the discussion may therefore be dismissed as being too trivial to warrant the taking of time and space.

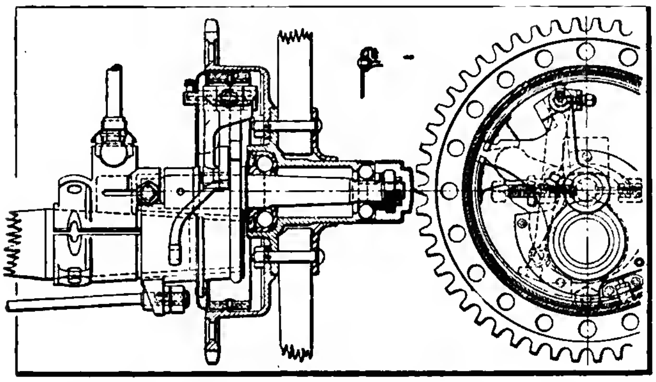


Fig. 4—Rear wheel, sprockets, brakedrum, showing ball bearings, and system of protection against silt of the road

Belongs to the Side Chain Drive Genera—Referring to Fig. 3, of the jackshaft, which is placed across the chassis frame in front of the hind axle a sufficient distance to allow of the required length of sprocket chains, of which two are used, placed as is the custom in cars in general. The differential gearset is shown in section and the cup and cone ball bearing to one side of the housing take the load at this point. The bevel drive also shows on the end of the differential sleeve, engaging the driving pinion on the end of the propeller shaft. leading from the motor through the transmission gearset.

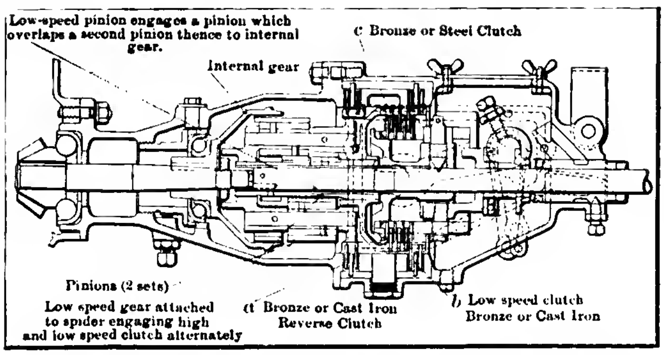


Fig. 5—Planetary gear set, showing multiple disc clutches, system of gears, and screw system of engaging the high speed

The large ball bearings used to back up the bevel drive are excellent indications of the plan of the designer, and, as will be well appreciated, the larger the balls are the longer they will last under thrust and high-speed conditions, which is the reason for the large balls used. The material of which the bevel gears are made is that which will best stand cementation and the finished gears are capable of serving for ball races of competence as well as for the regular work of transmitting power.

The remaining features of the jackshaft will require no more than a glance to disclose the character of the design and workmanship, and grease cups are placed at all points for the customary purpose and with the further idea that as grease oozes out silt of the road will not be creeping in.

Fig. 4 is a section of the rear axle, showing how the sprockets are fastened to the rear wheels by engagement at the bolting of the hub flanges, using the regular hub bolts for holding, and the brake drums are integral with the sprocket wheels. The brake shoes are of adequate stiffness, remembering that they are of the internal expanding type and have to be stiff to properly work, while the facings are wide, of material which affords a high coefficient of friction, and the means of applying pressure show competence. The brakes are inclosed and the dust cover is so contrived that it serves its purpose admirably.

The distance rods fasten to the rear axle just under the spring perches as shown, and a ball and socket (universal) joint, using large diameter ball for the purpose, takes the work, eliminates noise and may be adjusted at will. The wheels are fitted with 28 x 3 1-2-inch pneumatics and the cup and cone ball bearings are even large for the purpose. One other point before departing from the rear axle design; the means for adjusting the wheels to the bearings includes a large hub nut, castellated so that it can be locked when the adjustment is properly made, and closures are placed to keep grease in the cavity as well as to keep silt out.

Transmission Possesses Novel Features—The transmission is of the planetary type, giving two speeds and reverse. Like all planetary gears, when it is desired to go at high speed a clutch is interposed to lock the gears so that the whole nest rotates and the drive is that known as "direct on high"; to go into low, or reverse, the usual custom is to hold the drum by means of friction bands, which may be tightened at will. In the Brush multiple disk clutching members are used in the three cases, bands are eliminated and the ability of the low and reverse clutches is equal to the requirements as measured in this way. The clutch for the high speed (direct on high) differs again from clutches in general in that the means of engaging is novel and is claimed to possess certain specific advantages. The section Fig. 5 shows the general arrangement, in which will be found the high-speed clutch, consisting of disks resting between vise-like jaws, one of which is formed out of the spider and the other is in concentric relation, sufficiently spaced in the axle plane to afford room for the disks plus clearance when the clutch is not engaged.

When it is desired to engage the high-speed clutch, movement of the lever results in the closing of the vise on the disks, as follows: Through the compound action of a screw, which is thrown into engagement by the lever system, the original effort of the operator is added to by the torque of the screw, transposing the torque of the motor. All the operator has to do is to make the initial effort and the pressure resulting is enough to bring the screw into action, when the torque of the motor will wind up the screw and tighten the clutch, all without the use of a heavy spring and at the expense of a minimum effort on the part of the operator, while, at the same time, the engagement is not only gradual, but positive.

The screw effect is brought about by so shaping the metal sleeve so that rollers, which protrude into spiral slots in the sleeve, will screw the sleeve into engagement once the initial motion is imparted by the operator. In disengaging the clutch the reverse action follows and the disengagement is positive and quick.

The planetary, as shown, belongs to the internal gear type, is therefore free from noise when well made, and the low-speed pinion on the shaft, when going into reverse, transmits its motion through overlapping, intermediates, of which there are two pairs, thus making the mechanical balance perfect and assuring adequacy of mechanical ability without having to use large members attended by noise, inertia effects, etc.

The low-speed gear which is attached to a spider is free to engage either the high or low-speed clutch at will, thus perfecting the device for the purpose. The whole system is properly inclosed, may be packed with grease, is so simple to operate that skill is not required and to make a wrong move is quite out of the question, even in the absence of knowledge.

Novelty Resides in the Motor—The single-cylinder motor is rated at 10 horsepower and is of the vertical type placed in front, as in foreign practice. The power of the motor is greater by 3 horsepower than that of the last year's product, not so much due to any very great demand, but, as the designer put it, so that drivers will feel the excess and worry will then be out of a job. The cylinder is of the L type, as depicted in Fig. 6, and among the advantages symmetry has a claim. The head is screwed in against a bevel seat, is rendered tight by the pressure of the head cover against the seat and is readily removed at will if it becomes necessary to clean out the combustion chamber space, as when carbon forms. The valves are large, press against bevel seats, are properly water-jacketed, and, by means of adjustments at the terminals of the tappets, timing may be accomplished to a nicety at any time.

The crankshaft, as shown in Fig. 8, is of 40 points carbon open-hearth steel, stout of section and balanced. Even when balanced to a nicety a crankshaft in a single-cylinder motor cannot be free from unbalanced secondary moments, and it is in this particular that the 1910 Brush offers a new innovation. Fig. 7 shows a balanced gear which meshes with a gear of the same diameter on the crankshaft. The balance weight in the gear Fig. 7, in a plane parallel to the balance weight on the crankshaft, and since the crankshaft balance takes care of all unequal rotary moments plus one-half of the unbalanced secondary moments, it remains for the auxiliary balance (balanced gear) to cope with the remaining unbalanced secondary moments.

The secondary balance rotates on an axis above the axis of the crankshaft a distance sufficient to compensate for angularity of the connecting rod, and while it is not claimed that this sec-

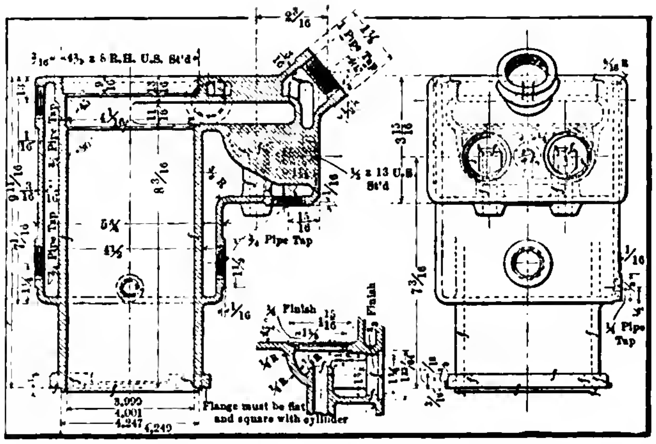


Fig. 6—Cylinder of gray iron, with screwed in head, bevel seat to make it tight, and valves at one side

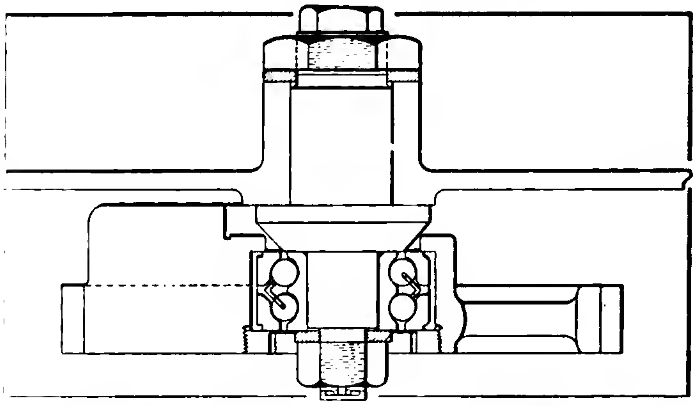


Fig. 7—Auxiliary balance gear showing New Departure ball bearing and eccentric spindle with adjusting nut outside

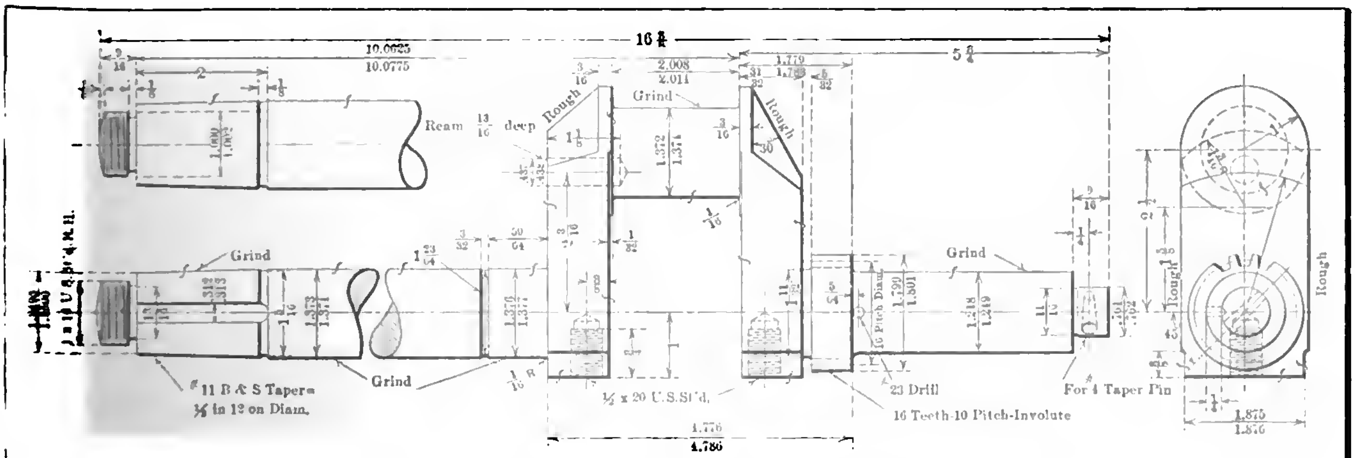


Fig. 8—Crankshaft of 40-point carbon open hearth steel, with liberal bearings surfaces, stout arms and means of direct and auxiliary balancing by thorough use of an auxiliary balance gear

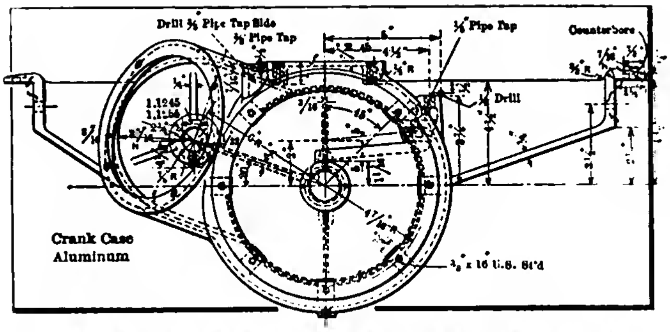


Fig. 9—Crankcase showing opening for balance gear, arms for supporting, and general design

ondary balance is capable of perfection in the sense that the ills of all secondary movements will be dispelled, even so it is the fair claim of the makers that a four-cylinder smoothness accompanies single-cylinder simplicity, and the performance of the motor seems to be the proof of the pudding.

The bore of the cylinder being 4 1-2 inches and accompanied by a longer stroke than formerly (5 inches for 1910), the power is vastly increased over what might have been the normal expectation, since the balance is sufficiently corrected to allow of running the motor at the higher speeds for which four-cylinder motors are adapted, and more power results.

This auxiliary balance is a new idea in American motor practice and in view of the revival of the single-cylinder motor, due to its simplicity and economy, it is reasonable to expect that the auxiliary balancing idea will have a large influence on the future of this situation. It was expected that the balance gear would introduce noise to some extent, which was the theoretical objection to its use, but the quality of work done in the Brush shop seems to be proof against this tendency.

The introduction of the balance gear makes the aluminum crankcase of the motor look as depicted in Fig. 9, looking at it from the end opposite the flywheel, and the opening to the left is that through which the balance gear is passed in assembling or examined thereafter at will.

Fig. 10 represents the steering gear, in which the reduction ratio is 6:1 and the performance is that of a well-thought-out device. The ball on the end of the steering lever is 1 inch in diameter and means are provided to take up lost motion if time makes inroads on the hardened cups which encircle the ball. The gear is rigidly supported to abort possible lost motion from this cause and the sleeves bearing leading to the gearset is long.

An inspection of the material and the way the cars and parts are worked up in the shop leads to the conclusion that a well-thought-out shop system is at the bottom of much of it, and it must be remembered that, while the Brush car is still young, it is built under the "watchful eye" of the responsible head of the Briscoe Manufacturing Company in a well-equipped plant which dates back into automobile history. This plant is primarily devoted to the manufacture of radiators, and is fitted out to do this and other accessory work on a large scale. The machine shop, for illustration, is modern, holds in its makeup a fine assortment of special machine tools of the most modern description, and the force of men available is large and skilled in automobile work. It is for this reason that the Brush car has been brought to a high plane and a large number put on the road, despite the fact that the new plant in which the cars will ultimately be turned out is not ready for occupancy. The new plant will be ready for this year's work.

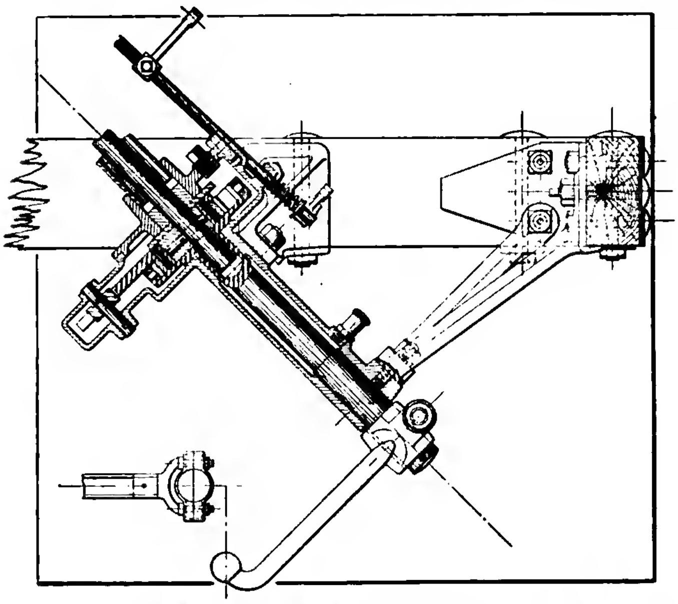


Fig. 10—Steering gear, having a 6 : 1 ratio, long bearings, and strong support to frame

ACCOMPLISHMENT OF ENGINEERS

The remarkable demands made on automobile engineers and the astonishing way in which these demands have been answered have produced the high-priced car of to-day. It is a wonderful creation and there is not a standard car made that is not worth more than is charged for it. At the same time to stand at any populous thoroughfare and see the hundreds of $2,000 to $5,000 vehicles rushing past carrying one or two persons makes one feel that we are living in an age of Babylonian luxuriousness.

Frank Briscoe

In recent times the medium-priced cars have been developed and sprung into favor, taking advantage of the skill and experience in the more luxurious class. Considered as a luxury, the high-priced car is magnificent, but for the great useful demand for transportation off of rails the utility type of car is offered.

Conspicuous efforts to put out very low-priced cars failed because the makers built them crudely, considering price only of importance, whereas the real endeavor must include the lesson learned by engineers and manufacturers, whose goal was results rather than price. We have, furthermore, learned new lessons, finding that just as much accuracy and strength must be put into the smallest car built as in the more pretentious. In point of being "fool-proof" the low-priced car must excel its big prototype for obvious reasons.

The object in the Brush runabout enterprise, aside from the primary one of making money, is twofold: First, to accomplish the broadest part of the demand for simple transportation, and, second, to make purchasers of larger cars appreciate the utility of the other class and thus stimulate the business in general.

PROPER SHOCK ABSORBER ADJUSTMENT

It sometimes happens that the adjustment is not the same on both sides of a car. This may happen even when the pointers indicate the same number on the dial, due to inaccuracy in dial setting. It is a matter of skill to apply the remedy, since it involves a readjustment on the part of the driver, and he must "feel" of the car, so to speak, and in the act determine if the "drag" is the same on both sides. If there is no dial, the adjusting process will be quite the same. It is too much to expect of shock absorbers that they will serve any good end unless they are capable of offering a well-regulated drag and of responding in step with the motions of the body.

Fig. 1—Model 50 touring car depicting a roomy tonneau and wide side entrance besides good taste

THREE new four-cylinder models, all touring cars, will be included for 1910 as follows: The Model 50 at $2,200, Model 40 at $1,700 and Model 30 at $1,250. In the Model 50 the wheelbase is 122 inches, and 36 x 4 1-2-inch wheels are used. Model 40 has a 110-inch wheel base and 34 x 4-inch wheels, and Model 30 has a 105-inch wheel base and 32 x 3 1-2-inch wheels; all models are with standard tread.

Similarity of Features in Design—It has been the aim of the company to employ the same principles of design to the respective models. The motors are placed vertically, in the front of the chassis, with dimensions as follows:

Model 50, 4 3-4 x 4 3-4 inches bore and stroke respectively. cylinders cast separately, valves in the head, and superimposed camshaft, actuating large, and advantageously disposed valves, thus insuring an excellent torque characteristic and increasing power with increasing speed as per the usual expectation under such conditions. The general appearance of the motor will best be appreciated by inspecting the reproductions Figs. 2 and 3, depicting the intake and exhaust sides respectively.

Model 40, 4 1-2 x 4 1-2 inches bore and stroke respectively, cylinders cast in pairs, valves in the head, camshaft superimposed, actuating 2-inch diameter valves with a 3-8-inch lift. Fig. 4 shows this motor looking at the intake side.

Model 30, 4 x 4 inches bore and stroke respectively, cylinders cast in pairs, valves in the head, super-imposed camshaft, actuating 1 7-8-inch diameter valves with a lift of 3-8 inch, with general appearance as in Fig. 5.

Position of the Valves Considered Advantageous—Since a hemispherical head, or dome of the cylinders, affords the greatest volume per unit of area of flame swept surface, which has the advantage of increasing thermal efficiency and eliminating radiator capacity troubles, the Jackson idea includes this form of cylinder, and by placing the valves in the head as shown in the figures, but one camshaft is necessary and that is designed as a unit, so self-contained that the shaft, bearings and housings may be removed and replaced at will. Fig. 8 shows a camshaft unit separate from its motor, and the two end bearings are in place while the two middle bearings are removed; one to show how the rockerarm for the tappets and the housing may be separated, and the other shows the housing parted through the middle, disclosing very liberal bushings, which serve as bearing-brasses for the rockerarm.

Adjustments are provided for the purpose of timing the opening of the valves, and to compensate for grinding in the valves, which, however slow may be the wear, must be provided for if a motor is to give good satisfaction for a term of years. The camshaft is provided with a long sleeve bearing on either side of each cam so that there is no chance of deformation of the shaft, and precision of timing is therefore assured from this point of view. The cams dip in lubricating oil each time that they make a revolution, and the oil is spilled on to the rockerarm, down which it runs and spreads out over the rockerarm bearings as well as the surfaces of the cams, so that friction, wear, and noise are aborted.

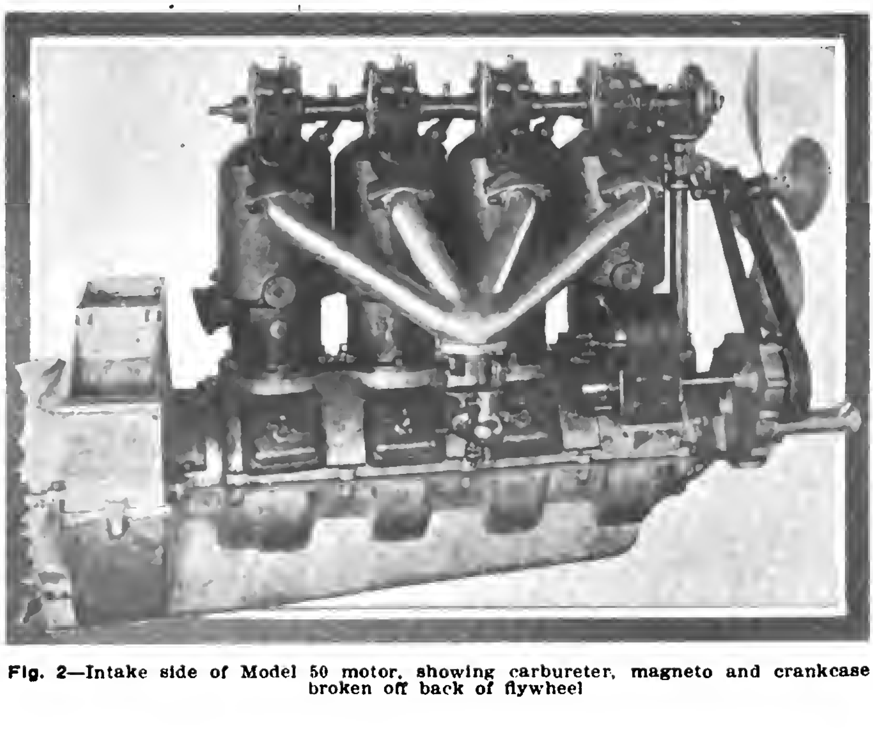


Fig. 2—Intake side of Model 50 motor, showing carbureter, magneto and crankcase broken off back of flywheel

General Characteristics of Power Plants — All three of the power plants are self-contained, suspended on three points, and include the transmission gear set in the same couple. Fig. 7 depicts the advantageous manner in which the trans-

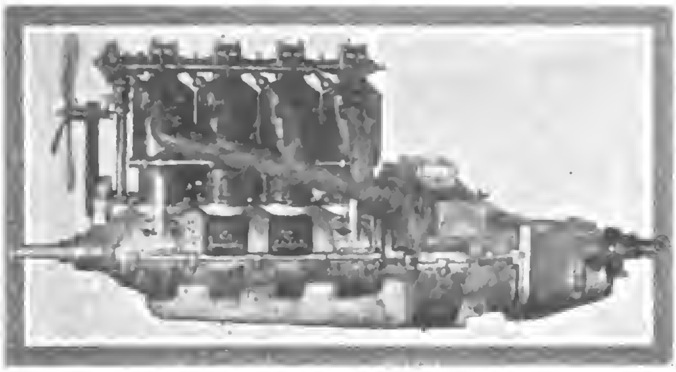


Fig. 3—Exhaust side of Model 50 motor, showing full length of crankcase, and nicely contrived exhaust manifold

mission gear and multiple disc clutch are included in a separate part of the housing, with a stout bolting flange, and referring to Fig 6, *A A A A* are wings of the discs and rotate with the flywheel with holes that register with bolts which slide into place during the process of assembling, thus assuring ease in the process and accuracy of result.

The principle of the three-point suspension is carried out in Jackson models in a most effective way, by means of arms extending out in the plane of the flywheel, to the frame, and the front end of the power plant rests on a cross member. In this way, as the designer claims, the frame can twist around the power plant, in response to road inequalities, and the slight allowance for relative movement prevents the transfer of torsional moments to the power plant. Then, the shape of the crankcase, which is practically circular, is a good guarantee of stability in its relation as a beam on the supports, so that bearings are held in strict alignment.

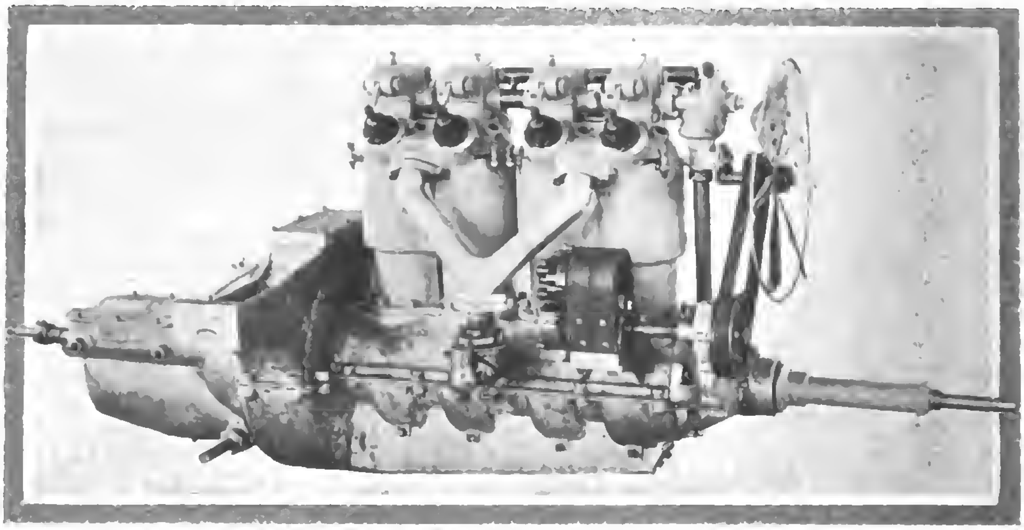


Fig. 4—Model 40 motor looking at intake side, showing carbureter, magneto, fan and cranking extension

Lubrication Is Positive and Novel—The lower half of the crankcase is separable, including the well for the flywheel, and an oil chamber extends all the way along, slanting towards the flywheel. Oil is placed in the flywheel chamber and is whisked up by the same, scraped off into a channel, and flows away to the respective bearings. All excesses of oil that land in the respective crank chambers, formed by cross walls in the crankcase, are picked up and landed into channels and flow on, increasing the tide of lubrication, which falls in profuse and continuous streams over the several bearings. From the bearing furthest from the flywheel a return channel is provided by virtue of which all the oil returns to the flywheel well, thus completing the cycle. This process of lubricating is continuous, and all that remains is to replenish the slight loss which is accounted for by the oil used to lubricate the pistons.

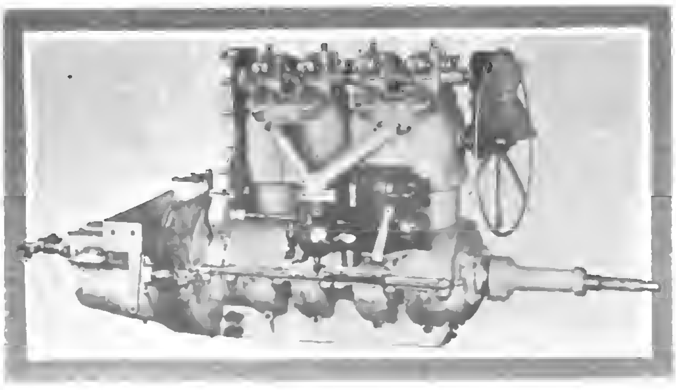


Fig. 5—Model 30 motor from intake side, showing housing for the silent chain drive for the camshaft

Dual Ignition Includes Magneto—Besides a coil and battery for use in starting and in an emergency, all models are provided with a Splitdorf magneto, located in front of the carbureter on the right side of the motor in each case. The magneto is flexibly installed, and the system of linkages and levers by which the spark is advanced and retarded is reduced to praiseworthy detail, free from lost motion and undue complication.

Fuel System Includes Scheb er Carbureter—The carbureter is placed on the right side of the power plant, low enough down with respect to the cylinders to assure that liquid fuel will not creep up and into the combustion chambers of the cylinders, hence carbon formations are aborted. The intake is of aluminum, with a branch to each individual cylinder in the 50 and to each pair of cylinders in the remaining models. The intake is absolutely tight, of a sectional area to deliver the exact requirement of mixture, remembering that it can be too large as well as too small. The Schebler carbureter, which, as a type, will not require explanation at this time, is selected for each model in point of size conforming to the best results, having experimented sufficiently to establish the governing facts. All piping from the gasoline tank, in each model, is made with a view to permanence, but provision is made for quick work if, perchance, foreign substances should collect in any quantity.

Cooling Is Aided by an Efficient Fan—The fan is placed just behind the radiator, between it and the front cylinder of the motor. It is of the latest die-formed type, with six blades of liberal area, set at an angle which is found to deliver the most air, and runs on ball bearings, fastened through a spindle of good diameter to a bracket of an adjustable type, extending out from the bevel gear housing of the camshaft. A wide flat belt drives the fan and takes its movement from a flanged pulley on the end of a spindle which has two bearings in an extension of the front end of the crankcase, and the gear which drives the spindle is enclosed meshing with a mate in its train, with a pinion on the crankshaft. The radiator, of liberal front area and sufficient depth, considering the excellence of the fan used and the hemispherical contour of the combustion chambers of the cylinders, maintains the temperature in all cylinders on an even level, and steaming is prevented, although the complication of a water pump is eliminated and the system works thermo-syphon.

Transmission and Other Notable Features—Models 50 and

40 deliver power to multiple disc clutches, as shown in Fig. 6, with large discs, submerged in lubricant, and actuated by a spring with positive release upon manipulating a foot pedal. The spring does not have to be of great strength, because its thrust is applied to a toggle system, which multiplies the thrust and gradually but positively applies an adequate pressure to the discs, pressing them into close contact, and when the foot pedal is pressed the discs are separated by springs placed for the purpose, one of which shows at B. The toggle system is adjusted by backing off the stud C and winding up the shell-spider D, all as indicated in Fig. 6. In this way lost motion due to wear of discs is taken up and the clutch, in each case, may be maintained in good working order at all times with a minimum of effort. Model 30 has a cone clutch, with a metal face, and runs in oil also.

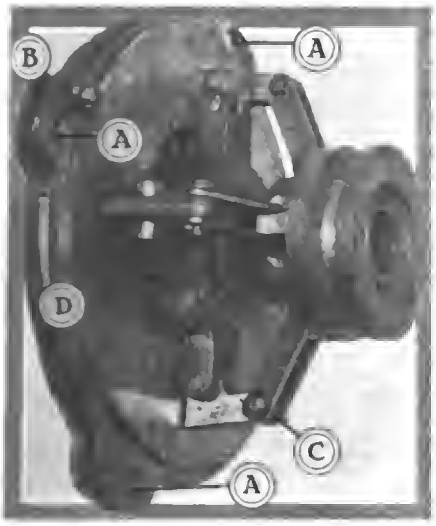


Fig. 6—Multiple disc clutch used on Models 40 and 50, showing toggle motion, discs and separating springs

The transmissions are of the three-speed selective type (and reverse) in each model, prime and lay shafts rotate on ball bearings, and the shifting selectors are of simple but positive design affording absolute certainty of action. The gears and shafts are of special steel, heat treated to bring out the desired hardness without loss of kinetic qualities. The teeth of the gears are wide, cut on Fellows' shapers to assure accuracy and mathematical precision of shape, and the ends of the teeth are chamfered on a special automatic machine to enable them to engage without shock or clash, while the aim is also to avoid cutting away an excess of the faces of the teeth in the chamfering process, which would reduce ability.

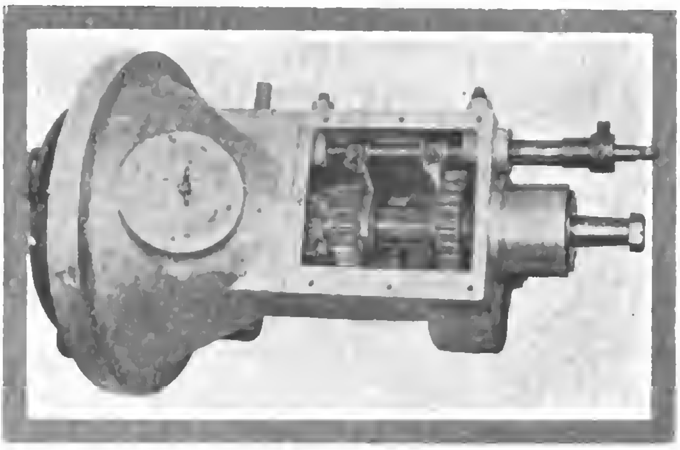


Fig. 7—Transmission and clutch case of Model 40, with cover off, disclosing transmission gears

Price Includes a Fine Array of **Equipment**—Besides a Splitdorf magneto on each model, there are the following considerations: Model 50, at $2,200, includes a wind shield and Prest-O-Lite tank, lamp equipment, tools, etc. The body is a standard touring design, of an advanced order in appearance and utility, seating five. At an extra cost of $50 two additional seats are provided, making it a seven-passenger car. This model is also delivered at $2,200 with a four-passenger tourabout body, which is regarded as one of the fine creations of the year.

Model 40, at $1,700, includes the usual equipment and a five-passenger body.

Model 30, at $1,250, will be furnished with a detachable tonneau, making it a five-passenger touring car, or it will be provided with a rumble seat, as a roadster, at the same price. The usual equipment is included at the price named.

The Jackson Automobile Company, at Jackson, Mich., with new additions to buildings and machinery, have 5,000 cars in the aggregate under way, and expects to deliver, as usual, on time. A large part of the increase over the last year's product is already placed, and a visit to the plant of the company disclosed a hive of industry, with system everywhere, all leading up to the great main issue, *i.e.*, the rapid completion, on a basis of accuracy, of more cars than were ever before contemplated.

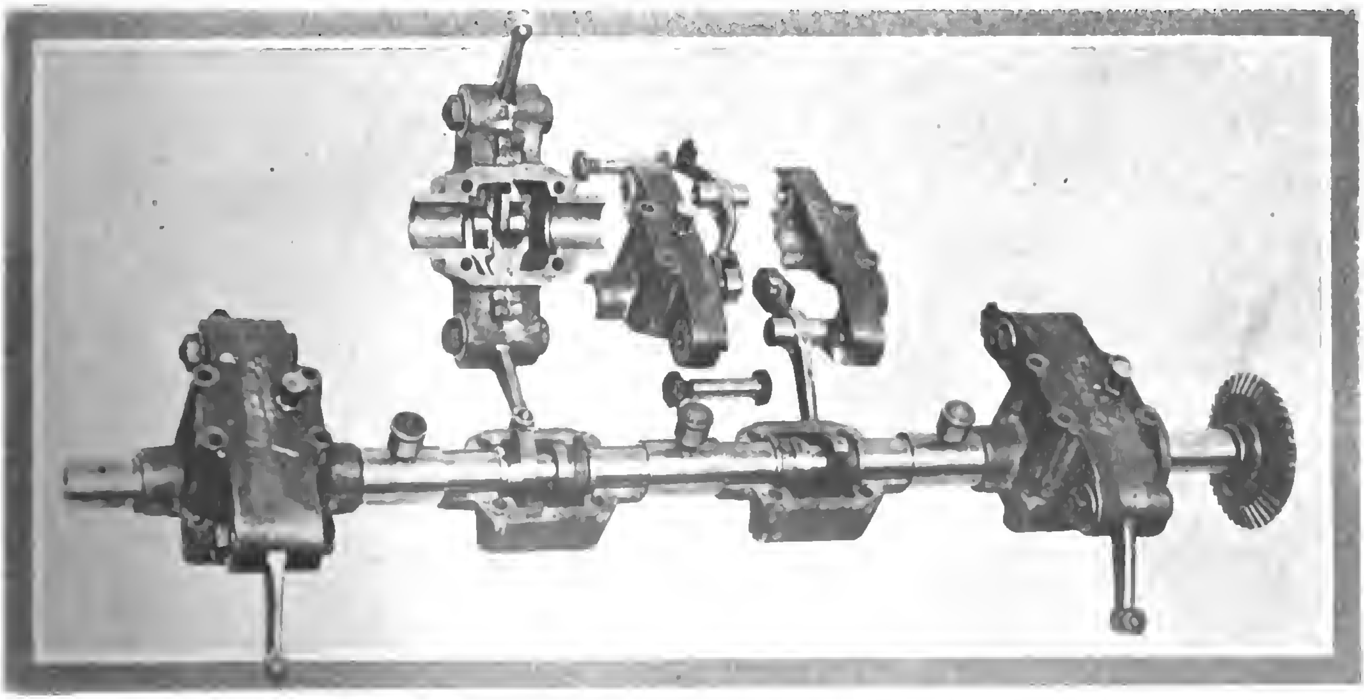


Fig. 8—Showing details of camshaft rockerarm construction, with bevel gear for Models 40 and 50. Chain drive for Model 30 not shown

Another Chapter in Packard Progress

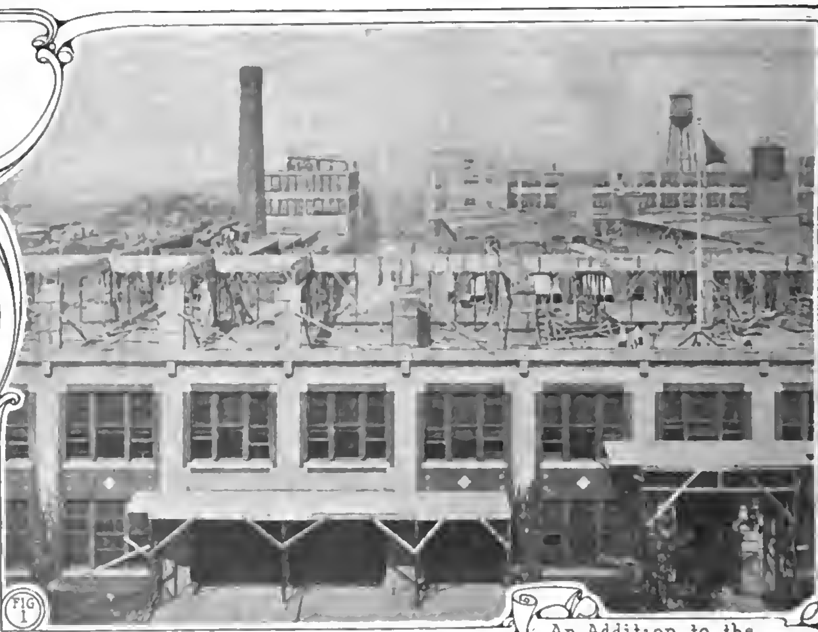


FIG 1 An Addition to the Administration B'l'd'g.

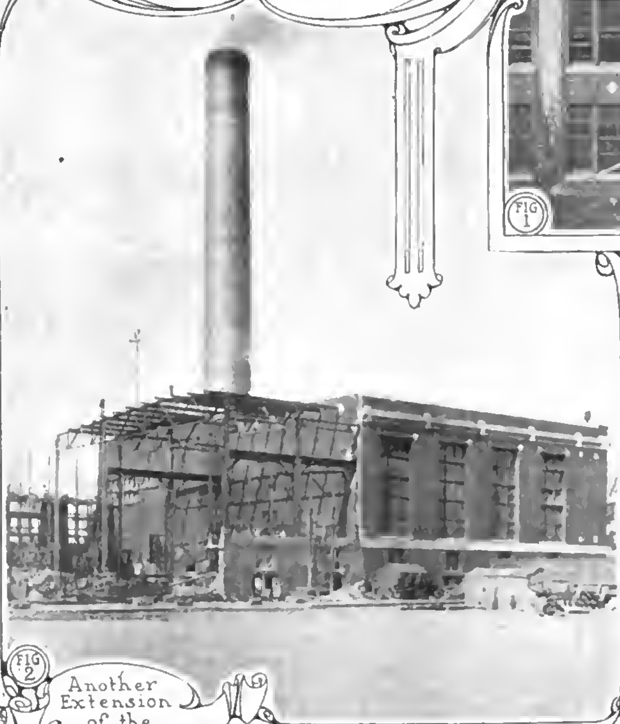


FIG 2 Another Extension of the Power House

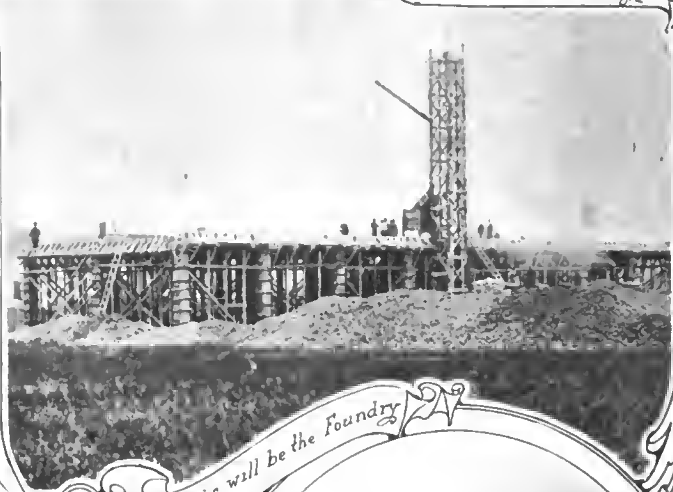


FIG 3 This will be the Foundry

"ASK THE MAN WHO OWNS ONE"

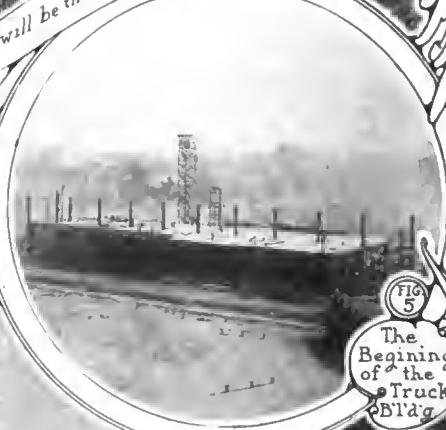


FIG 5 The Begining of the Truck B'l'd'g

FIG 4 Two More Floors on One of the Wood Working Shops

FIG 6 Paving Packard Ave. with Brick

PACKARD FACTORY SPREADS IN ALL DIRECTIONS

LOOKING over the plant of the Packard Motor Car Company, at Detroit, Mich., even at the expense of much time, discloses so many projects in process that it is with the greatest difficulty that a single story can be concentrated upon. The idea that crops out with the greatest prominence is, after all, one to be pictured better than told, and it represents the extent to which the company is putting up buildings, in order that this vast and growing business will be properly housed, taking into account the Packard ideas of permanence, convenience and to maintain the reputation of Packard cars.

Architecturally the buildings at the plant, when they were originally planned, took cognizance of the future, and foundations were laid with sufficient stability to allow of adding to the height in each case. Fig. 1 of the administration building shows how well the architects understood the situation, for, while adding 50 per cent. to the actual floor space, the project is carried on without the slightest inconvenience to the company. The original administration building was two stories high, and the floors are so weather-tight that they serve as a flat roof while the addition of a story is being made. All building work is done from the outside, and while the builders are pushing the work at top speed, even so, within the administration building, nothing of the usual builders' hubbub disturbs the serenity of the counting house, engineering office, laboratory, or headquarters offices.

Power Makes the Wheels Revolve—The power which emanates from the administration building would avail very little in the directions of actual results did it not include instructions to provide a sufficient addition to the power plant, so that the contemplated increase in machinery will include the power to run it. Fig. 2 is of the original power house and addition being made to it. When the building work is well along, power-plant equipment will be ready to install and in this way power to run the new machinery will be at hand at the proper time. As an incident it will be worth while to observe that the power plant is centrally situated, but somewhat isolated, so that the electrical transmission is made with a minimized loss, and in case of fire in any one of the buildings the power plant will not be in danger, and the fire hazard is reduced.

Scarcity of Material Demands Attention—The wise maker of automobiles will look to the source of material and in so far as it is possible to do so keep all such matters under direct control. The Packard is one of the American concerns which builds the entire automobile rather than to rely upon parts makers, and one of the more important questions lies in having a foundry at hand from which to procure good castings of every description. Fig. 3 depicts the new foundry in course of erection, and when this structure is completed, which will be at a very early date, the company will be in a far better position to do all of its own work of this character and on the extended basis required, as indicated by demand.

If it is important to have a foundry to draw upon, the same incentive holds with the woodworking plant, especially in view of body work. The Packard makes all its own bodies, and while they are of the class known as aluminum, the fact remains that the framing is of wood and demands treatment under conditions involving an extensive line of special woodworking machinery. Then, there are wheels to make, and such other parts as mahogany dash and other trim parts. Fig. 4 shows an extension of the woodworking plant, and since Packard bodies are of the most substantial character, in view of the large output of the company it is not to be wondered at if the woodworking plant is a very noticeable proportion of the whole establishment, ranking high in relative value.

Future Is Reflected as in a Mirror—The question is frequently asked: What is the future to be? Will commercial vehicles displace horses entirely? The Packard idea seems to be in favor of a horseless future, and Fig. 5 represents the new building, now being erected by the company, in which trucks will be built. In this is all the evidence necessary, showing that this company has faith in the future, and that commercial vehicles will be of the automobile genus, and that the remaining horses must go. Some two years past, when the Society of Automobile Engineers were entertained at the Packard plant, the truck work then attracted considerable attention, and the character of truck work being done was such that its future could not be accommodated in the plant as it then existed, filled as it was, at nearly every point, with pleasure car work. That the company had in mind a comprehensive scheme will now be seen, and it is a fair inference that there is now sufficient demand for trucks and other commercials of the character built by the company to warrant the expense of a large new addition.

An Industrial City Expanding—Gradually the plant expands; never a week goes by without witnessing the laying of a new foundation, and this has been the condition for several years. Despite this continual advance there is a picturesque similarity between all the buildings, and each one fronts on a wide brick-paved street. The impression is that of a large industrial city, with clean, well-paved streets and accommodation for traffic on a large scale. Fig. 6 portrays the situation at it exists throughout the entire plant, and with a view to adequate fire protection hydrants are placed at points of vantage, one of which is in the foreground. The sidewalks are wide, and here and there a bridge spans the streets, affording short cuts between departments, thus economizing in time required in the handling of materials, and in intercommunication.

Some of the Problems Are Engrossing—In observing the output of a plant account must be taken of the extent to which it is devoted to the manufacture of all the units that go into cars. In closely examining the Packard plant, for illustration, it is at once seen that much room is required in the manufacture of bodies. Of the whole force of men, footing up to the enormous number of more than five regiments of 1,000 each, not counting a full quarter of a regiment of officials and staff men, but relatively few of them are to be found in the body plant, despite the large amount of room required. In other parts of the plant there is a man for every square yard of space, and the obvious conclusion is that if a company builds every part of every car made (neglecting tires, ignition equipment, etc.), the amount of room needed, per car put out, will be far more than the average observer is likely to suppose.

True, the output in cars will be large or small depending upon the quality, and when the whole matter is simmered down to the last shred of sound reasoning, the output of a shop must be measured in dollars per square foot of floor space. In an estimate of this sort it is necessary to allow for the efficiency of the equipment used in the manufacture of the parts, and the extent of congestion of the space. It is a moral certainty that a very congested, poorly lighted building will result in inferior work and the real value of the product may then be far below the selling prices asked. These and many other reasons are at the bottom of the Packard plans, and it seems to be the idea there to provide commodious, sanitary, well-lighted buildings, and to do all the work, in order that the cars made will be in value, in the fullest accord, with the price asked.

The factory now comprises 21 acres of floor space in operation, with four acres under construction, as shown in the illustrations. Since there are now about 1,000 men on the night force, it may be that the addition of four acres of floor space will, to some extent, reduce the necessity for night work, the addition being in about the same ratio as the night force bears to the total force. This will, of course, bring good results, it being the case that night work is costly, and, on the whole, the best indication possible to show that the Packard plant must expand; hence the reason for the great activity as here portrayed.

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AN IDEA IN GARAGE CONSTRUCTION

In the course of an excellent editorial article on the subject of "The Garage from the Practical and Hygienic Aspects," *The Motor Trader* (English) brings out an excellent point that pertains to the modern garage, public rather than private, but, nevertheless, of wide interest. This is to the general effect that the ordinary garage is very much lacking in the all-important matter of ventilation. It is a fact, usually lost sight of, that the exhaust vapors of an automobile engine consist to a large extent of carbon monoxide, which is a poisonous gas. In ordinary running in the air this matters little, for the gas is diffused through an enormous quantity, relatively, of air, so that its influence is very small and is not felt even in close proximity to the offending vehicle.

Within the close confines of the garage, whether the doors be closed or not, an engine exhausting for a period of several minutes vitiates no small amount of air, rendering it, first, unfit to breathe, and, later on, through the engine continuing to run indoors, actually poisonous. Perhaps this accounts for the mental sluggishness of the ordinary public garage attendant or employee. At any rate, in the construction of future garages, and the improvement of existing structures devoted to this use, the thought is well worth some consideration. The article said in part:

Then there is the question of the health of the inmates or employees to be regarded. Viewed from this standpoint, it would be hardly too much to affirm that, did the sanitary officers in many districts, particularly in the large towns, exercise even a part of their authority, they could insist on the remodelling or compulsory closing of very many motor garages and workshops. The danger here is not so much arising from a deficient cubic space per inmate, but the worse one of his breathing an atmosphere grossly injurious by the presence of a varying quantity of carbon monoxide. The condition of the average garage is decidedly dangerous in this respect. The fact that part of the employees' daily task lies in testing motors increases the extent of the responsibility of the owner by the same ratio as the danger is increased or reduced by such factors as the capacity of the premises for the work in hand, their state hygienically regarded, and the varying amount of the poison that is being discharged from the motors. Traders contemplating an adaptation of existing premises should consult their local authority and first satisfy themselves of the possibility of their being enabled to carry out what may be required, and should also not overlook the trend of modern workshop planning so as to insure the most healthful conditions to the workers.

In the smaller private garage structure this idea is worthy of even more consideration, for the reduced size of the building increases the danger from this cause. As a consequence, this matter of ventilation should be given increased thought by the owner about to build himself a garage or motor house.

YESTERDAY AND TO-DAY IN RACING

Public sentiment changes quickly. It seems but yesterday that the talk of a competition on the public roads called forth the threat of injunctions and other forms of interference. The authorities were fearful of permitting what was designated as "usurpation of the highways by speed-crazed beings who belonged behind the bars." Gradually it became evident that the general public regarded an automobile contest as the greatest spectacle of modern times, and, furthermore, wanted such events instead of having them suppressed.

When one reads of a 200-mile race in Fairmount Park, Philadelphia, with a thousand and more city police guarding the course in the presence of a Mayor who had no hesitancy in presenting the prize to the winning driver, the fact is brought home somewhat startlingly of the present liberal attitude of the public officials, brought about undoubtedly by the knowledge that the people themselves are thoroughly in favor of a motor holiday.

Over such a tortuous course as the one in Fairmount Park cars are tested in every particular, and, while the personal equation, in the form of the driver, enters into the contest and makes it one of man and machine, the fact remains that any car which can survive such a gruelling examination creditably is worthy of the patronage of the discriminating buying public. There are still a few discrepancies in the exact definition of a "stock" chassis, but the rules governing are much nearer perfection than ever before, with indications that necessary revisions will make the 1910 competitions open only to cars the mates of which will be found in the salesrooms of every reputable manufacturer believing in one or another form of competition as a means of publicly demonstrating the worth of his product.

As to the exact future of racing there seems to be much difference of opinion, though indications are that the season of 1910 will be marked by a plethora of contests throughout the country, perhaps attaining a climax to be followed by a lessening of public interest. The agitation to revive the Grand Prix in France would foster the belief that the foreign manufacturers had found an entire absence of racing somewhat detrimental as a whole, though the class abroad most interested in competition has turned to the flying brigade.

CHICAGO SHOW HAS TWICE TOO MANY APPLICANTS

TWICE too many applications for the space available at the Chicago show, February 5 to 12, next, was the problem that confronted the management at the session held October 6 at the N. A. A. M. headquarters, No. 7 East Forty-second street, New York City. There were just 104 applications for space in the automobile section. Heretofore automobile exhibits have been confined to the main floors of the Coliseum, Annex, and First Regiment Armory, while a few cars have been placed in the Coliseum basement. This year, after exhausting the entire basement, there were still eight automobile manufacturers for whom it was impossible to provide any space at all, but who will, of course, be given the first opportunity to take advantage of any withdrawals. Since the allotment six other automobile manufacturing concerns have applied for space, so that there are now fourteen on the waiting list.

The entire gallery of the Coliseum, and the principal part of the second floor of the Coliseum Annex have been allotted, as heretofore, to the Motor & Accessory Manufacturers, who will make their own allotment. At this time the number of applications from members of that association is greater than in any previous year. All remaining space on the second floor of the Coliseum Annex is reserved for the Motorcycle Section. There are twenty spaces and applications in hand for over forty. Unattached makers of accessories have been given the gallery of the First Regiment Armory. It was necessary to allot them one space apiece, and even then there is not enough space in this section to go around. This is an unfortunate situation, for the luckless ones will have to buy space from those given space.

A list of the manufacturers of automobiles who have been allotted space is appended:

American Locomotive Company	Providence, R. I.
American Motor Car Company	Indianapolis
Anderson Carriage Company	Detroit
Apperson Bros. Automobile Company	Kokomo, Ind.
Atlas Motor Car Company	Springfield, Mass.
Auburn Automobile Company	Auburn, Ind.
Austin Automobile Company	Grand Rapids, Mich.
Baker Motor Vehicle Company	Cleveland
Bartholomew Company	Peoria, Ill.
Berliet Import Company	Chicago
Black Mfg. Co	Chicago
Brush Runabout Company	Detroit
Buckeye Mfg. Co	Anderson, Ind.
Buick Motor Company	Flint, Mich.
Cadillac Motor Car Company	Detroit
Cameron Car Company	Beverly, Mass.
Cartercar Company	Pontiac, Mich.
Chadwick Engineering Works	Pottstown, Pa.
Chalmers-Detroit Motor Company	Detroit
Columbia Motor Car Company	Hartford, Conn.
Columbus Buggy Company	Cleveland
Corbin Motor Vehicle Corp	New Britain, Conn.
Dayton Motor Car Company	Dayton, O.
Dorris Motor Car Company	St. Louis
Elkhart Motor Car Company	Elkhart, Ind.
Elmore Mfg. Co	Clyde, O.
Everitt-Metzger-Flanders Company	Detroit
F. A. L. Motor Company	Chicago
Fiat Automobile Company	New York
Franklin Mfg. Co., H. H	Syracuse, N. Y.
Fuller Buggy Company	Jackson, Mich.
Gaeth Automobile Company	Cleveland
Grabowsky Power Wagon Company	Detroit
Great Western Automobile Company	Peru, Ind.
Haynes Automobile Company	Kokomo, Ind.
Holsman Automobile Company	Chicago
Hudson Motor Car Company	Detroit
Hupp Motor Car Company	Detroit
International Harvester Company	Chicago
Interstate Automobile Company	Muncie, Ind.
Jackson Automobile Company	Jackson, Mich.
Jeffery & Company, Thos. B	Kenosha, Wis.
Jewel Carriage Company	Cincinnati
Kimball & Company, C. P	Chicago
Kissel Motor Car Company	Hartford, Wis.
Knox Automobile Company	Springfield, Mass.
Lion Motor Car Company	Adrian, Mich.
Locomobile Co. of America	Bridgeport, Conn.
Lozier Motor Company	New York City
Matheson Motor Car Company	Wilkes-Barre, Pa.
Maxwell-Briscoe Company	Tarrytown, N. Y.
McIntyre Company, W. H	Auburn, Ind.
Metzger Motor Car Company	Detroit
Midland Motor Car Company	Moline, Ill.
Mitchell Motor Car Company	Racine, Wis.
Moline Automobile Company	East Moline, Ill.
Moon Motor Car Company	St. Louis
National Motor Vehicle Company	Indianapolis
Nora Motor Car Company	Newark, N. Y.
Nordyke & Marmon Company	Indianapolis
Oakland Motor Car Company	Pontiac, Mich.
Olds Motor Works	Lansing, Mich.
Packard Motor Car Company	Detroit
Palais de l'Automobile	New York
Peerless Motor Car Company	Cleveland
Pennsylvania Auto-Motor Company	Bryn Mawr, Pa.
Pierce-Arrow Motor Car Company	Buffalo
Pope Mfg. Co	Hartford, Conn.
Premier Motor Mfg. Co	Indianapolis
Rapid Motor Vehicle Company	Pontiac, Mich.
Rauch & Lang Carriage Company	Columbus, O.
Regal Motor Car Company	Detroit
Renault Freres Selling Branch, Inc	New York
Reo Motor Car Company	Detroit
Ricketts Auto Works	South Bend, Ind.
Rider-Lewis Motor Car Company	Muncie, Ind.
Royal Tourist Car Company	Cleveland
Schacht Mfg. Co	Cincinnati
Selden Motor Vehicle Company	Rochester, N. Y.
Speedwell Motor Car Company	Dayton, O.
Simplex Motor Car Company	Mishawaka, Ind.
St. Louis Car Company	St. Louis
Staver Carriage Company	Chicago
Stearns Company, The F. B	Cleveland
Stevens-Duryea Company	Chicopee Falls, Mass.
Streator Motor Car Company	Streator, Ill.
Studebaker Automobile Company	Cleveland
Studebaker Automobile Company	Cleveland
The White Company	Cleveland
Thomas Motor Company, E. R	Buffalo
Toledo Motor Company (Overland)	Toledo, O.
Waverly Company	Indianapolis
Wayne Works	Richmond, Ind.
Winton Motor Carriage Company	Cleveland
Woods Motor Vehicle Company	Chicago
Woods Motor Vehicle Company	Chicago
York Motor Car Company	York, Pa.
Zimmerman Mfg. Co	Auburn, Ind.

HOW PALACE SHOW EXHIBITORS WILL BE PLACED

AT the recent drawing for space in the Tenth International Automobile Show, which will open New Year's Eve in Grand Central Palace, New York, 37 members of the American Motor Car Manufacturers' Association secured preferred space on the main floor, while more than 40 makers not members of the A. M. C. M. A. and 125 accessory concerns not included in membership of the Motor and Accessory Manufacturers, Inc., were allotted space on the first and second balconies. All records for space in automobile shows were broken, as 305 motor car makers and accessory manufacturers were allotted space. At no time in the history of the Palace Show has the show committee met with as much difficulty in trying to satisfy demands for space as this year. An unusual demand was made for space by members of the A. M. C. M. A. and other motor car makers, while outside accessory firms fairly deluged Chairman R. E. Olds and his associates with applications. The Ford Motor Company, of Detroit, secured the first draw, and selected the same space in which Ford cars have been exhibited for the past two years. Other concerns securing large spaces include Reo Motor Car Co., Brush Runabout Co., Premier Motor Manufacturing Co., Mitchell Motor Car Co., Dayton Motor Car Co., Maxwell-Briscoe Motor Co., Jackson Automobile Company and Mora Motor Car Company.

Other members of the A. M. C. M. A. who drew preferred space include Oakland, Marmon, Regal, Pullman, Moline, Lambert, Atlas, Hupmobile, National, McIntyre, American Simplex, Austin, Pennsylvania, Moon, Cartercar, American, Holsman, Pierce, Chadwick, Glide, Standard, Ohio, Gaeth, Speedwell and Midland. Of the commercial motor car makers belonging to the A. M. C. M. A. who secured preferred space on the first balcony are Rapid, Mack and Grabowsky.

As was the case last year, members of the Importers' Automobile Salon have secured a block of preferred space on the main floor, which has been secured by Fiat, C. G. V., Panhard, Renault, Lancia, Isotta, De Dietrich, Clement, Delahaye, Delaunay-Belleville, DeDion, Hotchkiss, Zust and S. P. O.

Pleasure vehicle makers who were allotted space on the first balcony include Croxton-Keeton, Kissel Kar, Inter-State, Kline Kar, Benz, Black, Cameron, Coates-Goshen, Columbus, Crawford, Empire, Houpt, McCue, Everett, Sultan and Allen-Kingston. Commercial vehicle makers on the first balcony not members of the A. M. C. M. A. are the Gramm-Logan, Hart Kraft, Lansden, Martin, Saurer, DeDion and Randolph.

On the second balcony will be found not only accessory makers as in the past, but about 18 makers of cars.

Contracts for the spaces alotted are being mailed.

LICENSED BODY AGAIN INCLUDES OLDS AND BUICK

WHILE an announcement outlining A. L. A. M. plans is anticipated within the next few days, it is now known that the General Motors Company group will be licensed makers. Whatever differences existed between the Licensed body and the Buick company have been satisfactorily adjusted, and the Olds Motor Works has been reinstated to active membership, which means that these concerns will be seen in the Garden show for the first time in two years. W. C. Durant, the vital factor in the General Motors segregation, is authority for the information.

Developments in relation to the Ford Motor Company have been somewhat sluggish, which means that the situation is the same as it was before. Henry Ford preferred to carry the burden of the Selden suit himself without any outside assistance, and apparently he intends to continue his attitude.

In the first story of the startling developments, printed in THE AUTOMOBILE of last week, seven A. M. C. M. A. concerns were given as assured new members of the A. L. A. M. These were Maxwell, Reo, Premier, Mitchell, Dayton, Jackson, and Regal. The last named being one of the later entrants into the industry, it is understood that its Licensed connection will be on slightly different lines to that of the others. In fact, the impression prevails that conditions governing not a few of the probable applicants may result in two kinds of membership. The continued healthy state of the industry is a condition generally desired, and it is believed that the present direction of A. L. A. M. affairs will not be subjected to any radical interference.

In obtaining the order of the court's decree, the Licensed Association is meeting with a slight delay because of the change in name of the Electric Vehicle Company to the Columbia Motor Car Company. While this has no effect whatever upon the decision itself, the delay interferes with plans mapped out.

The A. M. C. M. A. members who have joined the A. L. A. M. will retain their membership in the former body, and participate as usual in the Grand Central Palace show.

"Membership in our association has nothing to do with the Selden patent," said Alfred Reeves, the A. M. C. M. A. general manager, "and twenty-five of our members might in the end become members of the A. L. A. M. also."

WHAT THE N. A. A. M. EXECUTIVE COMMITTEE DECIDED UPON

TO a special committee consisting of L. H. Kittredge, W. R. Innis and Charles Clifton has been referred the question of the advisability of amending the standard warranty of the N. A. A. M. This action was taken at the regular October meeting of the executive committee, held at the New York headquarters, 7 East Forty-second street, October 6.

Frank Briscoe, representing the Brush Runabout Company; W. C. Johnson, representing the Waverley Company; W. H. Van Devoort, representing the Moline Automobile Company; R. H. Salmons, representing the Selden Motor Vehicle Company, and W. S. Austin, representing the Austin Automobile Company, were elected to membership.

The membership of the Electric Vehicle Company was transferred to the Columbia Motor Car Company, represented by H. W. Nuckols, and the membership of the Royal Motor Car Company to the Royal Tourist Motor Company, represented by George J. Dunham.

The executive committee decided to actively support the promotion of a convention to be held in Washington, either in December or January, designed to promote the interests of the National registration bill now before Congress. This matter is in the hands of the legislative committee and of Charles Thaddeus Terry, the association's counsel. It will be pushed vigorously and the results will doubtless show, that it was worth while.

IMPORTANT DECISIONS OF THE A. A. A. CONTEST BOARD

PROTESTS of a varied sort were passed upon by the Contest Board of the A. A. A. at a session held in New York City, October 5 and 6, the entire board being present.

In connection with the 1909 A. A. A. reliability tour, the protests of H. O. Smith and W. H. VanDevoort, entrants of the Premier and Moline cars, respectively, against the findings of the technical committee on the two Pierce touring cars and No. 108 Pierce runabout, were withdrawn.

The action of S. B. Stevens in calling off the 300-mile race of August 21 on the Indianapolis motor speedway was sustained, and in addition to denying the protest of the Jackson Automobile Company, that concern was disciplined by suspension from entering any contest until January 1, 1910, for advertising that it had won the race in question.

The Premier Motor Manufacturing Company's protest against the Quaker City Motor Club was sustained. The protest was on penalties imposed for time in checking at controls after the blockade at Giant's Despair, Wilkes-Barre, Pa., during the Quaker club's Spring endurance run. It was found that the subject hinged on part of the instructions given the contestants by a representative of the club at the instruction meeting, wherein it was stated in substance that, owing to road conditions, if a blockade occurred to a contesting car by reason of a disabled car, the committee would take care of it.

Relative to the appeal of the Dayton Motor Car Company in the hill climb of the Automobile Club of Cincinnati, two protests were entered against awarding the first prize to the Stoddard-Dayton car on the ground that the car was not "stock" in the meaning of the definition in the rules, and the referee decided in favor of the appellants.

On the report of the referee of the Brighton Beach races, August 27, and of a member of the contest board present, the entrant and driver of S. P. O. Car No. 1 were each suspended to January 1, 1910, and the driver fined $100 and suspended.

What the Clubs Are Doing These Days

STATE COMMISSIONER TO LEAD TIME RUN

HARTFORD, CONN., Oct. 11—State Highway Commissioner MacDonald will set the pace for the sociability and secret-time run of the Automobile Club of Hartford, to be held October 22. The purpose of the event is to celebrate the opening of the new seven-mile Berlin turnpike, which will also furnish the course for the run. On the return trip from Berlin to Hartford the commissioner will drive his car at what he believes a proper speed, both for safety and for the preservation of the road. His time will be taken and placed in a sealed envelope. The contestants will be started at one-minute intervals, and each will attempt to approximate the commissioner's time. Several prizes have been offered. The winners will be announced at a banquet at the Allyn House.

MILWAUKEE CONSIDERING A CLUBHOUSE

MILWAUKEE, WIS., Oct. 11—At the annual meeting of the Milwaukee Automobile Club the following directors were elected: M. C. Moore and C. W. Norris, to serve two years; C. S. Drake, Christian Scholtka, M. W. Pipkorn, J. E. Farber and J. F. Schreiber, to serve three years. Officers will be elected at a meeting to be held October 15. President C. S. Drake's report showed that the membership now is 355 and the assets are $9,000. The cash balance on October 1 was $2,634.29, and in addition the club owns three acres of choice land purchased for a clubhouse site. Mr. Drake urged immediate action toward the erection of the building.

COLUMBUS CLUB BUSY ERECTING ROAD SIGNS

COLUMBUS, O., Oct. 11—A number of the members of the Columbus Automobile Club spent several days in erecting road signs on the highways to the west of Columbus. The signs are much larger than those used earlier in the year, most of which have been destroyed by vandals. The club expects to cover all the highways with both danger signs and road directions.

WESTERN NEW YORK CLUBS PLAN SHOWS

BINGHAMTON, N. Y., Oct. 11—The automobile clubs of Buffalo, Binghamton, Rochester and Syracuse are planning to arrange their shows next spring in a circuit, with dates following each other in such a way that one exhibit can make the entire circuit. Binghamton's date has been fixed for February 21 to 26. Buffalo is deciding between the fourth week of February and the second week in March. Syracuse has under consideration some week in March which will not conflict with the others, and Rochester agrees that if its show is a club affair it will carry out the same plan.

DELAWARE ASSOCIATION MEETING AND ELECTION

WILMINGTON, DEL., Oct. 11—The Delaware Automobile Association held its annual meeting here last week, and elected the following officers: President, J. Danforth Bush; vice-president, A. B. Hazzard; secretary, Charles G. Guyer; treasurer, William Stanier; executive committee, Joseph Bancroft, John B. Bird, Frank J. Cheney, Louis A. Drexler and William C. Corey. All are residents of Wilmington except Mr. Corey, who lives at Bethany Beach. The year book for 1910, which is being prepared by the association, will contain maps showing all the roads of the State and their condition.

WORKING FOR ROADS IN NORTHERN INDIANA

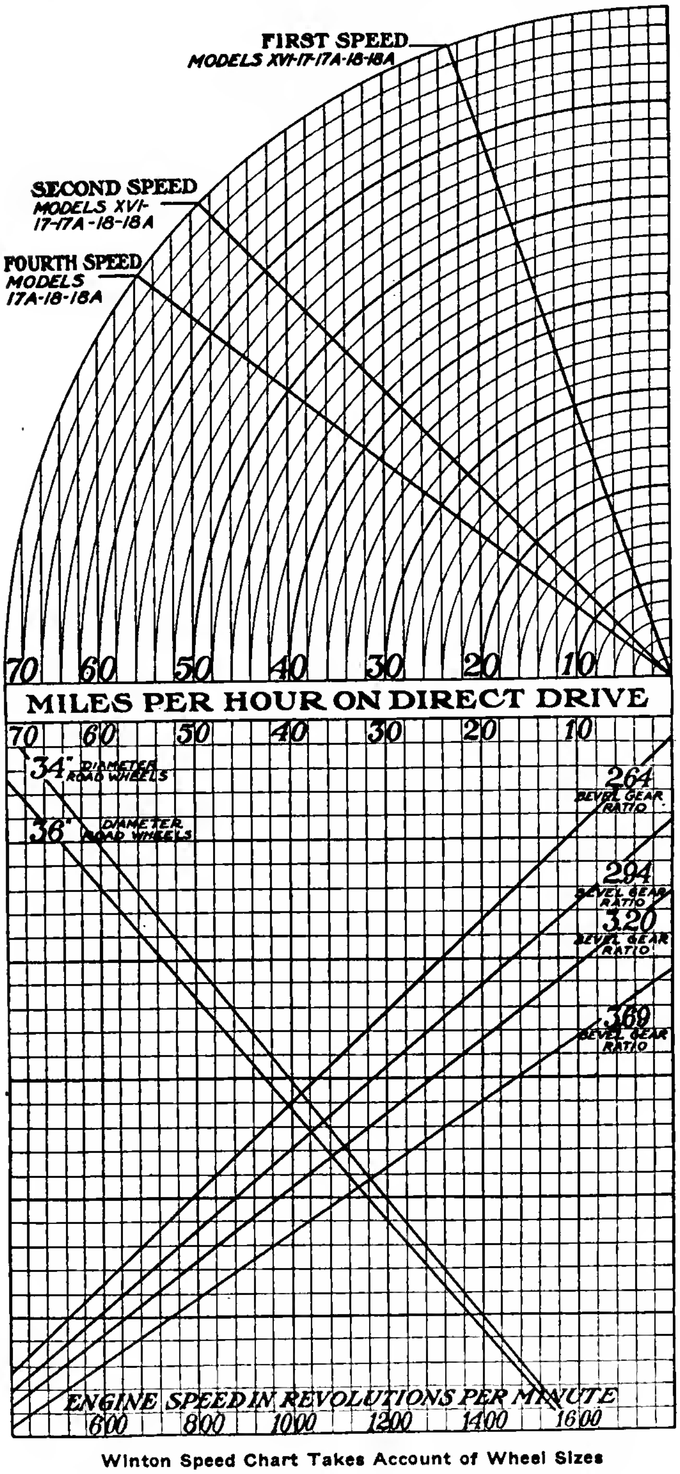
SOUTH BEND, IND., Oct. 11—At the recent meeting of the automobile club of this city in the Oliver, a movement was launched for the general improvement of the roads of the county. A committee was appointed to confer with the officials of Laporte County, where several hundred miles of macadam roads have been built, to find their cost and maintenance expense. M. L. Brummit, a member of the county council, was present and submitted a report on the proceedings of the good roads convention at Cleveland, to which he was a delegate.

North Pole Controversy Gives A. M. C. M. A. Manager Reeves a Bright Idea

First honors in the decorated automobile parade in honor of the Hudson-Fulton celebration, at Yonkers, N. Y., were awarded to Masters Clifford and Robert Reeves, the children of Alfred Reeves, general manager of the American Motor Car Manufacturers' Association, who represented the rival Arctic explorers, Dr. Cook and Commander Peary. The float on the Maxwell car represented an Arctic scene, with the North Pole in full view, surmounted by an American flag, with Teddy bears climbing to the top. There were polar bear decorations, and icicles and snow galore. Mr. and Mrs. Reeves in black furs represented esquimaux, while the two youngsters in full snow-white Arctic costumes represented the North Pole explorers.

USEFUL AND SIMPLE SPEED CHART

"Very handy" describes the speed chart just issued by the Winton Motor Carriage Company, Cleveland. It consists of two parts: the lower and the upper. The lower is rectangular in shape and has six diagonals, four extending upward to the right, which are for the four Winton gear ratios. The other two diagonals extend upward to the left and are for 34-inch and 36-



Winton Speed Chart Takes Account of Wheel Sizes

inch wheels. The upper portion is devoted to the three indirect speeds, three diagonals intersecting a series of circles denoting the speed in miles per hour. To use, if the engine speed is known, start on the bottom horizontal at that speed, and proceed upward to the diagonal indicating the gear ratio. Then go across horizontally until the diagonal for the wheel size is reached. This last intersection is the start of the second vertical movement, which is continued until the miles per hour are obtained. For the third, or direct, drive, this is read direct at the top line, but for the other indirect speeds the process varies. On first and second, follow around the arc to the diagonal, thence straight downward. On high or fourth speed, however, follow up on a straight line to the diagonal, thence back around the arc to the speed. Knowing any three of the four variables it is possible to find the other one by working backward.

Thus, if it is desired at any time to tell the speed of the engine, having a speedometer on the car, and knowing wheel size and gear reduction, proceed as follows: Start from the speed, then proceed upward to the speed diagonal in the reverse of the manner just described. Then a vertical will be obtained, which follow down to intersect the wheel diagonal. Then go across to cut the gear diagonal, and a perpendicular to the base line will give the desired speed of rotation of the engine.

This is a very handy chart to have, and all Winton owners will doubtless hasten to get and use one. It is to be regretted that the several diagonals on the lower part were not made more numerous, to allow of the use of the table by all automobile owners. Thus, if all gear ratios in even figures from 2.5 to 4 and all wheel diameters from 32 to 42 had been given, it would have been universal. The latter diagram, too, would have allowed a number of interesting deductions, as, for instance, the man with 34-inch wheels could read not only the speed at a given engine speed, but could figure out how much faster he would be traveling with the same engine speed if he but had 36, 38 and other larger-sized wheels; that is, this very handy and quickly used diagram would have been more handy and could be used just as quickly.

CAR'S AGE DIDN'T CHANGE MATTERS

Baltimore, Oct. 10—In the first case ever tried in this city for a loss sustained upon an automobile insurance policy a verdict was rendered in favor of the plaintiff, William P. Cummings, of this city, against the British and Foreign Marine Insurance Company, Limited, of Liverpool. Mr. Cummings purchased a Pope-Hartford machine of the make of 1907, which he had insured for $1,500, paying a premium of $60. The machine was subsequently destroyed by fire, when it was discovered to have been a 1906 car. The insurance company raised this point, saying that the defendant company would not have insured a 1906 car for the same amount. The case was tried before Judge Elliott and a jury in the Court of Common Pleas. The court refused all the contentions of the company and the jury rendered a verdict for the full amount of the policy, with interest to date, less the present value of the car as shown by the testimony. The total amount awarded Mr. Cummings was $1,430.

AMATEUR WINNER OF MUNSEY HONORED

Philadelphia, Oct. 11—At the Quaker City Motor Club last Saturday night, Gawthrop and Wister, local Elmore agents, presented a handsomely designed solid silver punch bowl to Frank Hardart, Jr., in recognition of his sterling work in capturing premier honors in the recent Munsey run from Wash- turing premier honors in the recent Munsey run from Washington to Boston and return. It will be recalled that Hardart's car finished that strenuous journey without a solitary road or technical penalty recorded against it—a most meritorious performance for car and driver, especially in view of the fact that Hardart is an amateur. Mayor Reyburn made the speech of presentation.

Gainesville, Fla.—The Cook Automobile Company has found it necessary to have its garage nearly doubled in size. An addition 50 by 60 feet will be built, extending the quarters to a length of 120 feet. The automobile fever seems to have struck the town and already 40 cars are owned by its residents, many of them having been purchased within the last four months.

FALSE IMPRESSIONS TEMPT INEXPERIENCED

By FRED W. HAINES, General Manager Regal Motor Car Co.

When reading the publications devoted to the automobile industry a person cannot help but wonder at the large number of new companies entering, or attempting to enter, the field. The desire on the part of men with money to get into the automobile business seems to amount almost to a craze, and it is now the easiest thing in the world to organize an automobile company and secure capital.

If people investing money in automobile manufacture had any idea of the troubles which have to be gone through and overcome before their business can be at all successful, if they had any conception of the many dangers to their investments, I really believe that they would be more careful in risking their capital than they apparently are.

The word "automobile" and the idea of manufacturing automobiles seems to have a magic sound to the ears of most people at the present time, and the abnormal increase in manufacture can only end in one way for the vast majority of these companies; and that way is failure.

It is a well-acknowledged fact among manufacturers, and it is now well known to most purchasers, that the first year's production of automobiles by any concern is bound to be inferior in a great many ways, and the purchaser now hesitates to buy a new production, no matter how well it may be backed by both experience and capital. There have been some exceptions to this rule, but it is so seldom that it is never noticed.

A new concern starting in, therefore, must have practically unlimited capital, and at the same time men with practical experience to guide the new company through its first year of life. In too many cases a company is promoted and its only asset is some supposed drawings made by a draftsman who has been employed by one of the older companies. In ninety-nine cases out of a hundred these drawings are not only incorrect, but incomplete, and from these drawings to the actual production of cars the way is very long and exceedingly hard.

The prospect of sales is very alluring, and it seems to be the easiest thing in the world to dispose of any old thing that may be manufactured. An automobile sale, however, is about the most unreliable kind of a sale, as it is subject to cancellation at any time before the money has actually been paid and the car delivered.

Another great trouble with the automobile business is the fact that almost every manufacturer overbuys on all his material, with the idea that if he does not actually need the parts he can cancel any part of the order at any time. The parts manufacturer, realizing this condition and the liability of a cancellation, in order to protect himself oversells on his production, so that he will not be able to produce anywhere near the number of parts he has contracted for.

Therefore, on account of the absolute unreliability of the contract made by both the automobile manufacturer and the parts maker, the entire production of cars depends upon the ability of the automobile manufacturer to secure a sufficient number of parts from the parts maker and to keep his entire stock of parts well balanced. A great many of the failures in automobile companies is caused by the seeming impossibility to secure needed material, and for 1910 this condition is going to be noticed more than ever. The enormous estimated production of cars for 1910 is about four hundred per cent. in advance of the actual production for 1909. The parts makers in 1909 were pushed to their fullest capacity, and the liberal estimate of an increase of fifty per cent. for the coming season will certainly account for all the increase that the parts manufacturers will actually be able to produce. It is, therefore, easy to see that the great majority of new automobile companies will find it practically impossible to secure any number of parts, and will wind up the coming season in a bad way financially.

This craze to get into the automobile business, to my mind, is brought about entirely by the successful manufacturers. The tendency to greatly overestimate their production, and also their profits, when advertising, cannot be too strongly condemned, as it not only accounts for the desire of others to get into this apparently successful business, but it creates in the minds of the buying public an idea that practically fifty per cent. of the retail price of an automobile represents clear profit. This reason undoubtedly prevents a great many people from purchasing cars, as a man certainly would hesitate at paying an exorbitant price for any goods. It also creates a demand for cut prices from the retail dealer, as it is very hard for him to convince a prospective purchaser that he is working on a small margin of profit, and it is impossible for him to cut prices.

Every new company getting in the business, if it only builds a few cars, simply takes that much business away from the established concerns, and in the majority of cases the few cars that they do build fall down badly when sold, and in that way create an unfavorable impression of the automobile in general, not only with the purchaser of that particular car, but his friends also.

If the automobile manufacturers in their advertisements, and in all other ways, would stick exactly to the truth in regard to their production, and if they would be willing to show the public in general the immense amount of detail necessary to the production of a first-class machine, the high efficiency of the men required, and the absolute accuracy of all workmanship used, I think it would go a long way toward convincing the public in general that an automobile manufacturer's business is not entirely all profit, and is certainly not a bed of roses at any stage.

WHAT MUST BE PROVED TO PLACE GUILT

Hartford, Conn., Oct. 11—Mrs. Lucy R. Eldridge, wife of Commander Frank H. Eldridge, U. S. N., retired, has been bound over to the December term of the Superior Court on a charge of manslaughter, and is held under $3,000 bond, which has been furnished. Mrs. Eldridge, while coming through West Hartford, September 29, in her automobile, struck and killed a seven-year-old boy. A chauffeur in the employ of the Columbia Motor Car Company, who was with Mrs. Eldridge in the car, testified that she did everything in her power to avoid the accident, and that he himself could have done no better. The car was running at 12 or 15 miles an hour. Mrs. Eldridge stopped immediately and tried to help the boy.

The case was tried before Justice Alexander J. Keeney, and Grand Juror Carl C. Thompson prosecuted for the State. Arthur L. Shipman, counsel for the defense, claimed that it was necessary to show negligence, criminal intent, wantonness or culpability before manslaughter could be proved, and denied that the prosecutor had shown any of these elements in the evidence introduced, which was chiefly that of a six-year-old boy. Nevertheless, Justice Keeney bound over the defendant. The case has attracted much attention because of the prominence of the parties involved, and it is generally held to be a rank instance of autophobia.

DENVER ENACTS TRAFFIC ORDINANCE

Denver, Colo., Oct. 11—The Board of Aldermen of this city has enacted an ordinance establishing the right-of-way of vehicles at street intersections, which fills an important gap in the laws regulating traffic. This rule, which is section 1703 of Ordinance 124, reads as follows: "It shall be the duty of every person driving any vehicle, when approaching any intersecting street, alley or public way, to halt or slow up and allow any other vehicle approaching along the intersecting street on the right to have the right of way." Another section of this ordinance requires an overtaken vehicle to turn out to the right when signaled to do so by a vehicle approaching from behind.

The wording of the statute relative to slowing at crossings is somewhat ambiguous, since it is not made clear which vehicle would have the right of way, and which would have to wait, but as a whole, is expected to prove of much value.

Detroit American League Champions Trying Out New Rambler Model Fifty-Five

Baseball enthusiasts will be interested in this picture of the present opponents of the Pirates for the Championship, taken recently while in Boston. Aside from the famous Cobb, who will open a Southern agency for a Detroit car, Manager Jennings, seated right behind the driver in this picture, is also very much interested in automobiles. He was much pleased with the showing of the new Rambler in and about Boston, and expressed a wish at the time that he had more time to ride. It is reported that he will purchase a car upon the close of the present World's Championship series.

Shipping Autos by Express—When an automobile buyer wants his car bad enough to pay the difference between freight and express to get it a few days earlier, the company that made the car has good reason to pat itself on the back. The F. B. Stearns Company had such an experience recently, and the autos went by carloads all the way from Cleveland to Los Angeles. Coney C. Slaughter, the Stearns agent in the latter city, was responsible for the hurry-up order. After enduring the impatience of his clients as long as he could, he got the Stearns factory on the wire just as the cars were starting for the freight station. It cost $1,000 to transfer the shipment to express, but Los Angeles doesn't care about that.

Mrs. Cuneo's New Records—Driving the Rainier which finished second in the Long Island Derby, Mrs. Joan Newton Cuneo made new records for the mile and five miles on a half-mile track in the races at Danbury, Conn. She drove the mile in 1:19, beating the previous mark by 12 seconds, and covered the five-mile in 7:19, cutting the former record by nearly a minute. The car in the case was the regular 45-horsepower stock chassis which is entered in the coming Brighton 24-hour race. The Rainier Company claims a record for the number of second places won this year in races by this stock model, usually competing with cars of much greater power.

Electrics for Dairy Use—Rapid transit is the primary requirement in the dairies which supply large cities with milk, and here as elsewhere the horse has been found too slow. The Faitfield Dairy Company, Montclair, N. J., recently received from the Baker Motor Vehicle Company, of Cleveland, a one-ton electric truck to be used for hauling milk cans to the railroad. This machine has a 92-inch wheelbase and 34-inch wheels shod with 3 1-2-inch tires. Its power plant consists of a 42-cell 9 M. V. Exide battery and a 3 1-2-horsepower series-wound motor, capable of 300 per cent. overload. Its performance will be watched with interest.

Speed Limit for Locomobiles—The amended Indiana automobile law is entitled, according to the heavy type on the front page of the booklet, "An Act to Regulate the Speed, Operation and Registration of Locomobiles, Motor Cycles or Other Motor Vehicles Upon Public Highways." The Locomobile Company of America has called attention to this mistake, humorously suggesting that it may be due to the well known possibilities of the Locomobile in the way of speed. However, it hardly seems fair that the many law-abiding Locomobile drivers should have this formidable piece of legislation pointed so unmistakeably in their direction.

American Simplex Meeting—About 25 stockholders, representing two-thirds of the stock of the Simplex Motor Car Company, were present at the annual meeting at the factory in Mishawaka, Ind. The following officers were elected: T. C. Starrett, of Detroit, president; R. E. Kamm and E. J. Gulick, of Mishawaka, vice-president and secretary and general manager respectively, and D. A. Shaw, of Detroit, treasurer. The directors include Messrs. Shaw and Gulick, H. M. Hovey and George Grant, of Detroit, and J. T. Knorr, of La Mars, Ia. Much elation was felt over the car's good showing in the Munsey run.

Activity in Moline Plant—The demand for Moline cars since the Glidden tour has forced the Moline Automobile Company to build a large addition to its plant in East Moline, Ill. At present a large four-story building is being rushed to completion, which will give an additional floor space of 60,000 square feet. This will be used chiefly for chassis building and assembling. In the other departments of the factory there is also great activity, and each is working to the limit of its capacity to keep pace with orders which have already been received for the 1910 models.

Warner Gears Are Flourishing—In order to avoid attempting to move into a new factory at the height of the rush season, the Warner Mfg. Co. has concluded to remain in its present plant in Toledo, O., till spring, merely relieving congestion by renting additional space. This arrangement, however, is temporary only. T. W. Warner, president of the company, emphatically denies that it is connected with the Overland Automobile Company, but says that it is making steering and change-gears for 1910 Overland cars on contract.

Bergdoll to Make Cars—Louis J. Bergdoll, the Philadelphian driver of Benz cars, has organized a company to manufacture a $1,500 car in touring, runabout and taxicab models. The first year's output will be about 150 machines. This will be the first automobile factory in Philadelphia, although that city furnishes many parts and accessories to the trade and contains many big manufacturing plants, insuring an abundance of skilled labor.

Graphite from Niagara—A building 50 by 105 feet is to be added to the Niagara Falls, Ont., plant of the International Acheson Graphite Company, Niagara Falls, N. Y. The building will contain a new grinding plant in which to prepare the various grades of graphite, for lubricating and other purposes, and also a shipping room and stock room for package goods, such as the graphite greases, powders, etc., made by the company.

Cameron May Move to Virginia—It is reported that the Cameron Car Company, of Beverly, Mass., contemplates establishing another plant for the manufacture of commercial cars in Norfolk, Va., in addition to its present factory. Inquiries have been made as to whether local magnates would consider raising a $100,000 stock subscription on condition that the new factory employs 300 men.

Peru Gets Wheel Factory—Negotiations have been practically completed for the removal of the Salisbury Auto Wheel Company, at present of Jamestown, N. Y., to Peru, Ind. Peruvian capitalists have subscribed $60,000 of the stock of the company, which is capitalized at $200,000. It is said that 200 men will be employed.

Open for Alabama Agencies—The Snow-Tullis Hardware Company, 23-25 Commerce street, Montgomery, Ala., wishes to enter the automobile business. The company plans to sell both cars and a complete line of accessories, and will be pleased to receive propositions from manufacturers.

R. B. F. Bearings in America—The exclusive agency in this country for the R. B. F. ball bearings, made by the Société Française des Roulements à Billes has now been granted to the International Engineering Company, 1779 Broadway, New York City.

IN AND ABOUT THE AGENCIES

Stearns, Detroit—The F. B. Stearns Company will in the future be represented in this city by the Palmer Auto Company, of which Howard Palmer is the principal member. Headquarters have been established at 1221-1229 Woodward avenue. The company will handle the Stearns exclusively.

Jackson, New York City—The Jackson Motor Car Company, of New York, recently moved into its spacious new store at 1663 Broadway. The building was formerly occupied by the De Luxe representative, but has been considerably altered to suit the needs of the new occupant.

Miller Accessories, Atlanta, Ga.—Chas. E. Miller, the New York manufacturer and jobber of automobile supplies and accessories, has arranged to open a Southern branch in Atlanta on or about November 1, in time to supplement his exhibit at the show.

Elmore, Atlanta, Ga.—E. R. Clark has taken the agency for the Elmore, and has opened a show room in the northern half of the ground floor of the Masonic Temple, in the heart of the new automobile row. He is negotiating for a garage.

Standard, Haynes and Demot, Bainbridge, Ga.—The Caldwell Motor Car Company, of which C. H. Caldwell is manager, has contracted for the agencies for the Standard Six, the Haynes and the Demot in southwestern Georgia.

Chalmers-Detroit and Hudson, Nashville, Tenn.—Howard Cregor & Company, who hold the agency for the Chalmers-Detroit and Hudson, expect to open a salesroom at 135 Third avenue North this week.

Pullman and Baker, Houston, Tex.—The Imperial Motor Car Company expects to have its new salesroom at 1113 Prairie avenue open this week. It sells the Pullman and the Baker electric.

Fal-Car, Kansas City, Mo.—The Genung Motor Car Company has taken the old quarters of the Tebeau Motor Car Company at 1716 Grand avenue and will act as agent for the Fal-Car.

Hupmobile, Davenport, Ia.—The Dillon Auto Company has established itself in Petersen's garage, Fifth and Main streets, and will handle the Hupmobile.

Great Western, Kramer, Ind.—The Great Western Automobile Company announces that it has arranged with Joseph Rice to handle its cars in Kramer, Ind.

PERSONAL TRADE MENTION

J. B. McIntosh, for the past three years Michigan agent for the Lambert Automobile Company, has been appointed general agent for Lambert cars over a larger territory. The retail department of the J. B. McIntosh Company will be in charge of M. L. Hagle, a well-known automobile man.

R. S. de Mitkiewicz, member of the A. S. M. E., who was formerly with the Fairbanks Company, is now associated with the New York office, 115 Broadway, of the Alden Sampson Mfg. Co., Pittsfield, Mass., as expert in mechanical transportation.

H. E. Grant has been appointed treasurer of the Motor Company, the Philadelphia representative of the Premier. Mr. Grant was formerly the Philadelphia manager of the banking firm of Newberger, Henderson & Loeb, and is well know in business circles.

R. E. Fulton, the Eastern wholesale distributor for the Croxton-Keeton Motor Company, sailed for Europe on the *Lusitania* to look over the foreign situation on a three weeks' trip.

M. C. Huie, who has sold Ford cars in Atlanta, Ga., for several years, has been retained to act as the manager of the Ford Southern branch recently established in that city.

Harvey Goodwin has taken charge of the Stromberg Motor Devices Company, at 91 Church street. Mr. Goodwin was formerly with the Austin Automobile Company.

RECENT INCORPORATIONS

El Paso & Fort Hancock Railroad, El Paso, Tex.—Incorporated with a capital stock of $100,000, by R. Capler, C. E. Kelley, W. Cooley and others, of El Paso, Tex., to operate an automobile 'bus line between El Paso, Socorro and other towns in El Paso county.

American Aeroplane Company, Wilmington, N. C.—Incorporated with a capital of $125,000, to manufacture aeroplanes; F. A. Bissinger, president; C. W. Polvogt, vice-president; David Palmgreen, secretary; C. H. Dock, treasurer.

Spencer Motor Company, Rahway, N. J.—Incorporated with a capital of $125,000 by Charles G. Willis, of Brooklyn, N. Y., and Henry Albisser and A. G. Spencer, of Rahway, to manufacture automobiles and other vehicles.

Schroeder Aerial Navigation Company, New York City—Incorporated with a capital of $75,000 by Lindley B. Newby, George E. Fleming and Will H. Crow, all of New York, to manufacture balloons, dirigibles and aeroplanes.

Berkshire Auto Car Company, Pittsfield, Mass.—Incorporated with a capital of $120,000 by John McQuaid, Clement F. Coogan, and Hawkins, Ryan & Kellogg, all of Pittsfield, to do a general automobile business.

Brockton Rubber Tire Company, Brockton, Mass.—Incorporated with a capital of $50,000 by Wallace C. Flagg, C. G. Nelson and McLeod & Sweet, all of Brockton, to manufacture and sell rubber tires.

The Pilot Motor Car Company, Richmond, Ind.—Incorporated by G. E. Seidel, C. H. Kramer and H. M. Kramer, with a capital of $100,000, to manufacture automobiles.

TOLEDO OPENS GATES TO OVERLAND

Toledo, O., Oct. 11—One hundred of the most prominent professional and business men gathered in the Toledo Club to do honor to the Overland Automobile Company, the Kinsey Mfg. Co. and the Warner Gear Company, who have recently established themselves in this city, on the occasion of the welcoming banquet last week. Each of the tables in the club's big banquet hall carried a cluster of dark red asters, and above the sideboard the name "Overland" was spelled out in pink carnations. The banquet was one of the most notable social affairs of the nature ever given in this city. The menus bore on the front cover an open gate, behind which appeared the sky-line of the city, and the inscription: "Toledo—Open Wide the Gates." Speeches were made by J. N. Willys, president; W. H. Brown, vice-president; and F. A. Barker, sales manager of the Overland Automobile Company, and by Isaac Kinsey, president of the Kinsey Mfg. Co., and Thos. W. Warner, president of the Warner Gear Company, as well as by many prominent citizens of Toledo.

PACKARD PROGRESS CALLS FOR POWER

Detroit, Oct. 11—What is said to be the largest steam engine in the State of Michigan was turned on for the first time last Friday night at a power house banquet in this city, when President Joy officially opened the valve and threw on the switch which set the wheels of the Packard Motor Car Company's enlarged plant turning under the new power.

After the new engine had settled down to work, about thirty executives of the Packard company, the installing engineers and the Packard engineers sat down to a table spread in the engine room, discussed the new power plant, and swapped stories about the rapid growth of the Packard factory, which has necessitated a wonderful development of the power plant until to-day the three engines in service develop 5,000 horsepower. Another addition to the plant already has been started.

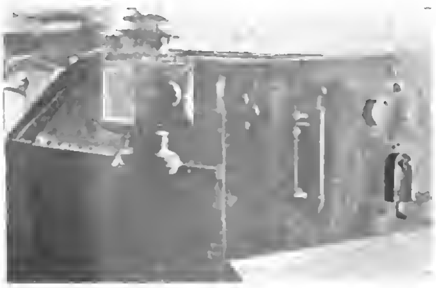
When the steam was turned into the new engine and the older one cut out, it was necessary for the untried monster to immediately take up the entire load. The engine is a Cooper compound of the Corliss type, direct-connected with a Western Electric generator. The bore of the low-pressure cylinder is six feet.

At the head of the table was President Joy and at his right and left General Manager S. D. Waldon and Manufacturing Manager C. J. Moore. The rest of the party comprised F. F. Van Tuyl, consulting engineer; F. C. Monroe, installing engineer; H. A. Hoagland, electrical installing engineer; Fred Willins, chief engineer of the Packard power plant; the assistant engineers and the executives of the Packard company.

Packard Executives Dining in Honor of Factory's New Power Plant

Information for Auto Users

Delco Ignition System—The Delco system of battery ignition is designed to provide a single spark for each charge of gas to be ignited, and thus avoid the waste of current that is inevitable in the usual vibrating-coil systems. The Delco



DELCO SWITCH ONLY PART ON DASH

system, which was brought out by the Dayton Engineering Laboratories Company, of Dayton, O., consists of four non-vibrating coils, a "controlling relay," which corresponds to what is commonly known as a master vibrator, and a special switch. The coils are built very compactly, and each unit is armored with a steel jacket, which protects it from water, oil and dirt. This enables them to be placed underneath the hood, close to the motor. The advantages of this location are numerous; the dash is left unobstructed, in compliance with modern

ARMORED COILS ARE UNDER THE HOOD

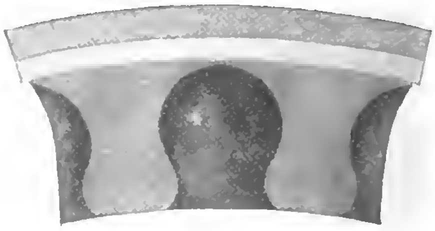
ideas as to the external appearance of the car, and wiring troubles are practically eliminated, because the wires may be made very short and direct. The circuit breaker, or "controlling relay," is also located under the hood, usually on the same bracket with the coils. This is the principal feature of the system, and its important points are covered by patents. It operates magnetically, and breaks the circuit the instant it is made by the timer, thus causing a single impulse of high-tension current from the coils and a single spark at the plugs. The switch is the only point of the system that is placed on the dash. It has the usual positions, battery, off and magneto—for a mcgneto may be used in the system instead of batteries, if desired. The switch has a push button connected with the contact-breaker which enables the car to be started on the spark. Six dry cells are commonly used with the Delco system, and on these a car can usually be driven 2,000 miles. The current consumption at low speeds is only .04 to .05 ampere, rising to .3 ampere at sixty miles an hour; it averages at about one-third the usual figure for the vibrating-coil system.

Airless Resilient Automobile Tire—Since so large a proportion of the expense, delay and trouble in operating an automobile arises from tires, a vast amount of time, money and thought have been expended in the effort to perfect a satisfactory tire. The National Airless Company, of Indianapolis, believes it has solved the problem with the Airless tire. At any rate, the tires are reported to stand the test of resiliency and, under some long runs at an average of 40 miles per hour, with a car of 3,000 pounds, the thermometer applied to the tires showed heat ranging from 72 to 84 degrees—whereas 200 degrees is the danger point. One set has been run over 15,000 miles by the Chicago Towel Supply Company and the company has reports on others that have ranged up as high as 12,000 miles without trouble. So good has been the showing made that the U. S. mail wagons operated by the Overland company in Indianapolis are being equipped with them.

SOLID PART OF AIRLESS TIRE

The construction of the tire is simple. The space occupied by the air tube in the pneumatic tire is occupied by globular cavities at close intervals, as shown in the second figure, which is a half-tone reproducing a photograph of a section of the tire sliced through the center. Each of these cavities has a circular outlet to the rim. This gives something of an umbrella shape to the solid rubber supports distributing the strains in every direction on the cantilever principle.

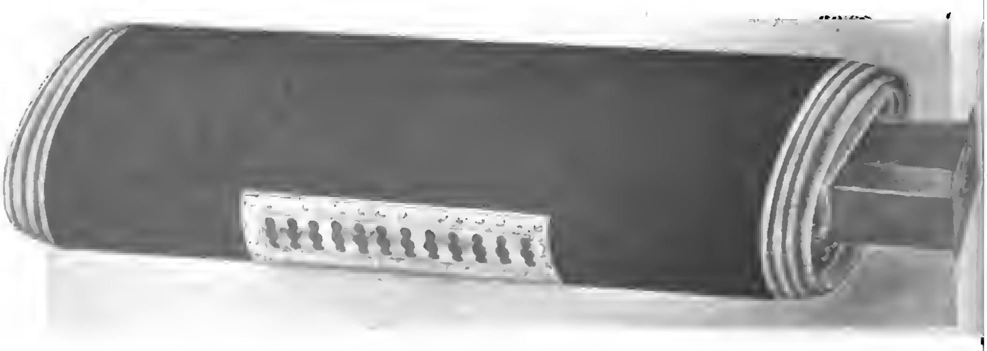
A glance at the first figure will show that the solid part of the inner construction does not reach the rim. A continuous air passage is left at the bottom of the tire, affording entire freedom of air circulation. After this inner part is molded, the tire is built up of layers of



INTERNAL TRUSSES GIVE STRENGTH

fabric and rubber just as are the best pneumatic tires, and it is all cured together, making one homogeneous whole. Thus there is entire absence of friction. The tire generates no more heat in running than does a pneumatic with either a reline or a tire protector.

Don't Get Cold Feet—For the man, woman or child bothered in winter or other cold weather driving, nothing makes such a hit as a foot warmer. Many of these are complicated, expensive, and costly to maintain. The new series of heaters just brought out by the Chicago Flexible Shaft Company, La Salle avenue and Ontario street, Chicago, under the names of Dutchess and Clark, do not possess any of these defects, in that they are simplicity personified, of medium price, and the cost to use is very low. These heaters are made in nine sizes, varying in price from the lowest, at $1.25, up to the de luxe type, the Dutchess, at $10. Each one of them is made so as to surround an inner compartment which is lined with or filled with asbestos to retain the heat as long as possible The one end has a drawer which may be withdrawn at will and within which the fuel, as it is called, may be placed. This fuel is a very important part of the heater, although supplied separately. It comes in small, compressed cakes, and throws out an intense heat, without flame, smoke or odor, and moreover leaves very little residue. By wholesale buying, the price of the heat is reduced as low as two cents per ordinary drive and lower. Despite the remarkably low price for the heater, and equally low cost of operation, every heater and every brick of Clark coal is carefully inspected and the ensuing product guaranteed on a money back if not satisfied basis.



CLARK FOOT WARMER *de luxe*, "THE DUTCHESS," SHOWING FUEL PAN

THE AUTOMOBILE

"TO THE SUNNY SOUTHLAND!"

How Georgia Is Making Roads

IT was a by no means easy task for the promoters of the "National Highway"—the New York *Herald* and the Atlanta *Journal*—to select the route of the good roads endurance tour to the Gate City of the South. For other important tours held in this country fairly definite data as to the best roads have been available, and the only requisite has been to send a pathfinding car over the established route to compile specific road directions. But no sooner had the two newspapers announced their scheme of a New York-to-Atlanta highway, when advocates of different routes started to overwhelm the promoters wtih conflicting claims to superiority.

Obviously there was but one way to decide which route was the best—namely, by actually testing all of them. To that end, a White Steamer, during the Summer months, made three trips of inspection between New York and Atlanta, covering as many different routes. The first trip was over the "Shenandoah Valley-Southern Railroad" route; the second trip was over the "Capital-to-Capital" route via Washington, Richmond, Raleigh and Columbia, and the route covered on the third trip coincided with the first as far south as Roanoke, and then turned southwesterly through a section of Eastern Tennessee but little known, by way of Bristol, Knoxville and Chattanooga.

After this thorough examination of all possible routes, one was decided upon and mapped and mileaged by the writer; more than 2,000 signboards have been placed along the roads, and all is now in readiness for the first touring contest between North and South, which, beginning on Monday next, October 25, will "inaugurate" the new highway between the Metropolis and Atlanta.

Those who made the three "scouting" trips were unanimous in the decision that the first route was the best, and, accordingly, the

via New York ~ Atlanta Highway

BY PATHFINDER

Ballyhack Ford, Southern Virginia

White Gasoline Car Found This Good Stretch of Road Near Summerfield, Va.

White pathfinders on their recent trip covered, for the most part, the same roads as were followed on the first trip of exploration except that between Roanoke and Charlotte an entirely new route was marked out via Rocky Mount, Martinsville, Winston-Salem, Greensboro and Thomasville. The accompanying map shows the "National Highway" as finally determined upon.

Inasmuch as the pathfinders traveled over many miles of road which they had covered four months before, they were able to see the tremendous improvement which had taken place in the interval, this advance being due in no small measure to the active propaganda which has been carried on by the two daily newspapers most interested in the tour. A case in point is that of York, Pa. When the White "scout" car passed through this prosperous city last May the main street was full of holes and ruts and compared but poorly with the macadam pikes which lead from that city out into the farming districts. The city was properly "roasted" in the news and editorial pages of the New York *Herald*. The local York paper reprinted these criticisms, and the outcome of the agitation was that the city voted an appropriation to pave the main street. When the pathfinders went through York two weeks ago they found as fine a brick pavement as could be desired.

While driving the pathfinding car between Staunton and Roanoke, I found it necessary several times to alter my road directions to read "Cross iron bridge over creek," to replace a reading of "Ford creek," which I had made on the trip last May.

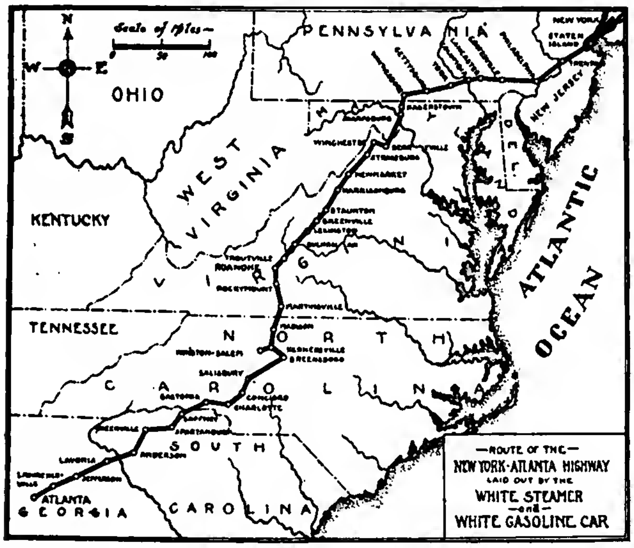
And now a few words about what is being done on the roads between Roanoke, Va., and Winston-Salem, N. C., as the narrative will illustrate how far-reaching have been the results of the recent good roads campaign. Winston-Salem was not visited on any of the three "scouting" trips, and it looked to the citizens of that thriving community as if the rival town of Greensboro, 35 miles away, was to wrest away the honor of being on the "National Highway." "Why are we left out?" inquired indignant Winston-Salem of the promoters of the enterprise. "Because the roads from Roanoke to your city are the worst ever," was the reply. "Then we will fix them," rejoined Winston-Salem, followed by a spectacle which, I believe, has no precedent. A mass meeting was held in Winston-Salem and with great enthusiasm several thousand dollars were subscribed by private parties to be spent on the roads of *another state!* But that was not all Winston-Salem did in its eagerness to be on the "National Highway." It was pointed out that even if the road leading south from Roanoke was improved it might still be possible that the route would go to Greensboro direct and leave Winston-Salem out. "Well, we will fix that, too," said Winston-Salem. Accordingly the town officials got busy and started construction work on three miles of entirely new road, thus building a "cut-off" which makes Winston-Salem logically and naturally on the New York-to-Atlanta highway as planned and mapped.

Fairly good roads are found almost all the way from New York to Roanoke, but it is probable that those who take part in this month's New York-to-Atlanta tour will not soon forget the sixty miles of mountainous roads south of Roanoke. The difficulties of the road may be judged from the fact that, although a large delegation of autoists drove out to meet us on our way into Roanoke, not a single driver was willing to show us the way south from Roanoke the next day. However, the president of the Roanoke Automobile Club, J. H. Marsteller, kindly offered to ride in our car and act as pilot. Mr. Marsteller is the most active motorist in that section, and yet he had never driven southward over the road leading from Roanoke.

The first stretch of 28 miles, from Roanoke to Rocky Mount, required 2 hours 40 minutes to negotiate. Perhaps fifteen minutes was spent in taking photographs and inquiring the way, but the balance of the time we were going as fast a pace as the road would stand. It is up hill and down hill—up and down without cessation. The road twists and winds around the mountainsides so one can rarely see what awaits him 50 feet ahead. The turns are very sharp and one comes unexpectedly to short grades as steep as

Roads Are Generally Excellent on the Popular Shenandoah Valley Route any on Giant's Despair at Wilkes-Barre. Add to this that the road is rough and rocky, and one can understand why we did not average more than eleven miles an hour with a car ideally adapted for just such road conditions. The wonder is, not that the road in this section is so bad, but that it is as good as it is, for the country is almost entirely deserted. There are no farms, no pasture, and no traffic. It is on this stretch of road that the money raised in the North Carolina city of Winston-Salem is to be spent. Already some work has been done in leveling off the rocks which project into the road and in filling up some of the holes. By the end of the month it may be a fairly decent road over which to drive a car. From Rocky Mount to Martinsville conditions improve somewhat, so that a schedule of 15 miles an hour may be suitable for the large cars in this month's tour.

The Scenery Is Picturesque Near the Piedmont Toll Bridge



North Carolina, as I have said in previous articles, has been leading the "New South" in the building of good roads. There are numerous fine straightaway stretches of flawless macadam where, for miles at a time, one may drive a car at its maximum speed wtihout any fear of accident, as cross-roads are few and far between and traffic is light.

South Carolina has been doing wonders during the last few months in improving its dirt roads, which are the prevailing type in this State. The roads are, for the most part, smooth, well graded, and without sharp turns. In dry weather splendid time can be made in crossing this State; in wet weather the tourist had better provide himself with three or four sets of tire chains and postpone his other engagements for a day or two.

Georgia, the pathfinders found to be literally torn up by gangs of convicts engaged in resurfacing the road. The counties are vieing with each other in bonding themselves to build new highways, and the good roads enthusiast may say of this State: "Not yet, but soon."

At the present writing, nearly a half hundred cars have been entered for tbe tour. A noteworthy feature of the entry list is that more than two-thirds of the cars have been entered by private owners from the South. Some of these latter entries are to represent the boards of trade or chambers of commerce of various cities along the line. The rules of the contest are of the simplest possible sort, merely requiring the cars to travel on a definite schedule, with no questions asked regarding repairs or replacements; but no time is allowed for repairing tires and the contestants must do their filling, oiling, etc., on their own running time. Whether the contest will appear to be a tour or a "road race" to those making their first appearance in competition is a question which only time will decide. However, one thing is certain—after the tourists cross Mason and Dixon's line they will be welcomed, dined, fêted, and "barbecued" in every town where a noon-stop or night-stop is scheduled, and unless the tourists have a different experience than did the pathfinders, they can ship their pocketbooks home as superfluous baggage after entering the Sunny South.

Colored Road Workers Are Healthy, Busy, and Happy

WHAT LIES BETWEEN SAVANNAH AND ATLANTA

SAVANNAH, GA., Oct. 18—Shortly after 7 o'clock on a recent October morning, the scout pathfinding car, a Chalmers-Detroit, set out upon its 300-mile journey from Savannah to Atlanta to pick out the route for the endurance run to be held November 8.

The car started from the T. A. Bryson garage, going through the following towns on its way to Milledgeville: Pooler, Edam, Stilson, Brooklet, Statesboro, Sandersville, and then to Milledgeville for the night. This place was reached at 6.30 o'clock in the afternoon, after a good run. There being no record driving to see how quickly the trip could be made, the work consisted solely of photographing and obtaining route information for the run.

The first stop was made at Louisville, where a big reception was given to the party, and similar ones followed in Sandersville and Milledgeville. In each town the county commissioners and mayor would come out and greet the car, and would sign the pledge to help to boost the good roads movement that has just now set this part of the country wild.

At Louisville a big spread was supplied, and after this the Savannahians were taken for a ride to the boyhood home of President Battey of the Savannah Automobile Club. At this place a battle took place between the auto crowd and a rattlesnake, in which the snake lost its life.

At Sandersville the party was met by Mayor Evans, who served as guide. Leaving here, the party was met half way by Mayor Bell, Milledgeville, who escorted the procession to that place.

The best roads on this part of the journey were found in Jefferson, Washington, and Baldwin counties. The roads in Jefferson county are already complete and in good condition. In Baldwin county large hills have been cut away to make the road. The roads in Washington county are torn up a little because they are beginning to grade them for the run. Other good roads were found in Burke and Jenkins counties, but these were a little sandy because of the lack of rain for several days. The time between Savannah and Milledgeville was 9 hours 10 minutes, the distance being 108 miles. At Millen, Sandersville, and Milledgeville gasoline stations were established for the run.


Putnam County Had Poor Roads


Road Building in Jenkins County


Near Millen, in midst of Sugar Cane

After staying overnight at Milledgeville, the party left at 8.30 the next morning with James L. Sibley, postmaster, as leader for the entire run to Atlanta. The following cities were visited and in each a big reception was given to the car: Eaton, Madison, Social Circle, Covington, Lithonia, Redan, Stone Mountain, and Dictur.

The trip from Milledgeville to Atlanta was made in eight and a half hours, but four of these hours were consumed in stops on the way. The roads in Putnam were found excellent, which made the running most enjoyable. In Morgan county the roads became poor. At Newton the commissioners are still working on the roads, but will have them in shape for the run. The roads of Dekalb county were rough, but will soon receive attention.

At Lithonia a party of Atlantians met the pathfinding party, among them being Col. J. R. Grinn, of the Atlanta Automobile Association; Police Commissioner C. Mason; H. L. Wilson, of the General Motor Works; C. R. Tyce; T. I. Ryan, of the Fourth National Bank; Chairman Whiting, of the reception committee, and J. F. Lewis, of the Atlanta *Constitution*.

Arriving in Atlanta, the car was taken through Peachtree and Whitehall streets, and then to the Atlanta

Automobile Association clubhouse, near Hapeville, via Stewart avenue. The odometer showed that on arriving in Atlanta the car had travelled 289.8 miles during the whole trip.

On the return to Savannah, the car left Atlanta Thursday morning, taking the old Capitol route. It is said that between thirty and fifty cars will participate in the run and try to capture the large prizes that will be presented.

The night stop on the run will be in Milledgeville, which will be reached about 6 o'clock in the evening. The cars will be divided as follows: Class C, cars costing $1,250 or under, speed of 15 miles an hour; Class B, cars costing $2,000 down to $1,250, speed of 15½ miles an hour; Class A, cars costing over $2,000, speed of 16 miles an hour.

The following cars were entered up to last Saturday: Three Packards, three Stevens-Duryea, two Chalmers-Detroit, two Cartercars, one Crawford, one Acme, one De Tamble, one Buick, one White Steamer, one Cadillac, and one Reo.

NEW YORK TO BIRMINGHAM

BIRMINGHAM, Ala., Oct. 17—The Interstate Good Roads Convention passed the following resolution:

Be it resolved by the Interstate Good Roads Convention now in session at Birmingham, Ala., That the suggestion of the Birmingham Board of Trade is hereby commended for an automobile route between Birmingham and New York by way of Chattanooga, Knoxville, Tate Springs, Bristol and Stanton, following the valleys between Appalachian ranges and not crossing the mountains.


Ogeechee Road Bridge, One Mile Long


Statesboro's Roads Looked Good


Near Blitchton Roads Are Rough

THE GOOD ROADS TOUR

For the Good Roads tour which will start from Herald Square, New York City, October 25, for Atlanta, these entrants had been filed up to noon on Wednesday of this week, with indications of several additional ones before the list closed. The total is 50 with 27 different makes represented.

Entrant and Address	Car	Class
Chamber of Commerce, Atlanta	Benz Runabout	1
Read Holliday, New York	Chalmers-Detroit	4
Carl N. Page, New York	Chalmers-Detroit	3
Renault Branch, Paul Lacroix, New York	Renault	1
R. M. Owen & Co., New York City	Reo	5
York Motor Car Company, York, Pa.	Pullman	4
York Motor Car Company, York, Pa.	Pullman	4
Matheson Automobile Co, New York	Matheson	1
Maxwell-Briscoe Motor Co., Tarrytown, N. Y.	Maxwell	4
Maxwell-Briscoe Motor Co., Tarrytown, N. Y.	Maxwell	4
Maxwell-Briscoe Motor Co., Tarrytown, N. Y.	Maxwell	6
John W. Grant, Atlanta	White	2
Board of Trade, Commerce, Ga	White	4
Edward H. Inman, Atlanta, Ga	Stevens-Duryea	3
Colonel John J. Woodside, Atlanta	Thomas	1
Anderson, S. C., Chamber of Commerce, Dr. W. E. Atkinson	White	3
F. D. Hughes, New York	Chalmers-Detroit	4
Mrs. E. A. de Giers, New York	Thomas	2
Colonel W. L. Peel, Atlanta	Stearns	1
Moultrie, Ga., Board of Trade, W. E. Aycock	White	3
Spartanburg, S. C., Chamber of Commerce, J. T. Harris	Buick	4
Alfred Austell, Atlanta	Apperson	2
City of Salisbury, N. C.; C. W. Smith	Overland	1
Atlanta Auto. Assoc., by Asa Candler, Jr., President	Pope-Toledo	1
Winston-Salem, N. C., Board of Trade; F. S. Vernay, President	E. M. F. Studebaker	4
Forrest Adair, Atlanta	Stevens-Duryea	3
William Oldknow, Atlanta	Buick	4
J. Lee Barnes, Atlanta	Thomas	1
Automobile and Commercial Associations of Charlotte, N. C.; J. H. Ham	Maxwell-Briscoe	5
W. J. Stoddard, Atlanta	E. M. F. Studebaker	5
City of Charlotte, N. C.; A. Burwell, Jr.	Premier	3
Jacques Futrelle, Scituate, Mass	Jackson	4
Henry J. Lamar, Jr., Macon, Ga	Oldsmobile	1
Charles I. Ryan, Atlanta	Thomas	1
Col. Jas. W. English, Jr., Atlanta	Thomas	1
Pennsylvania Agency, Atlanta, Ga	Pennsylvania	3
White Star Automobile Co., Atlanta	White Star	4
Lawrenceville, Ga.; W. L. Brown	Buick	5
G. W. Hanson, Atlanta	E. M. F.	6
W. A. Kelly, New York City	Knox	3
Lynchburg, Va., Chamber of Commerce, by Carter Glass	Pope-Toledo	2
Evelyn Harris, Atlanta	Selden	3
Metz Company, Waltham, Mass	Metz	6
Metz Company, Waltham, Mass	Metz	6
E. D. Crane & Co., Atlanta	Regal	5
The Official Automobile Blue Book Publishing Co., N. H. VanSicklen, Sr.	Apperson Jack Rabbit	1

VANDERBILT ENTRANTS ARE PRACTISING ON COURSE

PRACTICE over the Vanderbilt course on Long Island was scheduled to begin Monday morning; the 22 special flagmen were on duty, and all traffic was carefully diverted to other roads during the prescribed hours, from 5 to 8 a. m. However, the flagmen and several hundred spectators gathered at Hicksville were all disappointed, for not a single car appeared. It was learned afterward that most of the drivers had planned to begin Wednesday, sacrificing two days in order to have their machines prepared for fast work as soon as they were brought out. The corps of flagmen demonstrated their efficiency, however, and, viewed as a little private practice for their benefit, the day's work was a great success. Wednesday morning the daily practice work had its beginning.

The course has already been brought into very fair condition. The oiling and the banking of the corners has been completed, and all of the holes and ruts in the country roads have been filled in with the best of Peekskill gravel. Only a few rough spots remain to be rolled down. Manager Pardington has prepared special number plates which will be hung on the radiator of each practicing car, and none of these numbers will be issued except to *bona fide* entrants who have paid their entry fees. In order that the spectators may identify the cars, it has been arranged that those entered for the Vanderbilt Cup proper will carry numbers 1 to 29; those entered for the Wheatley Hills Sweepstakes will be numbered from 30 to 39, and those in the Massapequa Sweepstakes from 40 to 49. These numbers are only provisional, however, the numbers in the actual race will be drawn for later, although the system will be the same.

The policing arrangements, it is expected, will be a great improvement over previous years. Sheriff Joseph H. Foster, of Nassau county, has organized a large force of men who will be posted at the police and flag stations, marked by a yellow placard and numbered consecutively. Acting in conjunction with the sheriff, the Pinkerton detective agency will have about 400 picked uniformed men on duty. This force is to be drawn from all parts of the country, and most of them will be men who have seen duty in strikes and riots in various cities. Those who remember the Vanderbilt crowds of former years will agree that such experience will stand them in good stead. All of these men will he sworn in as peace officers, will wear caps and sheriff's badges, and will be provided with police night-sticks, which they are instructed to use if necessary. Flagmen, deputies, and Pinkerton men will be placed at an average of about 100 feet apart around the whole course. The management will endeavor to keep the course clear until at least five cars finish.

The box-office reports are extremely promising, and an extra force of men has been working at the headquarters, Forty-third street and Broadway, sending out the pasteboards. The grandstand contains only about 5,000 seats, and from present indications double that number will hardly satisfy the demand. One-quarter of the 300 boxes have already been sold. The arrangements for reserved parking space, which caused some dissatisfaction last year, have been altered so as to insure a satisfactory view of the competing cars as they approach and pass.

Twenty-two entries have been received at present.

Four Chalmers-Detroit cars will participate, their pilots being the veteran team, Lorimer, Dingley, Matson and Knipper. They have rented a house in Garden City as headquarters.

The foreign contingent is represented by two Fiats, one of which will be in charge of Hearne, the young Chicago amateur, and the Isotta, which finished second last year, to be handled by Joe Seymour.

George Robertson may drive one Simplex and another of the same make is also entered.

Others are the Alco, H. F. Grant; the Apperson, Hugh Harding; the Marion, George Riess; two Buicks, in charge of Chevrolet and Burman; two Nationals, to be driven by Merz and Aitken; a Moon, an American, two Marmons and three Maxwells.

The entry list does not close until September 25, but late entrants will have to confine their practice to the Motor Parkway, as the county supervisors have announced that they would not issue permits after last Monday. Renault, Stoddard-Dayton, Knox, Rainier, and Sharp-Arrow are still expected to appear at the starting line.

The race starts at 9 a. m., October 30. The distance for the Vanderbilt Cup contestants classes 1 and 2 is 278.1 miles, 22 laps of the 12.6 mile course. The Wheatley Hills Sweepstakes, for class 3, will go 15 laps, 189.6 miles, and the Massapequa Sweepstakes, for class 4, 10 laps, equal to 126.4 miles.

NO. 13 PACKARD, FLETCHER DRIVING, WINS BRAZIER CUP

PHILADELPHIA, Oct. 16—High winds, chickens and the number 13 played a prominent part in deciding the winner of the seventh annual renewal of the Brazier cup contest, that pioneer among automobile competitions promoted annually by the Automobile Club of Philadelphia.

There were thirteen contestants, and car No. 13, G. B. Fletcher's Packard, won with just exactly 13 points penalty against it. The trail over the 65-mile course, which wound rather aimlessly over the excellent country roads in Montgomery, Bucks and Philadelphia counties, in juxtaposition to the city, was laid with confetti and corn. That was where the high wind and the chickens came in, for whereas the former lifted the flimsy paper and whirled it into the beyond, the latter camped on the trail during the hour or more that elapsed between the passage of the pilot car and the arrival of the first contestant, and devoured every scrap of evidence! The result was that many of the contestants lost their way and had to return. On one stretch—that tbetween Conshohocken and Neshaminy, where the wind was either exceptionally high or the fowls particularly hungry, or both—no less than nine of the cars went astray.

Fletcher was among the few lucky ones and lost little or no time by missing the way. He accumulated his lucky 13 demerits by passing the hidden checkers either ahead or behind his official time. These checkers were secreted at several points unknown to the contestants and registered the time each car passed them. These lists were then compared with the times each car should have passed the several points, and any variation meant one point for each minute out of the way.

C. Yarnall Abbott, in a Pennsylvania, was second, with 23 demerits; Alan Wood finished third with his Pope-Toledo, accumulating a total penalization of 28½ points, and W. C. Longstreth, Pullman, captured fourth place with 39½ bad marks. The other contestants were: Alan Corson, Buick; Henry P. Baily, Winton; P. M. Elsasser, Winton; J. H. Schenck, Jr., Winton; G. M. Sailer, Packard; W. Stewart Harding, Autocar; George D. McCreery, Jr., Buick; E. C. B. Fletcher, Packard; D. Walter Harper, Stanley steamer.

The majority of the contestants had their families with them and the affair was voted a delightful social success. One of the rules required that the owner drive.

This being the third win for Fletcher, the Brazier cup becomes his permanent property. It is whispered that he may return the cup to the club for further competition; otherwise the most ancient of annual fixtures may be missing next year.

Line-Up of Brighton's Record "24": No. 4 Lozier (2d); No. 3 Lozier (1st); No. 9 Rainier (3d); No. 10 Marmon (5th)

BRIGHTON BEACH'S concluding 24-hour race of the season had record speed and a Lozier six-cylinder winner, with another car of the same make as the runner-up. Swept by ocean breezes in late October, the Brighton track did not present an inviting appearance, with the result that the crowds of previous 24-hour races failed to gladden the hearts of the Motor Racing Association officials in the interval between 8 p. m. Friday and 8 p. m. Saturday. But neither the weather nor the absence of spectators prevented the demolishment of the American one-mile circular track records, and the course evidenced much improvement and presented a reasonably smooth surface.

The winning Lozier accumulated a mileage of 1,196, which was an improvement of 19 miles over the previous record of Robertson and Lescault, made with the Simplex in October, 1908.

Mulford and Patschke formed the winning combination of drivers, with Cobe and Seymour in charge of the other Lozier, which traveled 1,169 miles and excelled anything previously done on Brighton track this year. Both cars used Diamond tires.

The starting line was graced by the presence of Dr. Frederick A. Cook, of Arctic fame, who for the occasion wielded the official pistol. The nine cars got away to a straggling start and were strung around the track before five miles had been covered. Chevrolet took the lead for ten miles.

Then the Palmer-Singer, with Howard at the wheel, gradually worked ahead and held the lead until the twenty-fifth mile, when Chevrolet again got ahead. The Buick driver kept up his fast pace until he had set new records for one and two hours. Burman with the second Buick was now in second place, and soon after succeeded in passing his team mate, himself making the record for the third hour. Chevrolet had trouble and Seymour and the Lozier slipped into second place.

The first accident occurred before the completion of the first hour. As Cobe drove his Lozier into the homestretch a rear tire flew off and struck him on the head. Cobe was half stunned, but kept control. Seymour took his place after the car had lost nearly a lap. Soon after midnight the Palmer-Singer got into trouble. As this car, with Lescault at the wheel, was rounding the turn into the homestretch its front wheel came off and hurtled into a group of spectators. It struck Miss Alice Roberson, of Brooklyn, fracturing her collar-bone. Lescault handled the car well and brought it to a stop without any further serious results. It resumed racing as soon as another wheel was put on.

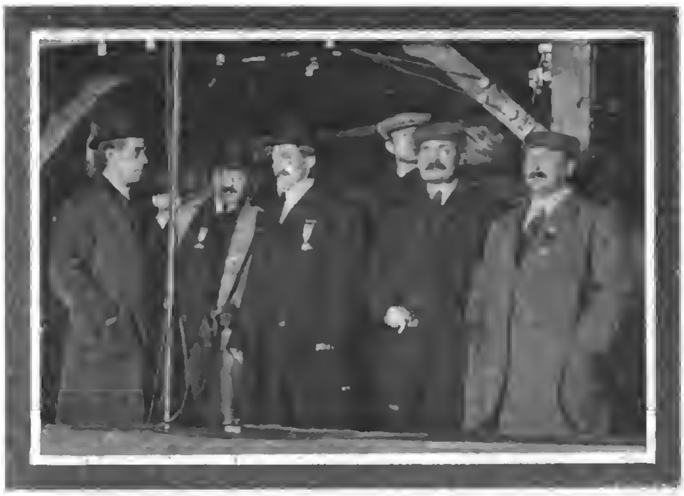
The Rainier Company for this race had placed its two star drivers, Disbrow and Lund, on the same car, and had entrusted its second entry to Wally Owen and Charles Bowers. At 6:45 in the morning, Bowers driving, the Rainier's right rear tire burst on the clubhouse turn, and the car went through the fence, turning over twice. Bowers sustained a fractured skull, but will probably recover.

Louis Chevrolet began to have his troubles soon after estab-

COMPLETE RECORD OF THE BRIGHTON BEACH 24-HOUR RACE HELD OCTOBER 15-16, 1909

No. Car and Drivers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Previous Record	55	107	158	211	265	305	356	408	455	508	559	613	658	710	761	**810**	**857**	903	949	992	1041	1086	1131	1177
3 **Lozier**, Mulf'd, Patschke	48	103	152	207	257	309	353	403	454	507	560	612	652	703	752	802	853	**904**	**951**	**1001**	**1050**	**1096**	**1145**	**1196**
4 **Lozier**, Seymour, Cobe	52	106	155	206	262	308	357	409	461	511	563	610	**664**	**712**	**763**	808	833	883	920	977	1027	1072	1120	1169
9 **Rainier**, Disbrow, Lund	42	87	139	185	230	278	326	391	427	480	529	578	623	670	716	759	808	848	890	937	985	1028	1070	1115
5 **Buick**, Burman, Hughes, L. Chevrolet	56	114	**167**	208	262	318	362	401	447	495	540	593	624	679	731	774	809	842	889	924	969	980	1012	1064
10 **Marion**, Strang, James, Flanagan	47	96	141	189	232	269	297	319	326	353	380	415	460	496	544	583	620	662	704	742	782	814	859	904
11 **Matheson**, Baale, Whalen	39	96	146	195	239	288	339	355	355	365	396	438	482	529	572	619	630	670	709	745	796	837	874	891
6 **Buick**, L. Chevrolet, A. Chevrolet	**56**	**114**	164	**217**	**267**	**321**	**372**	**422**	**472**	**523**	**570**	**624**	647	668	719	764	Broken steering knuckle.							
8 **Rainier**, Owen, Bowers	52	107	155	210	261	310	353	399	449	496	546	546	546	Through fence.										
2 **Palmer-Singer**, Howard, Knipper, Lescault	53	107	153	203	222	222	228	279	319	359	359	359	359	Burnt-out bearing.										

Note—Heavy faced figures indicate new and existing records.



Polar Explorer Who Started All the Trouble
Dr. Cook and a Number of the Other Officials of Brighton "24"

lishing a record for twelve hours. At 10:45 in the morning his rear axle snapped, and the frame was bent by the resulting shock. Repairs were made, but about an hour later Louis' brother, Arthur, who had taken the wheel, went through the clubhouse fence and struck a tree. Driver and mechanic were hurled twenty feet through the air, but escaped injury. The car was wrecked. A little after noon the steering gear of Lozier No. 4 went wrong, and the driver had to ditch the car to escape a collision. Little damage was done, and the Lozier was soon back on the track. About the same time James, driving the Marion, took the far turn so fast that his car skidded and turned completely around. The officials decided that he was incompetent to drive, and put a man named Flanagan in his place.

A special prize of $200 had been hung up for the greatest mileage made in the last hour of the race. This was at first believed to have been won by Buick No. 5, but at a later meeting of the M. R. A. it was announced that this prize, too, had been taken by Lozier No. 3. Owing to the fact that all the cars were permitted to cross the finishing line after the 24 hours had elapsed, the Buick was at first credited with one mile too much. The Lozier made 51½ miles.

Ralph Mulford, one of the winning pilots, was married Friday just before the race started. The wedding day had been fixed at the time the race was scheduled for September 24, and when the race was postponed he refused to change the date of the happy event. He and his bride will start on their honeymoon with the $1,000 cash prize and a bonus added by the Lozier Company.

The Maid and the Man
Mrs. Strang and the Famous Driver as They Appeared at Brighton

FAIRMOUNT WINNERS RECEIVE PRIZES

Philadelphia, Oct. 18—There was a veritable love feast of gratified Quakers at Keith's Theater last Thursday night when the prizes won in last Saturday's 200 mile Fairmount Park race were distributed among the victors. The big playhouse was jammed, and after witnessing the rerunning of the main features of the race on the moving picture machine, Starter G. Hilton Gantert was introduced by Manager Jordan, of the theater. Gantert "started" Referee R. E. Ross, and the latter in a neat speech presented Harry C. Harbach, secretary of the Quaker City Motor Club, in whose fertile brain was hatched the idea of having an annual race in Fairmount Park, and to whose untiring labors no little of the success attending the event during the last two years can be attributed.

To Mr. Harbach fell the pleasant task of presenting the prizes to the winners. Robertson captured $2,500 in gold and the $1,000 MacDonald & Campbell cup; Dingley annexed $1,250 in cash and the Autolight Company's gold watch, the latter for the most consistent work during the race; Harding, $750 in gold, and Joe Parkin $500 in the same yellow metal. The big, good-natured crowd insisted on speeches from each of the winners, but the latter were evidently out of their element, and the few words they uttered in response were hardly audible. Len Zengle, who was awarded $100 in gold for the fastest lap (7:41), did manage to express his regret that he hadn't made all his laps in that time, but the elocutionary efforts of the others were not impressive. Numerous speeches, however, followed by representatives of the four institutions which profited from the proceeds.

POINT BREEZE MEET WAS DISAPPOINTING

Philadelphia, Oct. 16—The combined "land and air" speed exhibition which was to have come off on the Point Breeze track this afternoon did not pan out according to expectations. The land end of the program came off all right, although the speed was not all that could have been desired, but the Curtiss aeroplane, in charge of C. F. Willard, which was to have given the Philadelphians their first view of modern aerial navigation, was prevented from spreading its wings by a howling gale which swept over the field. "I would be in the Delaware in two minutes if I went up in this gale," said Willard. So the 6,000 spectators, the majority of whom had come purposely to witness the first exhibition in this city, were disappointed.

The races were of the most perfunctory order, and were strung out in an effort to keep the crowd quiet until Willard could appear. In a best two out of three, five-mile heat match race, George Robertson and his Simplex were beaten in straight heats by Willie Haupt at the wheel of a six-cylinder Thomas. The times were 5:55 and 5:44. Robertson had his revenge in the five-mile free-for-all, which he won in 5:37, with L. J. Bergdoll and a Thomas second, and Haupt bringing up the rear. In a filler event Bergdoll beat Haupt two straight five-mile heats. A series of mile record trials netted 1:05 for Robertson, 1:08 for Haupt and 1:10 for Bergdoll. The promoters will endeavor to keep faith by having Willard later.

NEW NATIONAL FORTIES IN VANDERBILT

Indianapolis, Oct. 16—Two of the new National "Forties," of which the specifications have just been published, are entered in the Vanderbilt Cup race. These cars have four cylinders, 5 by 5 11-16 inches, double ignition with Bosch high-tension magneto and storage battery, a three-speed selective gear, shaft drive, 124-inch wheelbase and 36-inch wheels. This model during the present year has sold for $3,750, but for 1910, in spite of the longer stroke and the lengthened wheelbase, the price will be cut to $2,500. On the Indianapolis speedway these cars showed a speed of better than a mile a minute. John Aitken will drive one of the Vanderbilt cars, and either Merz or Kincaid the other.

Up-To-Date Accessory Features of Radiators and Pumps

By Thos. J. Fay

Part 1

Fig. 1—McCord System of making tubing from long ribbons of sheet brass, at a rapid rate and well, with a seam which adds strength

ACCESSORIES are made in separate shops to a vast and growing extent and assemblers of automobiles depend upon these specialists for much of the excellent results realized. Even the makers of automobiles who bend every effort to build as much as possible of the whole car under one roof go to accessory makers for such units as radiators, oilers, the ignition system, and tires.

Parts makers, then, are of great and growing importance to the well being of the industry, and it has been shown that, as a rule, these specialists make as good, if not a better, showing than is frequently indicated by shops in which the attempt is to cope with the whole problem in diversified form, it being the case perhaps that "a jack of all trades is a master of none" in this as in other walks in life.

Logic and Truth Not Always Parallel—The "farming-out" process has its faults, among which lack of interchangeability is uppermost. In any attempt to reason that all parts if made outside will lack in this quality, basing the reasoning on the results attained from the farming-out process, a fallacy will be concealed. There is a vast difference between farming-out parts of units and purchasing a whole unit from a regular maker of the same. A crankshaft, for illustration, is but a part of a unit (the motor) and if it is farmed out when it is made it may not fit into place. A radiator, on the other hand, is a whole unit; it is delivered complete; the limits of tolerance, involving its fit in the chassis, affords an ample range of variation and there is absolutely no reason why the whole unit may not be made in a plant devoted to radiators and when delivered, fit in the chassis to the entire satisfaction of all concerned.

What the Practice Is in One Shop—In the respective plants there are bound to be differences in methods, and in a general way, owing to changing types of equipment and on general grounds, it may be necessary to describe the process in each plant in order to see the whole situation. In the main, however, from the user's point of view, a good understanding of what it means to build accessories will be gleaned if the process in some one plant is illustrated and described. For this purpose the plant of the McCord Manufacturing Company, at Detroit, Mich., has been selected and Fig. 2 is of the regular form of McCord radiator showing the front at A and B is of the other side. This type of radiator is used on cars when a pump is provided for purposes of water circulation. The radiator shown in Fig. 3 differs from the one in Fig. 2 in important particulars; it is for thermo-syphon work, but as a thermo-syphon radiator it is a special form as used in Regal cars made by the Regal Motor Car Company, located at Detroit, Mich. These radiators are of the vertical-tube type, in which rows of brass tubing disposed vertically, the same 1-4 inch in diameter, are nested with about 24 tubes to the row, the exact number differing in the different cars, depending upon the distance across, and the number of rows used is regulated by the motor requirement. In the Hudson car, for illustration, which is the car on which the radiator, as shown in Fig. 2 is used, there are three rows deep and 24 tubes to the row, making in all 72 tubes in the radiator. In the Regal "30" the radiator, as shown in Fig. 3, has five rows of tubes and there are 25 tubes to the row, making 125 tubes in all.

In order to increase the radiating surface of the tubes they are nested in a set of horizontal flat plates, of which there are enough to reduce the spacing or pitch of the plates to about 1-4 inch. The tubes are made of brass by a process, as shown in Fig. 1, by a machine which takes a spool of brass ribbon in at one end and delivers tubing the length of the ribbon at the other. It is a simple and rapid tube mill which reduces the ribbon to tube formation, a section of which is shown in Fig. 4.

After the tubing is made it is cut to lengths and dipped in a bath of solder, as shown in Fig. 5, when it is ready to go to the assembling process which requires the use of a machine, as shown in Fig. 6; its function is to press the flat plates over the nest of tubes. The tubes are held in a form while the work is

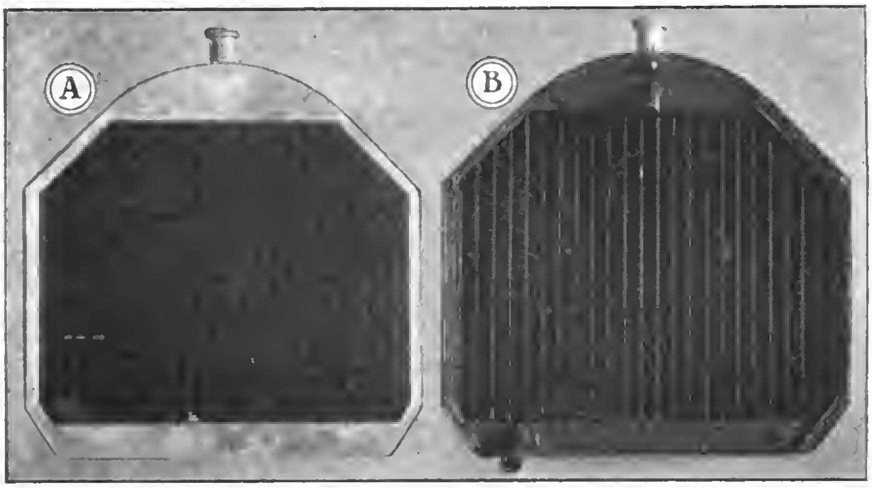


Fig. 2—McCord type of radiator as used on Hudson cars, designed for water circulation with a pump

being done and the holes in the plates are so sized that the tubes press tightly against the metal of the plates with results, as shown in Fig. 7, and the metal of the plates is turned down, thus increasing the surface of contact several hundred per cent. and the efficiency of the radiating surface to a vast extent.

Soldering Increases the Effectiveness—While it is true that the soldering process through which the tubes are put is a safeguard as against any possible leak, the fact remains that the tubes are tight, almost without exception, as they come from the tube mill and the solder has a more important function to perform. When the assembly is made by use of the press, as shown in Fig. 6, the whole is taken to an oven and heated to a temperature sufficient to melt the solder. Since the radiators are placed in the heater with the tubes in the vertical, it follows that the solder runs down and forms fillets at the junctions of the plates, as shown in Fig. 8, and the section of conducting metal at the point of contact of the plates with the tubes is increased very materially and the radiating effect is therefore vastly increased.

In order that the front of the radiator will look uniform and take on an artistic appearance the plates as used are fashioned with a wire binder, as illustrated in Fig. 9, which is enlarged to bring out the point to be made. The binder is in the shape of a length of wire which is turned under and acts as a stiffener for the plates, which, in the absence of this binder, would scarcely offer an adequate measure of rigidity.

When the internals of the radiator are made much as shown in the illustrations it is a simple matter to slip them into their casings and after soldering them they are subjected to a test to determine if there is a leak or a mechanical weakness at any point. For the rest it is a matter of finishing in black enamel for the tubes and plates and laquer over the remaining bright surfaces.

The finished radiators are light, strong, and in view of the unquestioned quality residing in them, it is interesting to note that this same quality would be at much extra cost were it not for the special processes employed. Many of the important details are omitted from the discussion since they are of little interest excepting to the maker, it being the idea here to show that quality is only possible (at a reasonable cost) if special processes obtain and it is needless to say that these methods did not come in a day and must have resulted after the expenditure of a pretty penny suitably mingled with skill.

Conditions as Demanded in Practice—The ability of any radiator is absolutely independent of the motor on which it is placed for the purpose of absorbing the heat from the jacket water. This fact is sometimes lost sight of and comparison is frequently made on a basis that leads to wrong conclusions. When it is desired to ascertain the required capacity of a radiator for a given motor it is first necessary to determine definitely the amount of heat that must be absorbed from the jacket water, and as should be well understood, this is a matter that depends upon the design of the motor and not upon the radiator.

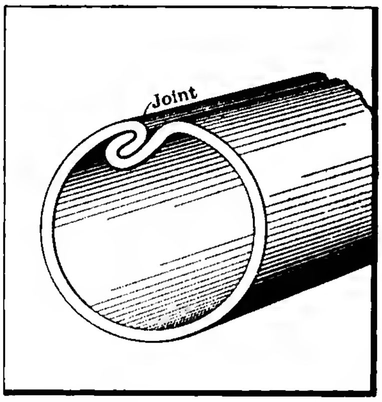


Fig. 4—Section of tube as made in McCord mill, showing how seam is overlapped and flattened down

In view of this and other conditions of more than a little importance, the McCord plant is equipped to investigate the whole situation for makers of cars in order to ascertain the best capacity of radiator to adopt in a given case. In the regular way it has been found that there are three conditions to be satisfied in the main, as follows:

(A) When motors are of the water-cooled type and a pump is used to maintain the circulation of water on a suitable basis.

(B) When the thermo-syphon system of water cooling is adopted under the conditions as here indicated.

(C) Considering the flame-swept surface in motor cylinders.

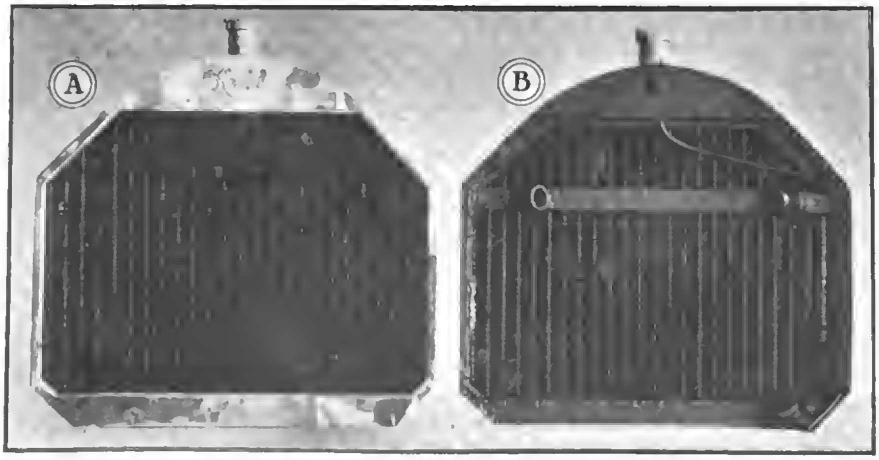


Fig. 3—Regal type of thermo-syphon radiator, utilizing energy of steam to add to circulation of water

Water Cooling Has Certain Limitations—There is a point beyond which the increased circulation of water adds but little to the result. This limitation is due to one of three considerations or a combination of them, viz.:

(A) Limiting value of air circulated over radiator surfaces of cylinders and radiators.

(B) Lack of ability of the water to take up heat from the radiator surfaces in direct proportion to water circulated after the speed of the water reaches a certain velocity.

(C) Effect of deposits of foreign substances over the surfaces brushed by the water.

It is perfectly feasible, of course, to do without a water pump if the ratio of flame-swept surface to radiator surface is properly adjusted. Under the circumstances it is one of the safe conclusions that the flame-swept surface of a cylinder should be reduced to the lowest possible value in square inches in comparison with the piston displacement in cubic inches. This is a matter which depends largely upon the shape of the dome of the cylinder, it being the case that a hemispherical dome is the most efficient for the purpose.

If in a given motor it is true that the flame-swept surface is very great in comparison with the cubical displacement or horsepower of the cylinder, it will be a showing of wisdom on the part of the designer to adapt a water pump for purposes of circulation, and even then it will be wise to use a radiator of large capacity. Obviously, the amount of heat that the radiator will have to dissipate will be relatively large, since the flame-swept surface will be such that much heat will escape to the jacket water, requiring increased radiation.

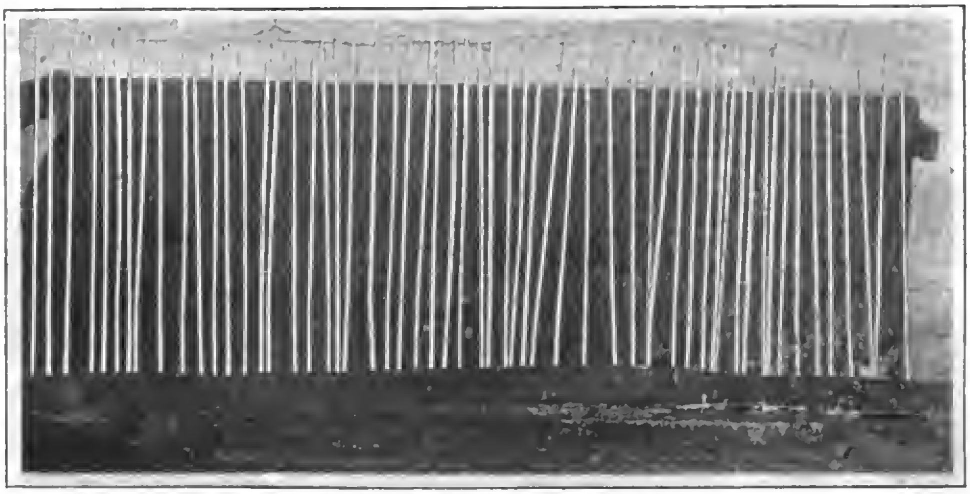


Fig. 5—Tubes, after they are cut to length, dipped in solder, and placed in a rack to drain and cool off before they are assembled

Very Little Power Wasted—From the point of view of the power required to drive the pump it is almost enough to say that the power consumption is but slight, yet even so, there are some who would prefer to have the proof, and with a view to showing definitely just what this power requirement adds to the pumping losses of a motor, the curve, Fig. 10, of a centrifugal pump as used on the Thomas "Vanderbilt Racer" is here offered, which test was made in the Thomas laboratory, at Buffalo, N. Y. This curve shows that the power required is not far from 0.2 horsepower when the pump is handling about 100 pounds of water per minute under the head then taken, and while the opportunity affords, it might be well to point out one or two other interesting matters as shown on the same chart.

Glancing at the curve marked "gallons per minute," it will be noticed that "impending delivery" begins at 680 revolutions per minute in this case. In other words, the actual quantity of water that a centrifugal pump will handle below this speed is not worth taking into account, and in gearing a pump of this character, it is necessary to run the pump at a speed somewhat higher than the crankshaft speed if it is true that the motor will do useful work at a relatively low speed. (Fig. 10, showing the curve mentioned and described will be shown in next issue.)

Contrary to the usual assumptions the power required is almost in proportion to the speed of the pump and the quantity of water is approximately on the same basis. Small pumps, as used on automobiles, do not conform to the laws of centrifugal pumps, even approximately, and it has also been found that altering the shape of the vanes has small effect on the result. If the vanes are curved it is almost a matter of no moment as to which way they rotate (with or against the curve), and it has also been found that, without any curvature at all, the results are very good.

It is fortunate that the performance of the pump is as shown, since the greatest requirement of water is when the motor speed is relatively low, and were the pump output to increase as the square of the speed the power required would increase in the same ratio approximately.

(To be continued.)

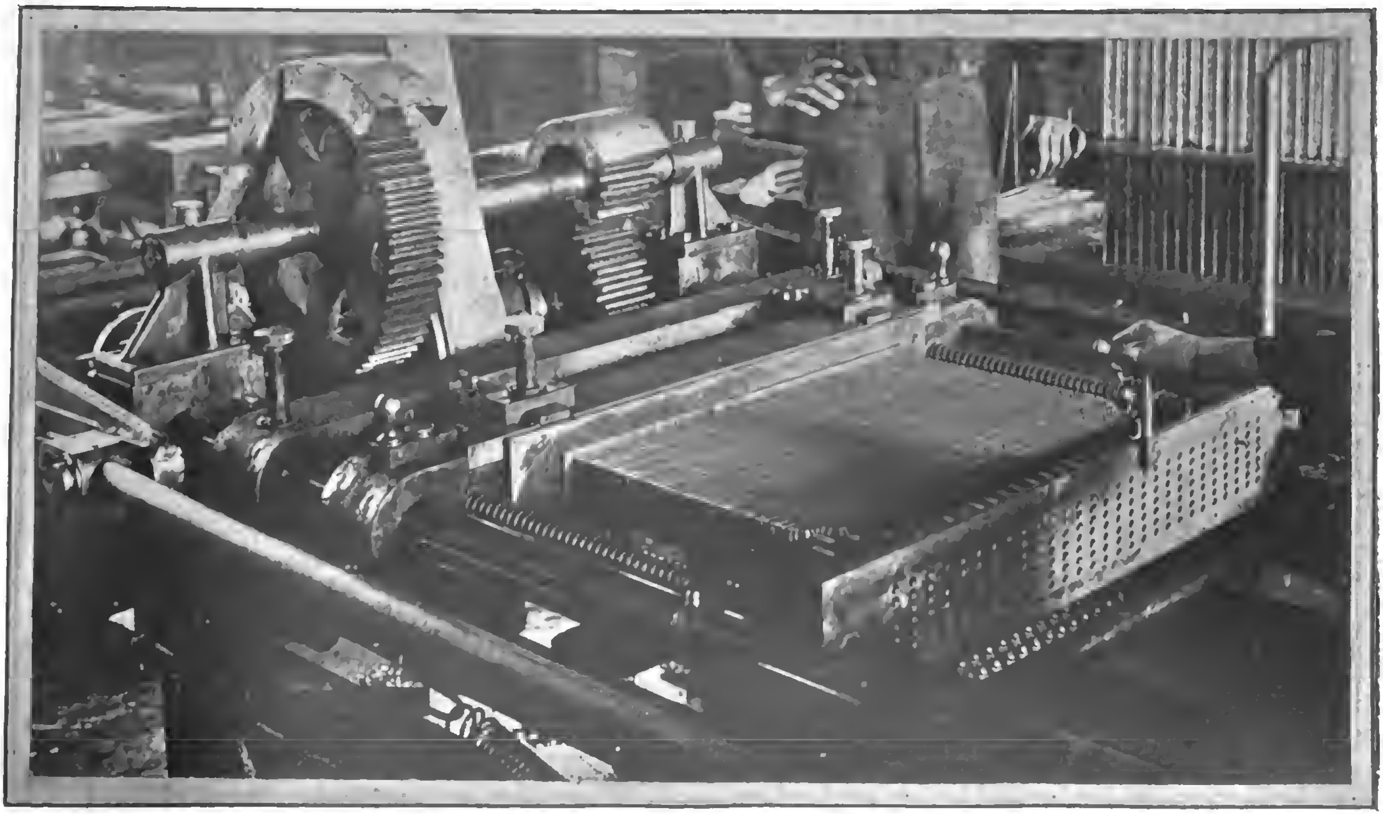


Fig. 6—Process and press, used to assemble McCord radiators, showing gill-plates being pressed on

Some Solutions of the Private Garage Problem

By Morris A. Hall

Part 1

COINCIDENT with the purchase and delivery of the first automobile the new autoist comes face to face with the garage problem. Shall the new "pride of the family" be kept in a public garage or shall some roofed building be adapted or specially built for it? These questions as well as many others of a similar nature and correlative to them are of real, live interest to the new owner. Or, perchance, being a forehanded man, perhaps this problem has been the source of much time and thought previous to the purchase of the car.

At any rate, the problem exists and must be solved at once. Unless the owner be a wealthy man or an exceedingly careless one, it is doubtful if the public place will be satisfactory with its high charges for either live or dead storage and excessive overcharges for the slightest item out of the ordinary, to say nothing of the irritating delays in washing, repairing and other things. In not a few cases, outside of the largest cities, of course, the charges at the public caretaker's place would be beyond modest means and slender pocketbooks.

Of course, no wonderful profit attaches to the simple storage and washing of cars, but the charges for the latter service are not lowered any on account of the prospective profits.

Private Garage Best for Private Citizen—All of which soon leads one to the inevitable conclusion that when conditions, such as geographical location in a small town or the outskirts of a large one and other things which enter in, are right for building or the adaptation of an existing building, this method, resulting in a private garage for every citizen, is best.

Granting, then, the necessity for the private building to house the new car, and another question of equal weight and gravity pops up, requiring like the first immediate attention and a quick decision. This is, "Shall I adapt a barn, cottage, outhouse or part of the basement of my house for this purpose, or shall I build a special building exclusively for this purpose?"

To consider this briefly, suppose that an unused barn can be converted so as to serve the immediate purpose for the cost of a new floor, and the installation of water pipes for washing purposes, amounting to, say, $50. If a new garage house is figured to foot up $250 the former is very liable to be the choice. If, on the other hand, this is chosen, and not being fireproof, burns down and the car with it, not only is the expense of fitting up the barn wasted, but the cost of the car as well. Or, if the roof leaks and destroys the upholstering and paint so as to call for retrimming and repainting at a cost of $200, there was no saving in the made-over barn.

The use of a cottage in the rear or nearby, of a room in the basement or elsewhere, and other similar methods may be ranked with the foregoing as makeshifts which are liable to be very expensive in the long run, more so than the special house would have cost in the first instance. So, far from being a matter of waste of money, the special house represents an economy.

Special Building Offers the Greatest Advantages—Reviewing the above, it seems as if the cheapest way out is the construction of a small building for this specific purpose. In this there is a chance for every man to show his originality, and the building should be such as will reflect the personality of its owner in outward appearance, in internal arrangement, or in its appointments. The latter presents a subject to appeal to the ripest judgment, since into its puzzling decision enters the question of economy. The man says to himself, "Shall I spend all of the money for the house, and buy tools and supplies later on as I need them, or shall I economize on the house and start with a full set of tools, thus saving all repair charges from the start? Or, shall I take an intermediate position, spending on the house what I think should be spent on it, buying tools and equipment with what money is left and adding to this later on as the need for special tools or supplies becomes apparent.

If a man has natural ingenuity and the ability to do work with few tools, the latter is by far the best course and one that gives the most satisfaction in the long run. The writer knows of a man who equipped a garage like this, buying a tool each time a saving was made which could be directly interpreted in money values. That is, whenever he did something on the car himself which saved him work at a public repair shop costing, say, $2, he invested the money in a tool or tools amounting to this or less. In this way he accumulated a fine set of needful tools, and as he looks upon it, absolutely without cost to him.

This tool subject is one that must be given attention very early in the matter of a private garage, since, when the total amount to be invested is limited, any source of expenditure must be considered. As tools not only represent an expenditure, but if care is not used, a very large one, this matter should be the subject of much thought. Correlative with it and requiring solution equally early, is the matter of what portion of the total repairs the new owner will make himself. If he decides that he will make all of them and be independent of the repair shop, he will need more tools than will the man who decides to make only the simpler repairs.

Tools Which the Maker Furnishes, Usually—Bearing indirectly upon this, the tools which come with the car influence the result. The following is an extract from the catalogue of a high-grade maker:

A full supply of drop-forged and hardened tools, with tool bag, is furnished with each car, as follows: Jack, six engineer's wrenches, two monkey wrenches, four socket wrenches, two spanner wrenches, hub cap wrench, pet cock wrench, combination pliers, screwdriver, valve spring tool, cold chisel, ball pein hammer, oil can, tire pump, tire tools, and tire repair kit.

Other makers furnish, in addition to the above tools, water pail, hub puller and wheel puller. This equipment will, of course, vary with different makes of cars and the price of the same, the higher priced cars furnishing more tools than do the makers of lower priced machines. In general, the above may be assumed to be a fair outfit as furnished with a $3,000 car.

Proceeding on the assumption that the above tools come with the car, it will be wise to sketch out about what extra tools the beginner will need. In case tools to this number and variety are not given free with the car, the assumption is that the owner will attempt to secure them within a reasonable length of time. Having these tools, then, it would be advisable to provide in addition, a stillson wrench of about 10 inches length open, which will take any size from 1-8 inch up to 1 inch, this being about as large a diameter as will be met with in gasoline-engine piping or tubing. The screwdriver supplied with the car will doubtless be all right, but a use will soon be found for other and different sizes, as this one will be a sort of general utility size. It is therefore advisable to purchase two additional at once and others later as the need arises. The two purchased should differ in that a small one with a wood handle will be needed for ignition purposes, one having a blade 2 inches long by 1-4 inch diameter being plenty large enough. For the other, a very long, moderate size comes in very nicely for inaccessible screws. A good size for this would be 10-inch by 3-8-inch blade.

Someone has said that it is possible to drive an automobile across the United States with no other repair parts than a bundle of wire. In the late Glidden Tour, three of the contestants carried no spare parts, only a roll of wire. In view of this, it is advisable to purchase a pair of wire-cutters. These come in several varieties, one being selected to suit the individual. Thus, nippers are for that purpose only, while side-cutting pliers may be useful in other ways. The price favors the latter, too.

Always Use a Soft-Headed Hammer on Threaded Shaft Ends—In assembling or dissembling, it is often, in fact, usually, necessary to pound or hammer on the end of a shaft or other part which is threaded at that point—that is, has threads right up to the end upon which the hammer is used. For cases of this sort it is not only advisable, but necessary, to have a soft-headed hammer. The heads can be bought separately either of copper or lead, the latter being both cheaper and more serviceable. They are cast with a narrow slot through the center, into which an ordinary hammer handle can be fitted in a few moment's time.

In case an ordinary hammer is used on a shaft end or other part and burrs up the threads or otherwise marks the finished piece, it will be necessary to use a file to take off the marks or protruding parts before the whole can be assembled. This calls for a file, which is not included in the tool kit. So, it will be well to buy a few files. These, too, will differ according to the nature of the work they are to do. Thus, for filing or, more correctly, dressing up, trembler points on coils, or sparking points on spark plugs and similar small, delicate parts requiring careful treatment, a very small, delicate file of the highest grade is an absolute necessity. Such a size is Nicholson's X F Swiss No. 6. In addition, a round file and one large flat shape is needed. For the former a 6-inch smooth cut will do, while the other should be a smooth, double cut of about 8-inch size. Others will be added later on, but these will do very nicely for a start and cost little as compared with their usefulness. Money saved on files is a poor economy, since they never reach the end of their usefulness. A poor file is an abomination in the sight of a real mechanic anyway. So, pay the price asked for the best when you buy files.

Since to the beginner the whole ignition system is mysterious, it is a good plan to get a reliable check on the amount of current being furnished, which may be done by the use of a voltmeter and ammeter or a combination of the two in the form of a voltammeter. For this purpose an excellent instrument is one that reads from zero up to 14 volts and zero to 30 amperes, but this wide range is not wholly necessary and costs money. The beginner may get a perfectly serviceable instrument of narrower range for less money. This is used for checking up ignition cells, but as pointed out in a recent article in The Automobile, may be used to check up wasteful coils as well. It is a great help in time of ignition trouble, when the action of the two meters denotes some specific trouble, enabling the operator of the car to go right to that point, whereas another driver without it, would have to hunt for hours to even find the trouble.

Necessary to Have Some Shop Equipment, Too—If a man is to do all of his own repairing he will need a few shop tools—that is, he will have to equip his garage as a small shop. One of the most necessary things is a vise for holding a piece while work is being done upon it. This will, of course, need a work bench as a fixed support, but as that will be considered a part of the garage, under the heading of building and equipping the structure, it will here be taken for granted. In size it should be large; since an owner never buys but one, it is advisable to have it large enough to handle any work. If large, small work can be held in it equally well, while if small, there will always be some large piece to be worked upon, too large, in fact, to go within the jaws. A vise which opens to 3 1-2 inches will take any part of the automobile barring the piston, crankcase halves and gear case halves, which two latter are seldom put in a vise, so that they may be neglected. If it is desired to have a vise large enough to take the piston it will have to be one that opens 6 inches, for while very few engines have that diameter of piston, it should never be put in the vise and clamped up without copper-facing strips, which will receive the imprint of the roughened jaws instead of the machined surface of the piston.

This larger size will double the expense at least. Bearing the same relation to large stock (whether round, square or of some other shape) as do the nippers to small wire, is the hack-

An Old Barn Sometimes Makes an Excellent Garage Without Much Alteration saw. This will be found very useful in many ways, and it is advisable to have one. The frame need not cost very much, but the working part of it, the blades, should be of the best. A cleanly man would purchase separate and suitable cans for oil, waste and gasoline, but this is not wholly necessary if economy be the order of the day. In purchasing oil and gasoline by the barrel wooden barrels are obtained (the ones in which they come) and the liquids may be kept in them and only drawn off as occasion demands. This is an excellent plan, since they are both cheaper by the quantity and the reservoir cost is saved. This plan has the disadvantage in that the fire risk is still present with the wooden barrels, whereas this is not so with fire-proof sheet-metal cans for that specific purpose.

All gasoline should be strained before using, since the quality of fuel grows steadily worse each year, so much so that to-day it presents a very large and serious problem. By straining all

City People Are at a Big Disadvantage in Building Garages

that is put into the machine the amateur owner is doing all that lies within his power to do, since beyond that chemical changes are necessary to purify it further. A funnel with a gauze insert is good, and better, although slower, is chamois.

In building and equipping the place, the owner will provide lifting and shifting means for heavy and bulky weights, to be described more in detail later on, so that for the present the jack furnished with the car will suffice. Beyond this the other tools furnished and those suggested above, the man of limited means would need little else at the start. After some use every man doing all of his own repairing will need more complicated and more expensive tools of various natures.

For instance, one of the very first things to buy would be a vulcanizer, since tire troubles are many and various, and the charges at the public garage or repair shop are equally many and various. Not only can much money be saved on immediate repairs, but it is thus possible to give the tires more intelligent care at all times, resulting in greater mileage per tire and lessening the per-mile cost of running. This necessity is more than apparent from an inspection of the following table of tire troubles, which has been carefully compiled from thousands of experiences with repairs by one of the large tire companies:

CAUSES OF TIRE TROUBLES

SHOES

17.3	per cent in consequence of insufficient inflation.
3.5	per cent in consequence of rusty and dented rims.
1.5	per cent in consequence of cutting off of cover pad through inadequate fastening of butterfly screw, whereby the cover could shift on the rim.
1.8	per cent in consequence of sudden braking, which scoured through tire at one place.
.2	per cent in consequence of contact with oil or other fatty substances, which are known to decompose rubber.
29.4	per cent in consequence of perforation by nails, stones and pieces of iron.
4.3	per cent in consequence of light damages and cuts on the threads, easily repaired.
4.9	per cent in consequence of considerable outer damages, whereby the upper canvas layers were destroyed.
37.1	per cent in consequence of normal wear and tear.
100	

TUBES

13.0	per cent nipped in mounting.
7.2	per cent places scoured through in consequence of defective mounting or the presence of sand and small stones in tire.
9.5	per cent through defective mounting.
6.8	per cent through riding on deflated tubes.
5.8	per cent damages through defective and wrong cover holders.
10.0	per cent valve defects through wrong manipulation of valve.
43.7	per cent normal wear and tear.
100	

From this it is immediately apparent that the driver of the car is responsible for much of tire trouble. This part of it is the one which might be helped by owning a vulcanizer, so that the little things, such as the "4.3 per cent. in consequence of light damages and cuts on the threads, easily repaired," mentioned above. This is an expensive outfit, however, and one that it would be inadvisable to buy at first, when there was a possible doubt as to the owner's ability to make his own repairs.

The same remarks apply to such items as taps and dies, which anyone can manipulate, but for which there would be no immediate necessity; in fact, there should be no use for them for many months of running. As a whole set, comprising about twelve of each, is rather high in price, the better plan is to wait until their use is a necessity and then buy them.

Some Idea of What the Whole Bunch of Tools Cost— Without going into the details of the various tools and things mentioned above, which, as explained before, are but a few of the total that one would like to have, and the least expensive, at that, it may be said that those described above should not cost in excess of $20. This, however, is exclusive of the taps and dies, vulcanizer, cans of oil, waste and gasoline, but includes the voltammeter. Inclusive of these the total would be triple and from that upward, according to size and quality. Further on a number of special tools and ways of doing one's own work will be elaborated on, while special apparatus will be illustrated.

Having settled, then, upon the number and cost of the tool equipment, the amount to be spent determines to some extent the size of the house, as well as the construction. But, generally speaking, there are eight forms of construction possible. These are:

1. Wood,
2. Wood and steel in combination,
3. Steel alone,
4. Concrete,
5. Hollow tile,
6. Other forms of fireproof construction,
7. Concrete in combination with any or all of the others.
8. Brick or stone.

There are other forms of construction and some other methods of doing the work which really influence the situation, but which do not deserve to be classified as a separate form of construction. Thus, as a simple example of this, concrete may be made up into bricks or stones and then laid up one at a time, as bricks or stones would be, or it may be made all at once, moulds being constructed for the entire sidewalls, which are then poured

One of the first things which the builder will want to know is the cost. This cannot be given except in a broad way, as conditions vary so much.

(To be continued.)

CAUSES OF TIRE DEPRECIATION AND ACCIDENTS

ENTIRELY beside the question of the sizes and quality of tires, or the matter of inflation, there are material reasons why their life may be materially shortened, among which the following are prominent: If, for any cause, the axles sag, the load will come on the tires in such a way as to deflect them out of the plane of the wheels and rim-cutting will follow. Fig. 1 shows a prolific cause of axle sagging, due to the use of rather small stays for the axle and saddles of no great competence. If the stay jumps out of the saddle, the load will then fall on the unstayed tubing, and if it is so frail as to require the use of a stay, it will sag when the supporting pressure is withdrawn. When this class of trouble is found in a car, it will be best to put a preventer clamp on the stay, just at the saddle, thus holding the stay into the saddle; stays should be under quite some tension.

Parallelism Must Be Maintained—There is still another class of trouble, due to the lack of parallelism of the road wheels. It may be one or both of the front wheels that will be found out of line, and with a length of stout cord it will be possible to ascertain just which and how much. The front wheels

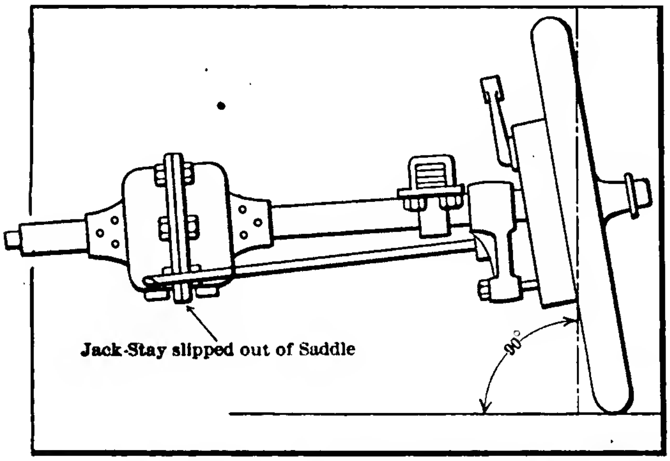


Fig. 1—Slack stay out of saddle, showing how axle sags in consequence

should be either parallel or they should toe in just a little bit. True, if they toe in they will cause wear on the tread of the tires, but it is better to have a suspicion of this trouble than to have them toe out. If the front wheels do toe out, steering will be attended by some additional difficulty, but if the toeing is slightly in, steering will be easier than when the wheels are exactly parallel.

If the wheels are parallel, a length of cord, when it is passed along from back to front, will just contact with the tire if the front and rear tires are the same size and equally inflated. If they are not the same diameter, the same idea may be used, but a rule, measuring from the felloes, will enable the workman to determine any difference existing. A long straight-edge, made of wood, will do this work very nicely, but there will be no difference in the principle, and in view of the clearness of the figure it is not believed that further explanation will be necessary.

Some Noise Emanates from Mud Guards—This year's automobiles are to be noted for silent performance if indications count, and makers of cars are paying much attention to valve and gear noises. In the meantime, since, in many cases, body work is done outside, with which mud guards are included, it will be well to remember that some of the former practices in connection with body work were not noted for noiseless performance. If stove bolts are used to fasten mud guards into place, it is highly improbable that the fastenings so made will prove to be secure, and just so soon as the nuts back off, as they invariably do, noise will creep in only to destroy the otherwise excellent performance of the cars.

Fig. 3 shows a class of construction which is rather common, and, unfortunately, it is extremely difficult to fasten the flap of the mud guard since it passes down between the rear wheel

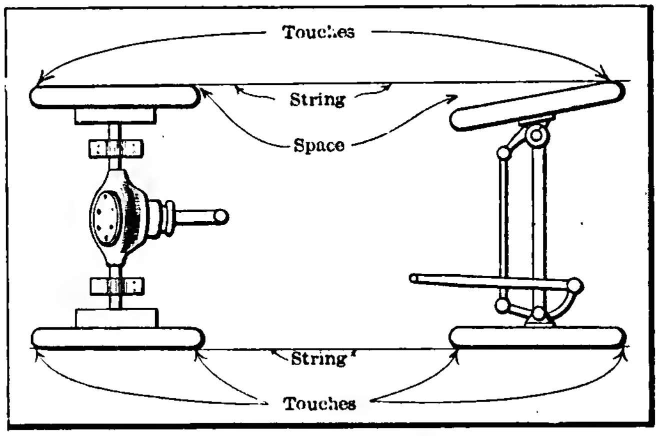


Fig. 2—Depicting one front wheel toeing out and method of lining up

and the rear spring suspension just at a point where there is nothing to tie up to. In any case, in view of experiences, it is necessary to do something about it, and if there is nothing to fasten to it is desirable to so fashion the "irons" that they will support the guards, and that better work on mud guards will bring its own reward is one of the points to be made.

Springs Should Be Tightly Clamped—While the subject is up, attention will be called to the most likely cause of spring failure. If the springs are not tightly clamped to the perches, they will fail in service, even if there is evidence of good designing, ample metal used, and a display of good judgment. By clamping the springs tightly they are prevented from deforming at the perch, which local deformation invariably ends failure; what is wanted is uniform bending over the whole length.

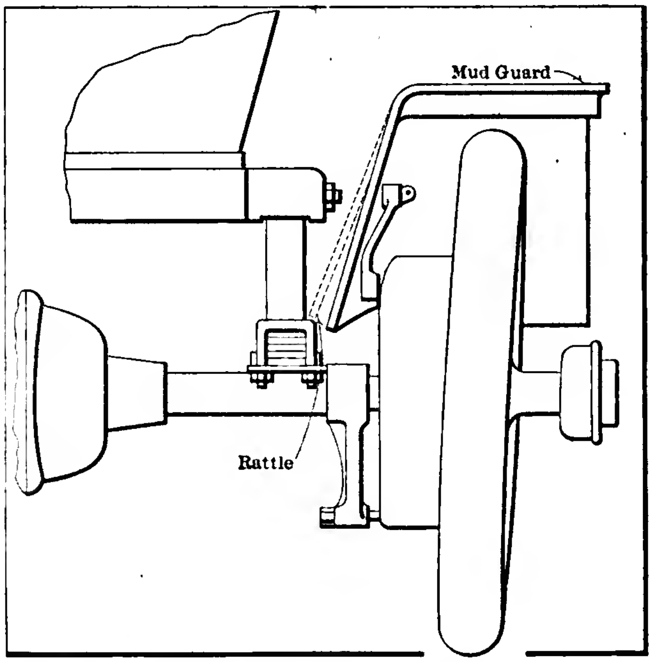


Fig. 3—Vibration causes the free end of the flap to interfere and noise is inevitable

HARD TO START "HER"

Editor THE AUTOMOBILE:

[2,059]—Will you kindly advise me through "Letters Interesting, Answered and Discussed," how to eliminate trouble in starting my 1907 four-cylinder car in the morning. It is a * * * * * * car with their own make of carbureter. I have to crank "her" over and over for about five minutes before getting the engine to start, and after so doing "she" runs all right. Aside from the matter of difficult starting, I have no fault to find. W. H. AHRENS.

City Island, N. Y.

It might be said that there are three sources of trouble of this sort, that is, on a cold morning. These are: carbureter not properly adjusted; ignition "out of kilter"; and natural inability of gasoline to vaporize in very cold weather without supplying heat to it from an external source. The first and second may be fixed and that, too, comparatively easily, but the third cannot be changed as long as gasoline is utilized as a fuel.

As for the first, carbureter out of adjustment, there are two things to consider. Does the carbureter give sufficient fuel for starting purposes, and is the air supply reduced to a minimum for this same purpose, both being irrespective of the amount supplied upon other occasions? You should know that for starting easy, the fuel should stand in a small puddle, so that the small amount of suction created as the pistons are pulled down at the slow speeds possible with manual rotation will be sufficient to pick up a lot of fuel, forming a combustible gas. If the fuel does stand in such a puddle; that is, if there is an excess of fuel at starting time, look into the matter of air supply. For starting purposes a very small amount of additional air is needed; in fact, practically none. So, to start the engine successfully, the auxiliary air supply should be shut off entirely and the main air supply reduced to a minimum. This will result in the overrich mixture necessary being sucked up into the cylinders.

If the air be allowed to enter as in ordinary running conditions, this additional amount of air will serve to render the mixture thin and weak, so that the feeble spark obtained at the speed of rotation will not be sufficient to ignite it. The ordinary magneto gives a spark of strength or igniting qualities in proportion to the speed of rotation of the armature, the ordinary speed under working conditions being somewhere between 400 and 2,000 revolutions per minute. The best possible speed of rotation by hand is not over 45 to 50 revolutions, so that the armature rotates very slowly. Consequently, it generates a weak spark. It is then apparent that the spark not being all that it should be for instantaneous and perfect combustion, the mixture must be just about exact in order to have an explosion. If you have no explosion, the engine does not start.

Just as a suggestion, try the effect upon the starting qualities of lowering the level of the gasoline nozzle within the carbureter. Open the carbureter and screw the nozzle down about one full turn. The effect of this will be to raise the level of the gasoline correspondingly. The fuel will then feed to the engine more readily, and you will doubtless find starting easier. You will also have to look out for flooding at other times, as the change in the fuel level tends to feed more fuel at all times. Doubtless you will have to change the level several times to get the best result.

This question has been discussed in the columns of THE AUTOMOBILE several times before, and several of the discussions were illustrated. In referring to these discussions, you may find the illustrations helpful in understanding the trouble and its remedy. You will find the subject of the effect of altering the fuel level discussed in the May 13 issue in answer to letter 1,876; June 17, letter 1,910; July 15, letter 1,940; July 22, letter 1,592; "How to Fix Carbureter," page 485, September 16 issue; "Engine Hard to Start," page 522, September 23 issue. The illustration is in the June 17 issue.

USE OF CLINCHER LUGS

Editor THE AUTOMOBILE:

[2,060]—Being much interested in and deriving much benefit from the discussion of current topics in the columns of "Letters Interesting, Answered and Discussed," I would like to ask what real use are the lugs or retaining bolts where clincher tires are used? I have a model F * * * * * * equipped with clincher tires and lugs. I have removed the lugs, plugged the holes in the rims, and find no bad effect therefrom. The tires can not creep under any condition if inflated, so I see no use for the lugs, except to pinch the inner tubes and make about nine-tenths of the trouble when you apply or remove a tire. I would like to know wherein it is unsafe or unwise to eliminate them.

Rodman, N. Y. H. F. RICE.

If there was no use for these and they were as superfluous as you would like to make it appear, the tire companies would not put them on, for they cost money and so does their application. No company would voluntarily put out something which cost real money and was actually useless. It seems that the whole argument lies within your statement "The tires cannot creep under any condition *if inflated* * * *"

The italics are ours, used to bring out the point that the tires are not always properly inflated, so that the holding power, whatever it may be with a fully inflated tire, is not always perfect, and it is advisable to have the lugs for protection in the unusual cases. More than this, these tires do come off when well inflated, as was proven last Fall when a picture of a racing car throwing a tire of this kind was given wide publicity. The tire then was fully inflated, so that the pressure could not have worked in that case. If not in that, why in others?

HILL CLIMBING STUNT

Editor THE AUTOMOBILE:

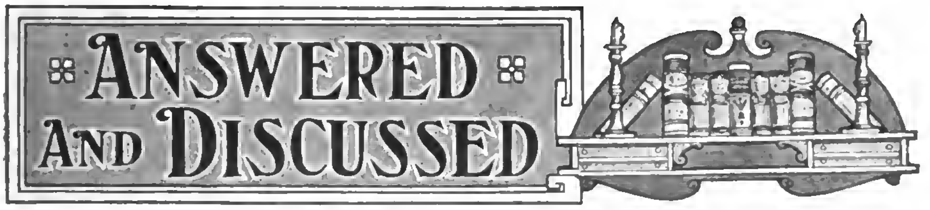
[2,061]—Will you please inform me if it is injurious to my motor (45 horsepower) when climbing a hill on the high gear, and the motor lags a little, just at the top, to slip the clutch a little. The latter is of the multiple disc variety. In "Motor Age" a couple of weeks ago, it stated that this was a trick which every expert driver knew and practiced. I have tried it several times and found that the motor will pick up immediately, and the car finish the hill without slightest difficulty. Of course, this is only if one is just at the top, as otherwise I should think the proper thing would be to change to a lower speed at once. But I was told last week that it is very bad for my motor to slip the clutch as I have said. As it was advocated in an automobile magazine, I will be greatly obliged if you will let me know your opinion.

Babylon, L. I. A SUBSCRIBER.

No reason appears why this practice in the hands of a skillful driver should injure the motor. The idea of the people who advised you to the contrary was doubtless founded upon the following supposition: The motor, when laboring very hard, that is, working, not laboring in the sense of pounding, if the clutch were suddenly thrown out, would speed up to a very high speed, the load under which it had been working so hard having been removed. Then, having attained a high speed, running free of a load, the same very heavy load is thrown back on it, tending to check it as suddenly as it was freed. It might be thought injurious to free the motor so suddenly and let it run so very fast. Also, it might be thought injurious to throw the load on very suddenly after it had attained speed. Both of these contentions, however true they might appear, fall flat when the amendment is made that the process be controlled by a driver of experience, who certainly never would take out the clutch suddenly or drop it in suddenly in a case of this sort.

The process of resting the motor near the top of a steep hill when ascending on the high gear, then should be practised only by an experienced driver, who will know how to release the clutch gently and let it back in after a very small interval of time not over a part of a minute, without a jerk, but slowly and gradually, so as to get the whole advantage of the increased speed of the motor, rather than drop it back in so as to be a dampening effort on the speed.

As you say in the last part of your letter, it should be used only at the very crest of a hill, and should not be resorted to as an excuse not to change gears, when the latter was really necessary. Anywhere below 40 or 50 feet from the top of the hill, the driver should drop down into a lower gear, and not overload the engine.



MATERIAL FOR GEARS

Editor THE AUTOMOBILE:

[2,062]—I have a four-cylinder car of well-known make, which runs very well, with the exception that the timing gears are very noisy and clatter all of the time. In the early Summer the car was fitted with new gears as follows: Main shaft, bronze; cam gear, steel; idler, fiber; pump and magneto (one gear) bronze. These ran very well, and made no noise, until about a month ago, when the fiber gear swelled and then stripped. The engine was then fitted up with new gears all around thus: Main shaft, bronze; camshaft, steel; idler, steel; pump and magneto, bronze.

Within a very short time, these gears, which by the way did not fit perfectly when new, as there seemed to be considerable play between all of the gears, became very noisy, although they had been well oiled. Now, the noise seems to be getting worse.

Now I would like your opinion of the best gears to put in when I replace these, and what the general practice is among the oldest builders of cars. Which combination of gears will run the longest, and which will run with the least noise; all gears of steel; steel and bronze; or a steel or bronze combination with fiber? In other words, of what material would you make each gear of to have the most silent and durable timing gears. The main gear works the idler, and the idler, the cam gear and the pump-magneto gear. Has the fiber gear been perfected so that it is perfectly safe?

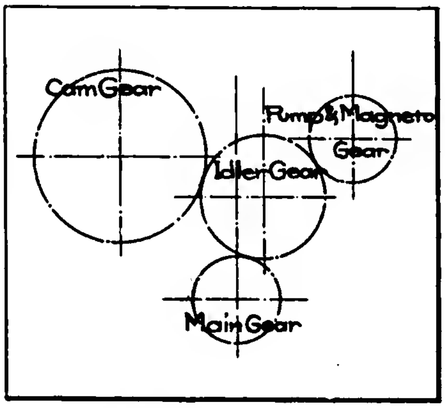
Port Jervis, N. Y. F. T.

Judging from the arrangement of the gears, as shown in the sketch, it would seem as if some noise-preventing gear for the idler would serve well. The other gears could then be of any desired material, as the material should have no influence upon the noise. The mistake that was made, from the point of view of silence, was in replacing the fiber gear with a steel gear. This was the only change of material, and it was a fatal one from your point of view, as it produced just what you wished to prevent. A number of makers use rawhide as well as fiber. Either one of these has much to commend it, but you should not expect too much strength and too good wearing qualities from this kind of material. You should be content to have a quiet engine, even if you replace a gear now and then.

Just as a pump shaft is often arranged with a cotter pin, which shears off in time of trouble, saving the expensive pump, so your gears might include one which would wear out quicker than the others, but while there and working would render the whole set of gears quiet. Give the fiher gear another trial.

Many of the oldest makers are now turning to the specially-cut gears for quiet action. Thus, one of the oldest uses a herringbone face made up of a pair of helical gears set side hy side, but with the helices pointing in opposite directions. This is an unusually quiet form, as is also the spiral gear, the worm gear, and other forms. To have a set of these specially cut for your car would be somewhat expensive, but would be quiet and durable as well.

Since you do not go into detail about the gears themselves, we cannot say exactly, but your statement about the play between the gears sounds funny. There is intended to be play between adjacent gears, and if you thought that they should fit up tight, you were mistaken. In cutting, the gears are so made as to have a small amount of play to and from one another. It may be that you mean that they were set too far apart, and that this clearance was materially increased so as to be very noticeable. If this was so, you were right, and the gears did not fit perfectly.



Arrangement of F. T.'s Gears

Fiber gears are now so well made as to give satisfactory service when properly used and the manufacturer's directions followed. For one thing, rawhide gears do not run well in oil, and the makers advise against its use when using that form. Makers of fiber gears may also advise against its use.

WIDELY VARYING TREADS

Editor THE AUTOMOBILE:

[2,063]—Why is it that some manufacturers make cars with 55, some with 56, some with 56 1-2, and still others with 60-inch treads? What is the reason for this variation? J. H. TYLER.

Buffalo, N. Y.

Standard railroad tread is 4 feet 8 1-2 inches, that is, 56 1-2 inches. The existing differences represent the result of neglecting the odd half inch, or of a misunderstanding of the exact figure. The extreme difference as shown by the 60-inch figure represents the cars built for Southern roads, where the wide tread is in favor, and replaces the ordinary railroad gauge used elsewhere. Cars built especially for Southern roads have that tread.

PROPER VALVE SETTING

Editor THE AUTOMOBILE:

[2,064]—I have a four-cylinder runabout, four-cycle, size 3⅝ bore, 3½ stroke, which has got out of square, I presume through wear and lost motion in the valve operating mechanism. That is, "she" does not beat square in the exhaust, as we say in speaking of a locomotive.

Valves are placed opposite each other in the head. The cams are made solid on cam shafts, and valves are operated by long rocker arms that have a screw adjustment on the end next valve stem, as shown in the enclosed cut.

Will you please inform me how to adjust valve opening relative to position of piston stroke to get best results as to power and speed?

Don't give any algebraic formulae; just state in plain fractions of an inch how far off dead centers inlet and exhaust valves should begin to open.

North Adams, Mass. NOVICE.

Not knowing the length of the connecting rod of the engine in question, we cannot give you the distance you wish exactly. Similarly, the cams were constructed for some certain valve setting, and should we give you a different one, the engine would not run well. You should write to the manufacturers of your car and ask them what valve setting they intended the engine to have. Knowing that, we could compute or lay out the exact distance the piston would be from each end when the various valve actions commenced or ceased. As it is, what we can give you will be approximate, and, as said before, the engine may not run well with this setting.

Set your inlet valve so as to start to open when the piston is 3-64 inch below upper dead center, that is, when it has turned so far that the piston has gone down that amount. Similarly, for the exhaust valve set that so as to commence to open when the piston lacks from 5-32 to 3-16 inch of reaching the lower center, that is, that much before the lower center is reached. If you cannot measure into 64ths, 3-16 inch will be close enough for you to find out if the inlet setting recommended is right enough to use with your engine.

The settings given above correspond as nearly as we can lay it out (guessing at the length of the connecting rod) to a lag of the inlet valve amounting to 10 degrees on the crank circle. The exhaust setting corresponds to a setting of 30 degrees before the lower center.

Current practice in valve settings varies from one factory to another, and you may find that with your cams, the inlet opening as given makes the inlet closing come too late. So, too, with the exhaust opening, you may find that your cams in combination with this setting, make the exhaust closing come too early.

Any angle of inlet opening less than the one given (10 deg.) would decrease the distance given, and any greater angle would increase it. With the exhaust, a smaller angle would lessen the distance given, while a larger one would increase it. We state this because you may set according to the above figures first, and write to the manufacturers later. In that case, you would have a means of comparison.

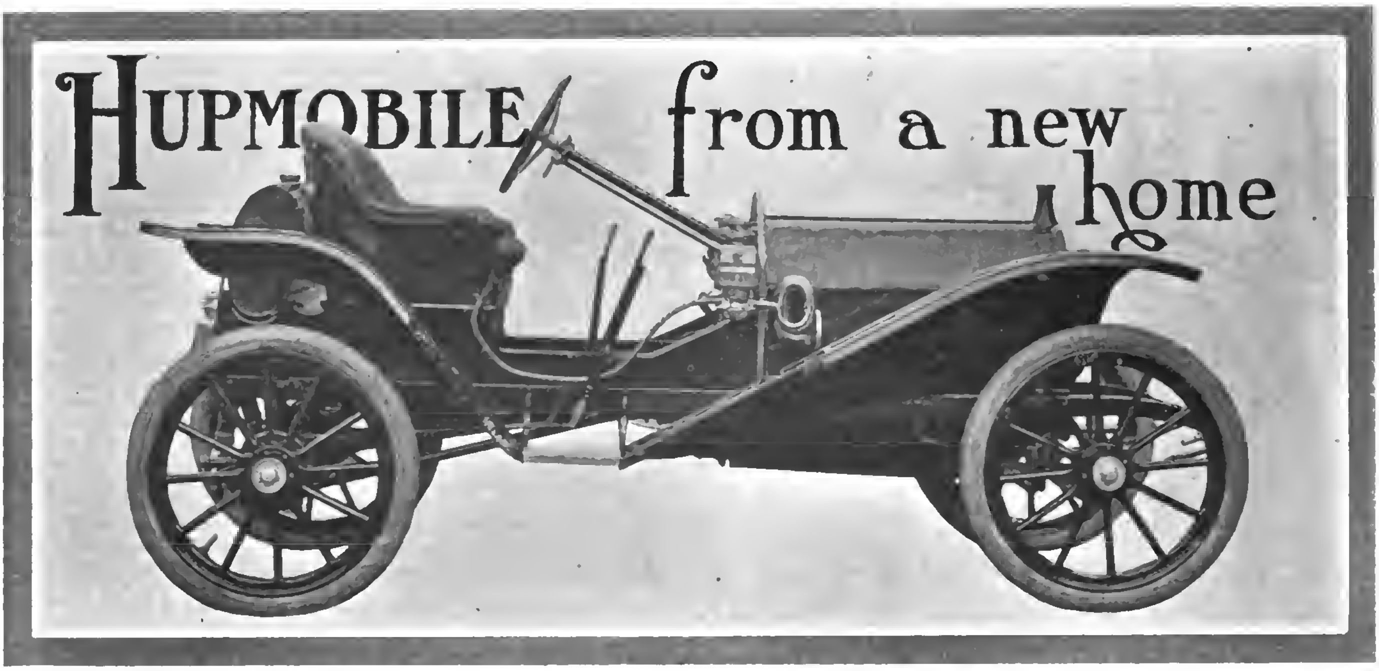


Fig. 1—Car as seen from the right side, showing a low seat, much tilted wheel, and fuel tank to the rear

LAST YEAR the number of cars produced of this make reached the comfortable figure of 500 despite the lack of facilities such as are now at the disposal of the company. The new plant, with a floor space approximating 50,000 square feet of concrete block construction, is a model of its kind, and Model B, which is the car for 1910, is being turned out under the most favorable conditions at the rate of thirty a day. The title illustration is a fair view of the car, presenting the earmarks of elegance, utility and evidences of a certain sturdiness which is borne out by performance in service.

The general design is such that the appearance is that of a racing machine, and since this is direct evidence of a low center of gravity and all that it implies, it will come as no surprise to learn that the road performance is praiseworthy in the extreme. With the seat located at about the point of least motion of the body and low, the sensation of ease and comfort is experienced, which is accentuated by the well-regulated distance from the front of the seat to the dash.

Four-Cylinder Motor Is a Feature—With a bore of 3 3-4 and stroke of 3 3-8 inches, the four-cylinder motor used is rated at 20 horsepower, and considering the light weight of the complete car, mode of suspension and other favorable considerations, the power situation lends confidence. The power plant is self-contained, and suspended in such a way that the chassis frame deformations, due to road inequalities, are not transmitted to the machinery.

The flywheel, 14 inches in diameter, weighs 40 pounds, is provided with helical blades to propel air to the radiator and is placed in front. The starting crank is journaled in a cast extension which is fastened to the front cross member of the chassis frame and is held out of engagement by a helical spring. The crankshaft, of special (heat-treated) steel, is designed to afford great initial rigidity, and the connecting rods, of H-section steel (drop forged) engage the crankshaft through bearings of Parsons' white bronze of liberal projected area, thus assuring long service in the absence of bearing trouble.

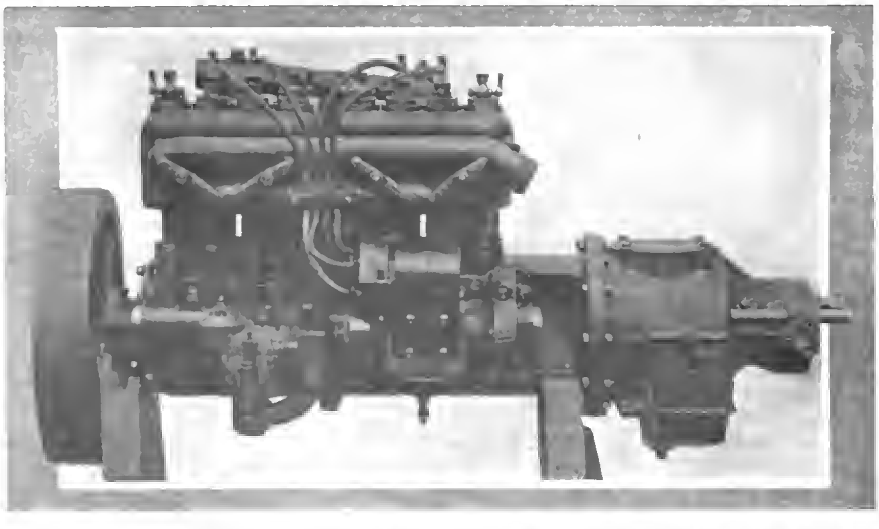


Fig. 2—Left side of the motor, showing magneto, fan in the flywheel, sliding gear system, Breeze carbureter, and unit construction

The pistons, of a special grade of cast gray iron, are taper ground, 3 5-8 inches long, with an oil groove 7-8 inches wide to oil the wrist pin, and three eccentric, bevel, split, packing rings prevent the leakage of compression. The rings are machined to near size and ground on three faces. The valves are 1 1-2 inches in diameter, made of nickel steel and finished with a 45-degree seat. All valves are located on the left side of the motor and spark plugs are located over the inlet valves.

Camshaft Placed for Quick Inspection—Referring to Fig. 4 of the camshaft, it is provided with five bearings in a separate demountable member of the crank case and the removal of ten nuts allows of removing the member, including the camshaft, gear and tappets. The shaft of the type with integral cams is babbitted in, which is a new idea in automobile work, and the gear, of the silent type, is exposed to view and may be gotten at. The magneto is bolted to a shelf which extends out from the same member and the same scheme of bolting renders it feasible to demount the magneto and its driving mechanism without disturbing any other part of the motor. The half-time pinion on the crankshaft is of steel and the thickness of the gasket between the cover and the case may be varied to alter adjustment of the meshing gears.

Bosch Magneto Provided for Ignition Work—The Bosch magneto is of the high-tension type with fixed ignition, and the wiring system, which is neatly and securely installed, comprises five leads, four lead to the respective spark plugs and the remaining lead connects with a switch on the dash; the switch short-circuits the magneto for purposes of cutting out the ignition.

Oiling System Has Special Features—As Fig. 3 shows, the oiler is placed on the exhaust side of the motor and the heat of the exhaust keeps the oil at a constant viscosity. The oil is piped to the crankcase by visible piping and the system of oiling is by splash. Oil pockets are provided over all bearings and the lubricant, when it splashes, falls into the pockets and runs down through proper channels to the respective bearings. The rate of flow of the lubricating oil is controlled by a suitable adjustable valve, easy of access, and by means of a lever system the flow of the oil is increased with the speed of the motor.

Multiple Disc Clutch and Sliding Gear—From Figs. 2 and 3 of the extension of the crankcase for the transmission gear, including the clutch, to Fig. 4 of the same members separated, leads to a better understanding of the nice details inclosed. The multiple disc clutch is of liberal proportions, having nine discs, designed for easy but positive engagement and the two-speed (and reverse) sliding gear is something of an innovation in automobile work. The low speed is designed with a gear ratio of 2.7:1 and the high speed is "direct."

The control is with a suitably contrived side lever of artistic appearance and the system is "selective." The gears are of 20 carbon steel, bone-hardened and drawn in oil after machining and accurately generating the gears, which are ten pitch.

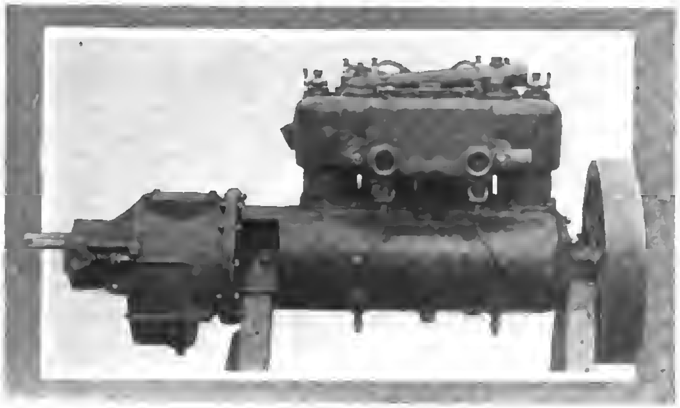


Fig. 3—Right side of the motor, showing flywheel in front, and lubricating oil tank which is warmed by exhaust heat

The faces of gears are 5-8 and 11-16 inches, respectively, and layshaft gears are riveted to a bronze hub that journals on a hardened and ground shaft.

Front Axle Represents a New Departure—In the latest car the front axle is of the I-section, drop forged from 40 carbon steel, and the yokes are forged integral. This is considered a big advance over the former practice on Model A, which was a built-up tubular type. In the new axle one of the noteworthy points is in the use of large steering arms, 13-16 inches in diameter, mounted with adjustable ball bearings of large diameter.

Some Prominent Chassis Features—The rear spring suspension is one of the most prominent features, and in view of its fine performance in the last year's cars, it is continued in Model B with a good showing of confidence. This spring is designated as an inverted double sweep type, has a ball socket clipped in the middle, taking a ball-ended taper shank bolt that seats in a bracket in the middle of the rear cross member of the frame, giving the frame a three-point suspension.

The eyes of the spring are pivoted to sliding journals having a bearing on a cross-bar parallel with and to the rear of the axle, and arms extend out from the brake supports to support the mechanism. This construction allows of suspending the chassis frame considerably lower than usual, and the fine appearance of the car is almost wholly due to this method of spring suspension, including semielliptic front springs.

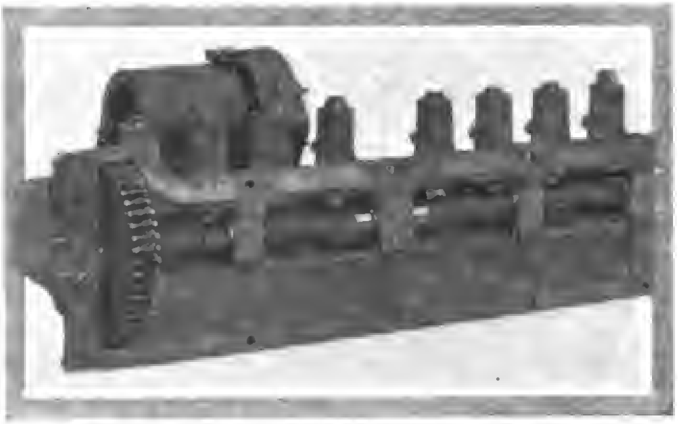


Fig. 4—Camshaft, indicating how it is placed in a separable part of the case and can be removed, with its gear, at will

There are four internal expanding brakes, faced with asbestos fabric, which is rendered strong by interwoven copper wire. This double set of brakes, with two sets of shoes in each wheel drum (side by side) being cam actuated, considering a straight-line system of linkages and rods, assures a safe and permanent braking system. The brakes are manipulated by side lever and foot pedal, respectively.

Steering Gear Is Nicely Worked Out—The steering gear is of the inclosed rack-and-pinion type, both members bone-hardened and ground accurately to size, and sustained straight-line connections assure entire freedom from bending moments. The housing of the gear is riveted to the front cross member and holds a liberal bearing for the shaft, which is inclosed and tilts back at a convenient angle from the point of view of appearance and utility. The steering wheel is of standard diameter, has a spider of aluminum and the spark and throttle system is above the wheel.

Additional Important Considerations—The wheelbase is 86 inches with a standard tread, and 30x3-inch G & J tires are used. The road clearance at the lowest point is 11 inches and 13 inches clearance under the flywheel assures safety. The color of the body is "Hupmobile Red" with black moulding and hair striping. The upholstering is of a substantial character with plain black machine buffed leather, padded to support the back without interfering with easy motion of the shoulders.

The oval gasoline, placed at the rear of the seat, is a 1910 innovation which adds materially to the general appearance of the car, and it has the further advantage of rendering the fuel system easy of access. The tank has a capacity of 11 gallons and is high enough up to allow of a gravity feed. The whole car weighs 1,100 pounds, and it is claimed by the makers that it will reach a speed of 50 miles per hour. The price, including oil lamps, tools, with full equipment for the road (with magneto) is $750, a reasonable figure for the average buyer.

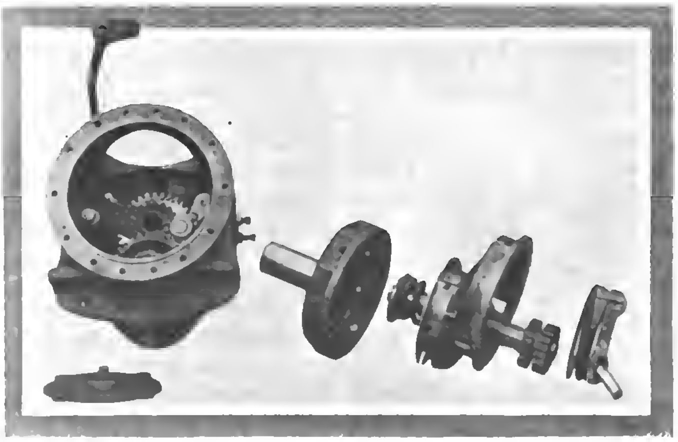


Fig. 5—Two-speed sliding gear, multiple disc clutch, and relating parts, with housing and details

Fig. 1—Three-ton chassis showing power plant in front, radiator above, and fuel tank which comes under driver's seat.

"WE guarantee service" is printed on the cover of the catalogue issued by the Grabowsky Power Wagon Company, of Detroit, Mich., and the title illustration of this article depicts the chassis which is responsible for the results attained. While the makers have a line of commercials to place at the disposal of users, the fact remains that the 3-ton power wagon, as shown in the chassis, as well as in the service of a brewery, as offered in Fig. 2, is the leader of the line, and the many nice features which will be uncovered by a close inspection, are well worth enumerating.

Demountable Power Plant a Conspicuous Feature—All models of this make are so contrived that the power plant may be removed or replaced in less than ten minutes. In this way it is possible to run a number of these cars in service, and by having one extra power plant, a repair can be made without laying up the wagon. The double opposed motor and all its accessories are located as a unit, at the front end of the chassis frame, and the radiator is placed at a point back of the power plant, but in front of the driver's seat.

Obviously, it is an advantage to have the power plant open to easy access, rather than under the driver's seat, and with the radiator placed above the motor, the thermo-syphon system of cooling may be employed to the greatest advantage. In a sense there is nothing new about this advanced method of nesting the machinery, so far as Grabowsky practice is concerned, but there are little refinements to be noted, as for illustration, by means of a register, the heated air, from the radiator, is guided into the cab of the car, and the driver is kept warm thereby. If the weather is not inclement, the register may be closed and the heat is deflected so that the cab will not be too warm.

The thermo-syphon radiator, instead of having the filler on top, has it at a point about one-third down, from the top, at one side. In consequence of this, the remaining upper third of the radiator has no water in it at all, and as the water bursts into steam, the latter rises to the top, and then condenses. The steam cannot ooze out and become a nuisance as well as a source of loss of water, because it is entrapped, and owing to the high temperature (that of steam at the atmospheric pressure) the efficiency of heat transfer is very high, and in this way the good results experienced are accounted for.

Fig. 2—Three-ton power wagon in brewery service, with open cab, steel wheels, dual rear tires, and a full load

Sturdy Vigorous Motor Practice—The double opposed, water cooled, 40-45 horse power motor, with 6 x 5-inch bore and stroke respectively, of cylinders, is designed especially for truck service, has a relatively heavy flywheel to assure that the motor will not stall under severe conditions of service, and the oiling system is absolutely automatic, brought about through the use of a pump driven from the camshaft. In the design of the crankcase, a chamber is provided for the excess lubricating oil, and it is the duty of the pump to force oil in to all of the bearings; excesses drain back to the chamber.

The camshaft is of special steel, with hardened integral cams, and it is so placed that it is readily removed and replaced, besides facilitating the straight line motion which is necessary if good timing is to be counted upon. The half-time gears are pressed on and properly keyed, are of liberal proportions, do the work without making noise, and the bearings, not only for the camshaft, but the crankshaft, are of a fine grade of white metal, of liberal length, and fitted by hand scraping.

The timer is placed on the end of the camshaft where it extends out from the case, and in view of the location of the motor in the chassis, the timer is accessible. The main bearings of the motor may be removed at will and the method of assembling is such that a mistake on the part of a new man at the task is quite out of the question. The valves are large, reciprocate in long guides, and a suitable adjustment is provided at the tappet ends to enable the timing to be done with great precision.

Besides all the care exercised to assure that the motor will give absolutely no trouble on the road, provision is made for quick work, if for any reason trouble should be experienced. In order that an inspection can be made in short order, a cover is placed on the top of the case, and it is large enough to uncover the camshaft and other working parts. Besides this, at the expense of removal of four nuts, it is possible to remove the camshaft from its position and then the crankshaft will be so exposed that the bearings will be accessible and may be adjusted if necessary; a point not always so carefully provided for.

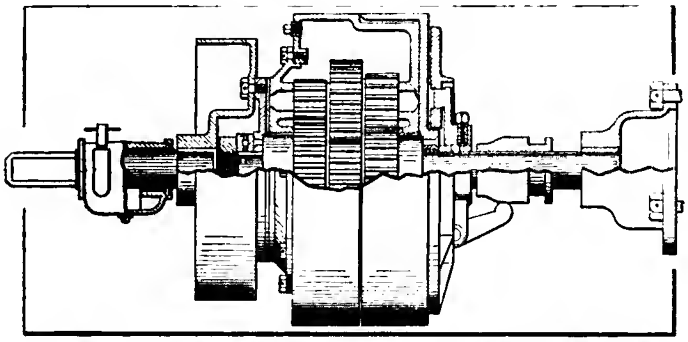


Fig. 3—Planetary transmission, opened up to show integral planets in a grease tight case and other nice design features

Planetary Transmission of Great Value—The planetary gear system is a part of the self-contained power plant, and by removing the plant the transmission comes out with it and may be overhauled at the same time. The planetary gear, as shown in Fig. 3, has a pinion on an extension of the crankshaft and planetary gears revolving around the same. The planets are duplicated to assure a correct balance, and the three gears of each set are cut integral, on Fellow's shapers, using special steel. The gear gives two forward speeds and reverse, and the clutches are so liberally designed that the driver may not destroy the facings even if slipping is tolerated. The gears are so nicely cut and fitted into the case that noise is eliminated, and when the case is properly filled with lubricant wear is rated below a remote contingency. The thrust of the clutch, which is

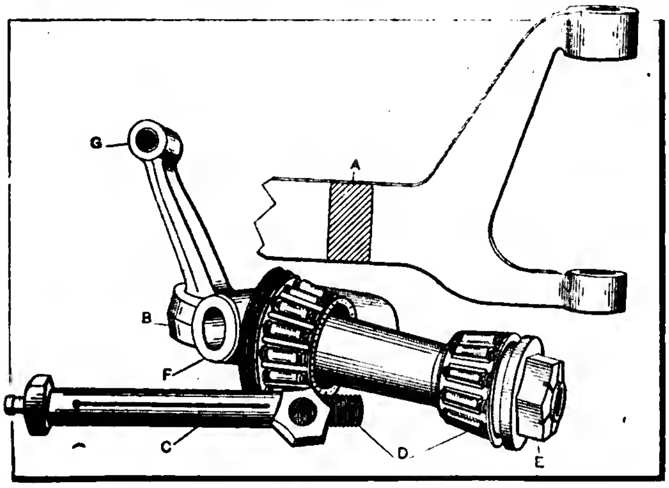


Fig. 5—Knuckle end of front axle, knuckle, bearings and knuckle pin of special steel

but slight, is taken up by a suitable ball bearing, and due to the use of liberal bearings throughout, coupled with fine workmanship, the transmission system is capable of performing its important functions, even in the hands of men of no skill, without showing depreciation worthy of notice.

Chassis Features of Noteworthy Purport—Steel wheels are used in all cases unless the purchaser elects to the contrary. Fig. 4 depicts a section of one of the steel wheels, and besides great strength, this type of wheel is proving to possess peculiarly advantageous properties, according to the Grabowsky experiences, among which resilience is mentioned. The construction of the steel wheels is such that lateral efforts are adequately cared for by using two discs of steel dished in and out, and they, in turn, clinch a ring of wood which is clamped between the bub flanges. Additional strength is imparted to the wheels by virtue of spoke-shaped contouring, which is done in dies, and this shaping also has the advantage of giving to the wheels the general appearance of spoked wheels.

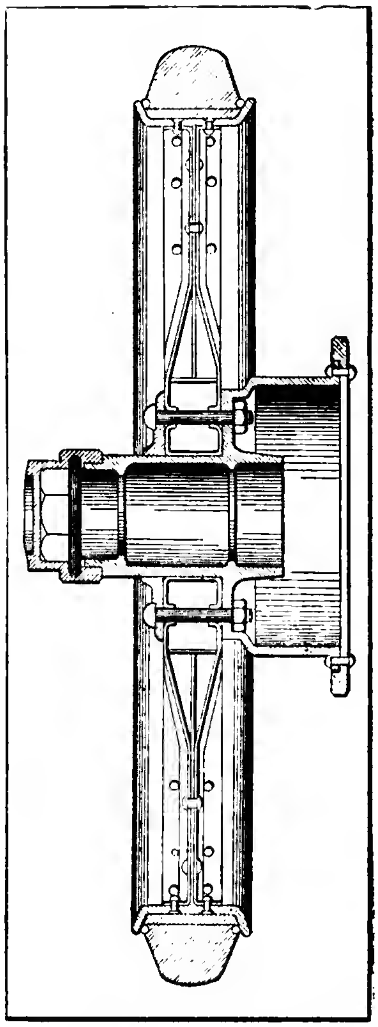


Fig. 4—Section of a steel wheel showing wood rings to which the discs are clinched and reinforcing methods.

The solid rubber tires are clinched in place in the usual manner, with tires in front, and dual tires in the rear, thus affording adequate tire capacity and reducing the cost of tires per ton mile to a minimum in expense accounts.

Side-Chain Drive with Special Features—The large sprocket wheel which is an integral part of the rear wheel hub, on each side, accommodates sprocket chains of liberal size, and passes around sprocket pinions placed on the jackshafts which extend out on each side of the unit system for the differential and bevel gear set. This unit system of housing for the bevel drive and differential is not unlike a live rear axle excepting that it is placed under and suspended from the chassis frame at a point in front of the rear axle. The advantage of this system over the conventional method lies in the ease with which the whole unit may be removed if the occasion requires, and strains are kept from distorting the chassis frame and destroying alignment of the rotative members.

Steering Methods Show Strength—The front, as well as the hind axle, is of the rectangular section, sufficiently large to assure a wide margin of safety, and the knuckles, which are die forgings of special steel, are designed to accommodate the steering road wheels wtih Timken roller bearings, as shown in Fig. 5. *A* represents the axle, *B* is the knuckle, *C* is the knuckle-pin, *D* the taper roller bearings, and *E* the castellated lock-nut which holds the wheel on. The bushings *F* and *G* are a fine grade of phosphor bronze, and purposely made thin enough to abort deformation, which would follow were they very thick of walls. The knuckle-pin, made of a special grade of steel, heat treated, is grooved to facilitate the flow of oil, and in view of the method of heat treating the knuckle, as well as the pin, it is believed that the system embodies a wide measure of safety as well as

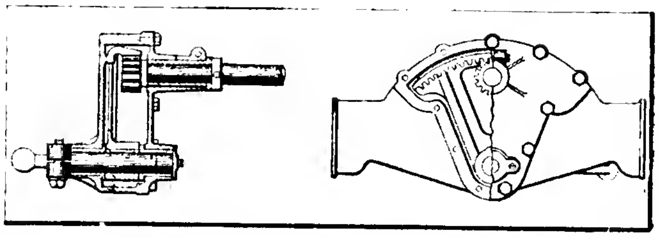


Fig. 6—Steering gear, opened up to show pinion and sector, liberal bearings and grease tight housing

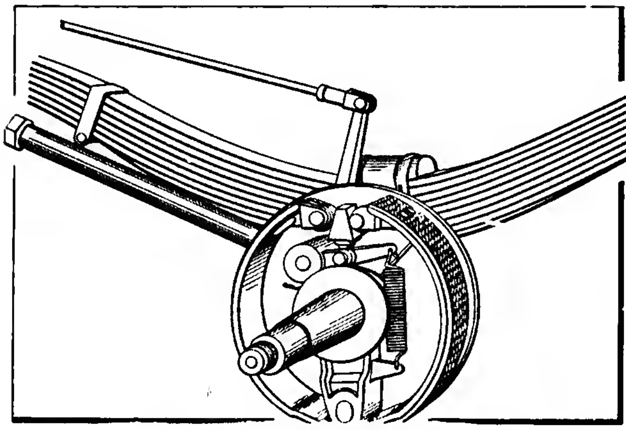


Fig. 7—End of rear axle with wheel removed, showing brake-drum, band, facing, and toggle system

behaving nicely under severe road conditions when the trucks are heavily loaded.

The steering gear proper is of the pinion and sector type, as shown in Fig. 6, sectioned at *A* and cut away at *B* to show how the pinion meshes with the sector. The sector is of large diameter, and the pinion has the minimum number of teeth safety considered, so that the ratio of reduction is in full accord with the best practice. The pinion is cut integral with its shaft so that strength is in no way depending upon a key or other insecure means of fastening the same to its shaft. The whole system is properly housed, runs in grease, and is easy to get at owing to covers being placed where they will do the most good. The steering arm is of special steel, heat treated, and the ball *a*, shown in the section *A*, is of large diameter, hardened, and fits in a socket, with means of take-up, to be utilized as the occasion requires.

Brakes of Durable Design—To properly cope with this problem it was deemed expedient to provide three sets of brakes, two of which are in the rear wheels, of the internal expanding order, as shown in Fig 7, cut away to disclose one set of faced shoes, which are 2½ inches wide. The emergency brake, 10 inches in diameter and 2½ inches wide, is located on the engine shaft next to the transmission. The propeller shaft is of good diameter, runs in a straight line in all planes, yet even so, a universal joint is provided in order to care for frame deflections, which must be taken into account.

With a surfeit of power which is a Grabowsky claim, and the over-loading which cannot be governed, it is necessary to allow for deflections, provide a superabundance of brakes and have all the members so strong that they will not fail in an emergency. These points are rarely ever taken into account in a theoretical discussion of the subject, and in all probability experience only will lead to assured results. The chassis frame is of the channel section, 4⅛ x 2¼ x ¼ inches, of special steel, so braced laterally as to render the structure capable.

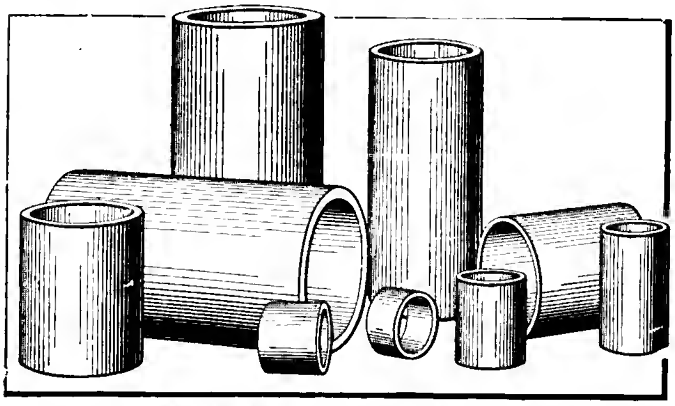


Fig. 8—Bushings used at every point, made interchangeable in order that repairs will be cheap and quickly made

Three-quarter platform springs at the rear are fastened to the rear cross member by a strong steel casting, and hot riveting at every point has the advantage of clamping the riveted members into close relation, due to the care with which the riveting is done and the shrinking which takes place when the rivets cool off. The rivet stock is of a character which will not deteriorate when it is heated, and the pneumatic riveters do the work so nicely that good results are a normal expectation. The front springs are of the half-elliptic type, wide, of a fine grade of spring steel, and while the number of plates change under the several conditions, yet even so, the loading in front is so nearly constant that half-elliptic springs for the front are satisfactory.

One Prime Idea Dominates Everything—The most important detail of design of the Grabowsky power wagons has been retained to the last, and Fig. 8 portrays, better than words, the system of bushings used in the several bearings. They are so fashioned that, should a bushing wear out, all that is necessary is to replace the same wtih a new one from stock and the unit will then be as good as new. The idea of the designer is that every bearing in the wagons will be so easy to keep in order by this means that there will be no excuse for laying a wagon up even for a short while. The bushings are low in cost, require little space for keeping, and by having a set in stock every owner of a Grabowsky will be in a position to do his own repair work at small cost and with no loss of time.

Some Commercial Phases of the Grabowsky—The whole line of cars, as well as the 3-ton chassis here discussed, are uniform in design, and what is true of one is also descriptive of the remaining models. The line includes everything from a 1-ton truck or delivery wagon to the largest size for which there is any demand, and the uses to which these power wagons are put includes sight seeing, trucking, delivery service, etc.

NEW BOOKS FOR AUTOMOBILISTS

"Carburettors, Vaporizers and Distributing Valves" as used in internal combustion engines, is the title on one of the best recent additions to the library of the automobile enthusiast or engineer. In this work the author, Edward Butler, has attacked the subject with typical English thoroughness, and the result is a book that is well worth having. From the point of view of the automobile engineer it is to be regretted that so many of the excellent illustrations are drawn from stationary practice, but this can be overlooked when the unusual number and character of these same illustrations is considered, many, if not most of them, being shown in print for the first time. The only other regrettable feature of the whole twelve chapters is the author's very evident featuring of his own inventions, which, however meritorious they may be, ought not to be so exploited.

Starting with the first carbureters, the author carefully traces out the development of the up-to-date devices for fuel vaporization, not in a historical way, but from an efficiency standpoint. The extent of Chapter 12, devoted to slide valves, may fairly be taken as a measure of this, the whole twelve pages being devoted to the latest practice. This matter concludes the book and follows twelve equally excellent pages on rotary distributing valves. Since the valves and valve action is so closely allied with the fuel question, and any treatment of the latter must include proper treatment of the former, Chapters 9 and 10 will be of more than passing interest. The former is entitled "Water-Cooled Exhaust Valves," while the latter deals with "Admission Valves and Combined Valves for Large-Powered Engines." Coupled with the extended interest in two-cycle motors and their well-known fuel vaporization troubles, it is very appropriate that the chapter devoted to "Two-Cycle and Camless Enignes" should be large, the third largest of the book. The 200 illustrations, aside from the complaint above, are very good, having been selected from best English, French, German, Swiss and Belgian practice. This work, from the press of J. B. Lippincott Company. Philadelphia, should be one of the "best sellers" if judged on the basis of real merit.

ELEGANT FRENCH LIMOUSINE IMPORTED BY NEW YORKER

PARISIAN ideas of luxury in automobile bodies are well illustrated in the handsome 50-60-horsepower Renault limousine imported by E. L. Giroux, a wealthy copper magnate of New York City, which was on view at the garage of Renault Frères last week. The chassis is a standard Renault construction, carrying a six-cylinder motor of 120 by 140 millimeters bore and stroke; evidently there will be no lack of power. The wheelbase is very long, approximating 12 feet. The car embodies the usual Renault features of thermo-syphon water circulation, ignition by high-tension magneto with fixed spark advance, four-speed gear with two sliding members operated by a progressive lever, and shaft drive to the live rear axle.


Revealing Luxurious Interior

Mr. Giroux bought the car last spring and had it fitted with an open touring body. With this equipment he made an extensive tour through France, Italy and Germany. Returning to Paris on his way back to the United States, he happened to visit the plant of Kellner, the famous French body builder. There he saw a limousine which was being made to the order of the Czar of Russia. Mr. Giroux liked the body so well that he ordered practically a duplicate to be placed on his Renault chassis.

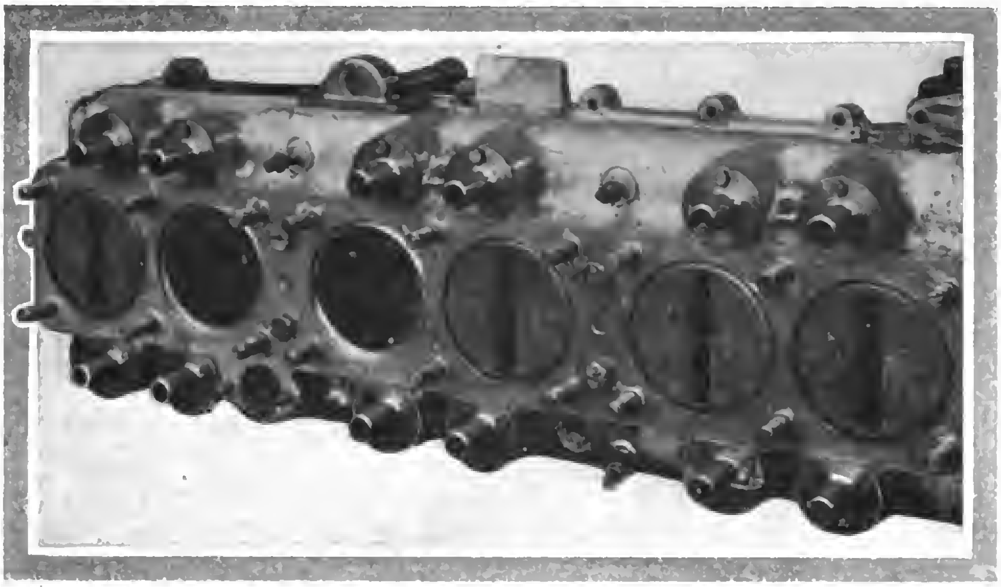
The limousine body appears through the open door nearly the size of a small reception room. Five passengers are easily accommodated. The two forward seats in the interior, instead of the usual small and uncomfortable stools, are full-size revolving arm chairs, and the occupants can swing around to face either forward or back without disturbing their companions. The interior woodwork is mahogany and the upholstering silver-gray velours. The finish in wood has many advantages over the old method, in which that part of the interior not upholstered was covered with cloth. The wood finish is preferred by many for its appearance, but is also easier cleaned and retains longer its freshness. The interior fittings show the designing of an artist of no mean ability. The electric lights are supported on little figures of angels, richly gilded.

Most striking in their novelty are the side lamps, which, as is rapidly becoming customary with limousine bodies, are carried on the body framework back of the driver's seat at a considerable elevation. Also following the most modern practice, these lamps are electric, thus avoiding the unpleasant heat and odor inherent in oil lamps. The shape of the lamps is particularly elegant. Each has three windows of a graceful outline tapering to the bottom; these are set so as to occupy about one-half of the circumference of the lamp. The further equipment of the car includes two powerful headlights and two horns, one an electric siren and the other a four-tubed device which gives a call similar to that of a bugle. The mudguards and running boards are very wide and are supplemented by aprons extending to the frame. Although by intent a town car, the machine's great power gives it considerable ability as a tourist.


Renault Limousine Imported by Mr. Giroux Ornaments a Drive in Central Park

LUBRICATING SYSTEMS REFINED TO AVOID TROUBLE

WHEN a little excess of lubricating oil accumulates in the crankcase of a motor it is prone to splash up and be sucked by the piston (on the suction stroke) into the combustion space of the cylinders, causing ignition trouble and accumulations of carbon which will end in knocking. In passing through the plant of the Pierce-Arrow Motor Car Co., at Buffalo, a few days ago, the writer noticed the way in which this possibility is prevented by the simple process of fitting slotted covers over the cylinder openings of the crankcase, the slots being for the connecting rods to play in, as will be seen at a glance.



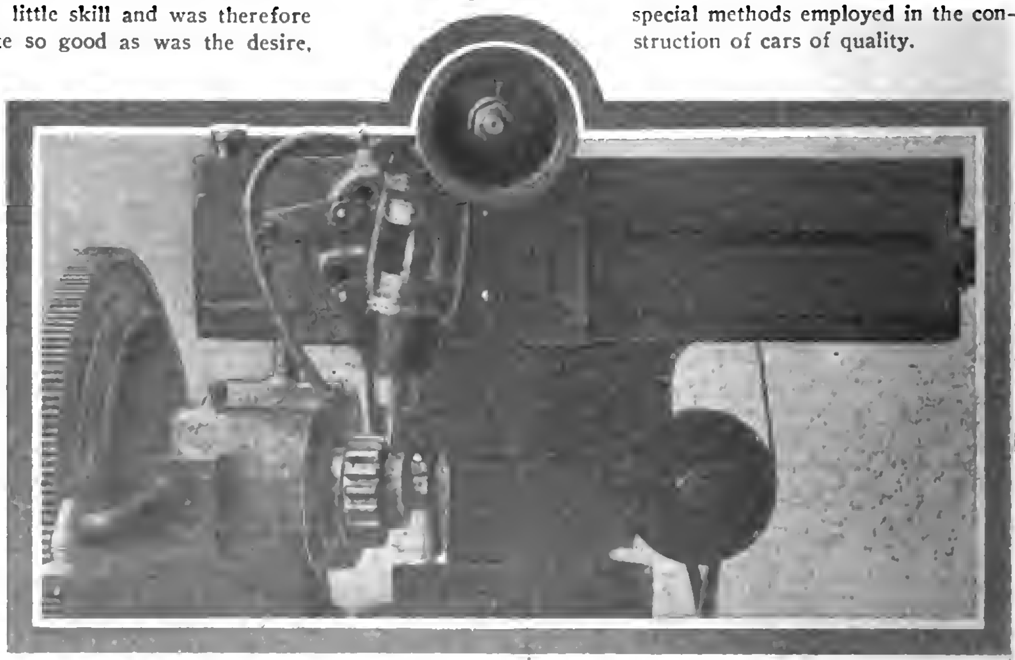
Baffle Covers Fitted Over Crankcase Openings to Prevent Oil Splashing

This form of baffling the excesses of lubricating oil was originally brought out in connection with double opposed motors, and is used on the Reo in order that excess of lubricating oil will not be experienced in the rear cylinder, it being the practice in Reo cars to place the motor so that the cylinders are in the fore and aft plane. The idea worked out very well indeed in this car, and it should be of good advantage in a six-cylinder motor, even if the cylinders are vertical, for, with a rather long crankcase, it is just possible that a little excess oil in the crankcase might pile up at one end when the car is negotiating a steep grade and produce lubricating trouble. True, in the Pierce cars the means for lubrication are so well applied that this extra precaution, as illustrated, comes as a safety measure rather than as a necessity.

AUTOMATIC CHAMFERING PROCESS FOR GEARS SAVES COST

FORMERLY it was the practice to hand chamfer the teeth of sliding gears in order to provide the wedge shape which is necessary to enable them to engage readily when sliding into the respective speeds. The hand process was slow, had to be conducted by men of more than a little skill and was therefore costly. The results were not quite so good as was the desire, owing to the differences which will always be present when hand work is depended upon, it being impossible to realize exactly the same degree of accuracy from any one man on different days, to say nothing about differences which will exist between different men.

Fortunately the efforts made to reduce this process to an automatic-machine basis has succeeded and the machine now used for this purpose is here depicted, showing the gear in place on the "mandrel" and the chamfering tool just entering to make a cut. This tool belongs to the vertical milling-machine class, and for this work is provided with motions to impart to the milling cutter the ability to skirt around the end of the gear tooth, to give it a wedge shape, and to back off, register and enter again for purposes of cutting, which it will do as many times as there are teeth in the gear. The photograph was taken at the plant of the E. R. Thomas Motor Company, at Buffalo, N. Y., and is but one of the many special methods employed in the construction of cars of quality.



Profiler Leaves More Face Than That Due to Hand Work

Bablot In a Brasier Making Fast Time In His Approach to the Foot of the Hill

GAILLON'S CLIMB HAD BABLOT FOR STAR

PARIS, Oct. 15—Bablot, driving Brasier's four-cylinder Grand Prix racer, made the fastest time in the eleventh annual Gaillon hill climb. With the car built for the late Leon Thery, and driven by him for the last time in the 1908 Grand Prix, Bablot romped up the Normandy hill in 28 2-5 seconds. This is 2 1-5 seconds slower than the same driver's time last year, and is far behind the world's record set up by Lee Guinness with the famous eight-cylinder Darracq sprinter, which climbed the hill in 25 flat, at an average speed of 89 miles an hour. The slower time is largely explained by the fact that for six hours previous to the start of the hill climb rain had fallen continuously. It had been necessary, in fact, to postpone the start from morning until noon in order to give the competitors a reasonable chance. Even this did not allow the course to dry thoroughly.

Joerns, on a German Opel car built in expectation of a 1909 Grand Prix, made the second fastest time, with a climb up the hill in 30 seconds. The car conforms with the regulations issued for the Grand Prix race announced for this year. When the race was abandoned, almost immediately after it was announced, the Opel company found themselves with three special 130 millimeter cars on their hands which they have only been able to use for hill climbing and demonstration events. Gaste, with a six-cylinder Rossel, put up 32 seconds.

In the racing voiturette class, for one-lungers with a bore of 3.9 inches and a stroke not exceeding 10 inches, Lion-Peugeot continued its series of victories, Giuppone getting up the hill on his high-bonneted monster in 46 1-5 seconds. A Corre-La-Licorne climbed the hill in 57 seconds, and Crespelle went up in 59 2-5 seconds. Georges Sizaire, who came forth at the eleventh hour with the intention of pitting his Sizaire-Naudin one-lunger against the eternal Lion-Peugeot rival, found that he was geared too high for hill work, and had to retire.

Page, driving a four-cylinder Motobloc, made the best performance in the touring classes. Though having a bore of only 3 1-2 by 5 1-0 stroke, he made the excellent time of 47 2-5 seconds, beating cars of much larger dimensions. For the tourists a classification was made on an efficiency formula. Under this the Motobloc came out first, with an efficiency of 0.847. The others in order were single-cylinder Sizaire-Naudin, 0.829; single-cylinder Crespelle, 0.824; four-cylinder Delage, 0.811; four-cylinder Rolland-Pilain, 0.793, and single-cylinder Hurtu, 0.756.

Scene In Evreux at the Weighing-In Previous to the Start, a Voiturette on the Scales

57-Horsepower Daimler, with Which W. R. Conill of New York Is Making a Tour of Europe

NEWS BUDGET OF LATEST BRITISH AUTO AND AERO DOINGS

LONDON, Oct. 15—The Government's Development bill, which provides for the expenditure of the money raised by taxation of motor cars and petrol, is still far from settlement, but apparently the final arrangement will be considerably more favorable to motorists than was expected. The framers of the bill were strong on the matter of special motor roads (or "speedways," as they were soon styled), but the opposition of the various motor organizations has resulted in these ideas being dropped, and, instead, the major portion of the money will be spent on the improvement of existing main roads, particularly in the direction of making them dustless. A few new roads may be constructed,* but these will be open to all forms of traffic, and no speeding will be permitted.

As regards the tax itself, the Government states that a nominal power rating—such as the R. A. C. formula originally proposed—will not be used; instead, some means will be brought forward to measure the power actually developed. Details of this plan will be interesting, and at the same time the new arrangement circumvents those makers whose 1910 cars have been designed to come just within the R. A. C. rating standards originally announced. Another important concession is that no tax will be imposed on visitors bringing their cars to this country for touring purposes.

The auto buggy has made its first appearance over here. A Coventry firm has taken up the agency for the Duryea "Buggyaut," and the first car is already on the road. The type is something entirely new to the British motorist, and, as may be imagined, a great amount of interest is evinced in its construction. From the number of inquiries received, the agents are convinced that there will be quite a good market for this vehicle.

Interviews with Lieut. Shackleton since his return from the South Polar expedition have revealed his strong belief in the advantages of motor transport for exploration work of this kind. The special Arrol Johnston car which he took with him did good service, and had the vehicle been of the sledge, instead of the wheel, type, it would have been used for the final stages of the journey over the soft snow of the Barrier. The new expedition, in charge of Capt. Scott, will be provided with motor sledges, but details of their construction are not yet available.

Additional to the descriptive article which recently appeared in THE AUTOMOBILE, referring to the new British styles in motor bodies, the accompanying photographs show further developments of the "Torpedo" style. The last car is particularly graceful in its lines, and it is the property of F. A. Bolton, a well-known Midland automobilist. The first illustration shows one of the 57-horsepower six-cylinder Daimlers, with valveless engine, purchased by W. R. Conill, of New York, for use on an extensive European tour. It will be noticed that both cars are equipped with detachable wire wheels,

Two Americans Prominent in the British Aerial and Automobile World—Colonel Cody and Charles Y. Knight

*In the form of loops round big towns.

different methods being adopted for carrying the spare wheel. The adoption of this by an American will be watched with particular interest, for this type of wheel has made so little progress there.

How Matters Aeronautical Are Progressing in England

Matters aeronautical are progressing apace at present, and before another month is completed there should be much to record. The two principal events on the list are the attempts for the *Daily Mail* $50,000 prize for the journey from London to Manchester, and also the Aviation week at Blackpool.

The distance from London to Manchester in a straight line is 180 miles, and during the journey two stops will be permitted for the purpose of replenishing the fuel tanks. Col. Cody is the first to make active preparations for the attempt, and during the past week he has been carefully mapping out route and selecting numerous suitable landing places, so that he may be able to make his two stops according to his convenience during the flight. The acompanying photo shows Col. Cody on the occasion of his visit to Coventry, which is exactly half-way between the two places. Additional interest is given to the picture by the fact that Col. Cody's mentor is Charles Y. Knight, who is busy demonstrating the advantages of the Knight-Daimler engine.

Cody's attempt will take place in the next few days if the weather is suitable; in the meantime larger fuel tanks and an extra water supply are being provided on his machine.

It is not unlikely also that Blèriot will make the attempt, in spite of the published statements that he is retiring from competitions for the present. As the result of Blériot's recent visit, the announcement is made that the Humber Co., of Coventry, is commencing straightway the manufacture of Blériot monoplanes. Inquiries show that this is quite correct, and that at its mammoth works the Humber firm has already got out specifications for the first batch of 100 machines. The list price has been fixed at $2,000 each. The Humber Co. has also secured sole rights for the manufacture of the Farman machine, and as Mr. Farman is arranging to stay at Coventry for the next few weeks, it is quite possible that he, too, will endeavor to make the journey to Manchester.

The Blackpool Aviation week is now definitely arranged to commence October 18. Contracts to appear have been signed by Farman, Paulhan and Delagrange, and the Société Ariel has promised to provide two Wright machines with competent pilots. An excellent ground has been secured two miles from the town, and stands are being erected for 15,000 persons.

BRITISH DUST-LAYING EXPERIMENTS

London, Oct. 12—The Roads Improvement Association has just issued a report on the recent trial of calcium chloride as a dust preventive. Calcium chloride is produced in large quantities as a by-product in the ammonia-soda process of manufacturing common washing soda and in certain other chemical process. In its common form the chemical contains 40 per cent of water, but other definite varieties have 25 per cent water or even less. The common form costs $12 per ton at the works. In all its states it has in a marked degree the property of absorbing moisture from the surrounding atmosphere, and if left exposed to damp air it eventually becomes a thick syrupy liquid through the absorption of moisture. If then it is exposed to a dry atmosphere it will gradually part with some of this moisture till it regains its original condition. It is on this property that the utility of calcium chloride for laying dust on roads depends.

The chemical was tried both in the wet and the dry methods. In the former the granular chloride was dissolved in water in the proportion of one hundred weight to each 100 gallons, and this solution was sprayed on the road from a watering cart. The second method was effected by distributing the chloride dry over the surface of the road. Two consecutive half-mile stretches on the main London-Staines road were treated in the two ways on June 12 and careful observations were then made each day till August 12. The result of the observations demonstrated that while both methods were effective in laying the dust to a marked extent, the dry method of applying the chemical gave more lasting results than were obtainable with the wet method. The total cost was $26 and $16 respectively, so that the dry method would seem to be undoubtedly the more advantageous.

The association is bringing the results of the experiments before the notice of all country surveyors, and it is expected that during next Summer an organized attempt will be made to lay the dust on all main roads passing through populous parts.

Queen of Siam Orders a Napier—An especially fine piece of body work was that done on the Napier omnibus body purchased for the use of the Queen of Siam. Round the royal palace at Bangkok there are miles and miles of fine roads, through which the ladies of the court have been in the habit of walking. Now, having adopted a more modern means of locomotion, they will doubtless cover a greater country, and more pleasantly.

A Particularly Graceful British "Torpedo" Body—Property of F. A. Bolton, a Midland Autoist.

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INTERNATIONAL TOURING CONTROL

"Bureaucracy discomfited" might summarize the story of the Paris international congress for the regulation of automobile traffic. Thousands of gilt-braided officials, whose sole duty has always appeared to be to prevent anybody from ever accomplishing anything, face the loss of their snug positions and the necessity of working for a living like ordinary mortals. Truly it is deplorable. The volubly polite, regretfully firm Frenchmen—"But, monsieur, it is impossible!"; the erect and soldierly Germans, with heads of a most surprising woodenness; the Italians, those graceful cigarette smokers, all are doomed. Perhaps the American tourist will shed a parting tear.

Like most other great reforms, the only thing remarkable about the proposed international passport is that it was not thought of long ago. There are no real difficulties whatever in its application. Nobody gets any money out of the triptyques and customs deposits, except the bonding companies which hold the stakes. The countries which enter in the agreement will actually receive a direct financial profit from the saving of the wages of the many officials now necessary. Examinations of automobiles to ascertain their suitability to road conditions, and of drivers to test their operative skill, might just as well be made once for all, and their results accepted wherever car and driver may go. The German examiner does not believe that the French examiner would be wilfully mendacious, but rules are rules, and he must make a pretense at least of earning his salary. So it goes, each country stupidly duplicating work which had been done before. One illuminating flash of intelligence suddenly reveals the absurdity of the old system, and makes a reform almost inevitable.

This convention, it must be emphasized, is not a gathering of club members, uncredited save by private organizations, merely to air their grievances. Each delegate officially represents his government, and in many cases has full power to act for it. The resolutions passed by the convention are practically certain to be adopted in England, France, Belgium, Germany and Italy. Moreover, the program of the convention covers practically every subject of legislation of interest to the automobilist except that of speed limits. Although it would be desirable to include this as well, everyone recognizes the fact that speed depends too much on local conditions and sentiment to permit any agreement at present.

Of even greater moment to the automobilists of this country is the paragraph in the story of the convention which explains that, although the United States has a representative in the convention, he is unable to act in behalf of his government. Picture the amazement of the European delegates when they learned that the United States, although supposedly a single country, was divided among itself exactly the same as the different states of Europe, and that before it could take active part it would first need a similar convention of its own. It is by no means a flattering testimonial to American progressiveness and initiative.

"BUILT ENTIRELY IN OUR SHOPS"

In the parts industry to-day the press of business is so great that the parts maker must refuse orders. The disgruntled maker having his order refused, decides to make his own parts hereafter, and so the parts maker loses future business. Since the latter is so overworked at present, he does not mind this in the least.

But this congestion is going to result in more manufacturers installing tools and equipment so as to be able to make their own engines, transmissions, etc. This will mean that more cars will come under the class of "built entirely in our own shops," the advantages of which no one denies. More than all that, although not quite so close to the manufacturer's and user's hearts, is the influence on trade as a whole.

This is bound to be beneficial, for with more capital invested in land, buildings, and equipment, any business assumes a more stable position. So, too, as to the disposal of the resulting cars, the greater the output, the more care that will be used in disposing of them and in creating a stable market so as to keep the factory busy at all seasons. This should settle down very soon—there are many indications that some firms have already done so—to a business of unwonted stability with the "hot air" and "flim-flam" all eliminated, as well as the season and the model bugaboo, so that the automobile industry as a whole will line up alongside of the typewriter, furniture, clothing, and other similar businesses. These, in a broad way, may be said to have no seasons or models, and their yearly business is very carefully worked up in a quiet way, without any of the hysterics which have attended the automobile business in the past.

FOR MUCH NEEDED INTERNATIONAL RULES OF THE ROAD

By W. F. BRADLEY

PARIS, Oct. 15—Eighteen nations represented by sixty-three delegates are united in Paris for the purpose of making automobile regulations throughout Europe as uniform as possible and thus abolishing the difficulties in the way of international travel. The delegates are not representatives of automobile clubs, but the accredited representatives of their respective governments, having in nearly all cases full power to act for them. The congress is one that means business.

Europe has the misfortune to be divided into a score of countries, each one of which has its own way of controlling automobile traffic and its own conditions of admittance into its territory. As the automobile has made touring among these different countries almost as common as road intercourse among the different States of the Federal Union, the authorities have awakened to the disadvantage of individual laws, hampering travel and hindering free intercourse. Germany asked France to call together a conference to consider this question. France willingly acceded and every nation in Europe accepted the invitation.

America also asked to be allowed to come in, with the result that William S. Hogan, the A. C. A. delegate in Paris, was officially appointed by the Secretary of State. But America needs internal reform before she can usefully participate in a congress for the uniformity of automobile regulations, and it was this point that Mr. Hogan was instructed to make clear. Until there is a Federal automobile law it is impossible for the Secretary of State to give anybody power to sign an automobile traffic convention on behalf of the United States. The opinion of the American delegate is that this movement in Europe will help forward a Federal automobile law more than anything else. If Europe, with its score of nations speaking different languages, having different tariff rates and different customs, can come to an understanding on automobile circulation, why should not the United States of America?

Summary of What Is Wanted

There are nine distinct items on the program, as follows:

(1) Conditions to be fulfilled by all automobiles before being put into circulation.
(2) Conditions to be fulfilled by drivers of automobiles.
(3) International recognition of driving certificates and national registration numbers.
(4) The types of registration numbers, and the way in which they shall be carried.
(5) Types of horns and other signaling apparatus.
(6) Rules of the road covering overtaking and passing other vehicles.
(7) Road signs and danger signals.
(8) The recognition of road regulations in force in each country.
(9) The creation of frontier stations and customs offices authorized to carry out the formalities provided for in the international regulations.

Under Article 1 will be set forth the various conditions that an automobile must fulfill before being put into use. Thus, in France, for instance, before a car can go on the road it must be examined by a government engineer and meet certain requirements regarding brakes, freedom from explosion, fire, noise and disagreeable smell. There are several countries, America and England among them, which have no such examination. But custom has gone even further than the government regulations, and there is not a car built by a reputable firm which could not come up to the standard of safety proposed by the congress.

Article 2, dealing with drivers, is a more knotty problem, for the congress proposes that a severe examination on the lines of that already existing in France shall be instituted. No person under eighteen could hold a driving license; in every case an examination of ability must be held and each nation would have the power to withdraw the licenses where the authorities saw the necessity for such a course. To introduce such a scheme every nation would have to be prepared to undertake a certain amount of internal reform.

The first two points agreed upon, the third follows naturally, for if a common understanding has been arrived at on the examination of cars and the issuing of driving licenses, there is no reason whatever why a New York registration number should not be accepted in Paris and a New Jersey driving license received without question in Berlin. It is understood, of course, that New York will only issue registration numbers under the international regulations and that New Jersey will examine its drivers and license them on the same international basis. But this should not be impossible.

The size of the registration figures and the way in which they shall be carried is not a matter likely to cause any difficulty. Article 5, dealing with types of horns, is also readily settled.

Turning Left Not Likely to Be Adopted

Article 6, dealing with rules of the roads, is a difficult point. All the States in the Union follow the common rule of keeping to the right. In Europe it is not so, the majority keeping to the right, but England having a rule that all traffic shall keep to the left. Curiously, in certain countries, notably Italy, the two rules are in force, in some towns it being necessary to drive to the left and in others to keep to the right. The congress appears to favor an international driving law under which all vehicles shall keep to the left, as is done in England. With the driver placed on the right-hand side of the car, it is claimed that this is the safest rule. It is doubtful, however, if it can be passed, for the change is so drastic that every nation will hesitate to make it. It is certain, however, that those nations that have the two rules in force will have to select either one or the other.

Road signs and danger signals can readily be agreed upon. Indeed, a basis for action has been made in the signs without lettering now used in France and various parts of Europe and recently approved at the international automobile congress. Some of these signs were used in the 1907 Vanderbilt race.

The recognition of road regulations in force in each country is also a matter that should not cause much difficulty. If, as is probable, it is found impossible to establish international driving rules, it is not difficult for each nation signing the agreement to make the necessary detail internal improvements and simplifications and agree to recognize the laws of the other nations. It is, in fact, merely a continuation of the present conditions.

Vexing Matter of Customs Duties

Article 9, on customs and frontier stations, particularly interests Europe and Americans who tour Europe. The present improved system consists of the issuing of triptyques by the various touring associations. Thus, if you are an American and wish to visit France you can, before leaving home, arrange with the Touring Club de France, deposit your duty, receive in return a threefold piece of paper and enter France as easily as crossing the East River. The same can be done for several other European countries. The result is that there is no money transaction at the frontier. You make your deposit through your banker at home and are refunded by him on your return.

The system is a concession on the part of the various custom authorities of Europe. It is a concession, indeed, that is not always sufficiently appreciated by the automobilist, who does not see the years of labor necessary to convert the authorities and the large sums guaranteed by the Touring Club of France and other associations.

The defect of the system is that for each country issued a deposit must be made. Thus the American who intends to do Europe thoroughly has to obtain about half a dozen triptyques and make a heavy deposit with his banker. It is proposed that there should be one international triptyque, and that the amount deposited on it should be equal to the highest tariff of the various contracting countries. Thus, if an American car, for instance, visits Europe, enters and leaves several countries, but enters and does not leave Italy, the officers of that nation would claim that the deposit be handed over to them in payment of duty. This, in fact, is what is done now, with the difference that instead of one single deposit there are half a dozen different ones and half a dozen different triptyques to be carried round for presentation at the various frontier stations where they must be presented.

With the international passport the automobilist would be able to enter and leave any country in Europe—with a few rare exceptions—on the presentation of a paper. The authorities have nothing to lose by such a scheme and the automobilist has everything to gain. In all probability this scheme will be adopted by the nations now issuing triptyques. The nations that have not yet adopted the triptyque, among them being Russia, Turkey, Greece and the eastern states, will doubtless come in later.

AGAIN FRANCE WANTS TO RACE HER OWN WAY, OF COURSE

PARIS, Oct. 15—French automobile constructors have got over their racing fright apparently, for the Sporting Commission of the Automobile Club of France has just decided that there shall be a Grand Prix next year if the principal constructors desire it. The full committee of the club has approved this decision. As the Sporting Commission is composed of representatives of all the leading French firms, especially those having given the greatest encouragement to racing, the probabilities are that the event will be held. A referendum will be taken immediately and a decision arrived at before the end of October. As the race cannot be held until June or July, constructors will have about eight months in which to make preparations.

It has been decided in principle that the 1910 Grand Prix shall be held over a distance of five hundred miles, and that it shall be open to all cars without restriction of bore and stroke or weight. After the Gordon Bennett races the weight limit of 1,000 kilos was continued for a couple of years. Then came a maximum bore of 155 millemeters for a four-cylinder engine. This was fruther reduced by the International Association of Automobile Clubs to 130 millimeters for 1909. Owing to the action of the French constructors, however, no race was held this year, and although a few 130 millimeter cars were built, they have never been tested in a long distance event.

France Wants Rules of Her Own Making

It will be remembered that the 155 milllimeter rule provoked a war between the International Association and the Vanderbilt Cup Commission, which declined to accept this rule. It might be supposed that if an international meeting were needed to frame a racing rule for 1908 and 1909, the same would be necessary for 1910. But this is not so when the French Club is the organizer. It believes that a no restriction rule is the best for the health of the automobile industry, and America, England, Germany, Italy, and Belgium must accept the rule without a murmur.

The proposal to hold a race for cars of any power or any weight is not new. It was brought forward at previous international conferences, its strongest supporters being a group of French manufacturers. It was then feared that the result of such a rule would be the production of such cars as the famous eight-cylinder Darracq sprinter, of Florida fame, capable of doing two miles a minute. Experience has shown that such a car would be its own destroyer on a 500 miles test. Neither in 1907 nor in 1908 did the cars with the most powerful engines come in first. The ability to hold to the road, and especially the wear of tires, much more pronounced on some cars than on others, considerably influenced the results. Partisans of the no-limit rule maintain that it will open a new field of investigation, instead of directing effort entirely into one channel. Something will doubtless be gained in speed, and tires are there to keep weight down to a reasonable limit.

Anjou and Dieppe Both Want Race

It is not yet known where the French Grand Prix will be held. Anjou was promised the race this year, and is still prepared to offer its roads in 1910, together with a subsidy of $20,000 to the club. Dieppe, which had the race in 1907 and 1908, has also come forward with an offer of the same course. Other courses are not lacking, and it may be a month before the Racing Board makes a selection. However the French automobile constructors may regard racing, there can be no doubt that the country people are keenly alive to the advantages to be reaped from such contests. Were it not regarded as practically certain that the choice will lie between Anjou and Dieppe, a dozen other localities would quickly come forward to offer circuits.

A. C. F. Will Also Have Aeroplane Meet

In addition to its automobile Grand Prix, the Automobile Club of France will undertake the organization of aeroplane races next year. This decision has been arrived at on the proposition of Marquis de Dion, approved unanimously by the full meeting of the club. The races will extend over one week and will commence immediately after the great national horse race at Longchamps, marking the height of the fashionable Paris season. It is not yet known where the aerodome will be located, but a site near Paris is most probable. Valuable prizes will be offered. There has been a great rush of former automobile racing drivers into the ranks of the aviators. The drivers find aeroplanes easy to control, and certainly no more dangerous than their former occupation; at the same time the emoluments are by no means to be despised. Among those whose names have often been heard in connection wtih the older sport are Rougier, Gobron, Le Blon and Fournier. Baron De Caters, too, now pilots a Voisin biplane.

GERMAN TRADE STATISTICS

BERLIN, Oct. 12—Some of Germany's foreign trade during the first seven months of the present year shows a slight increase in its exports as compared with a decrease in the number of motor cars sent into the Empire. It may, therefore, be said to be of a favorable nature on the whole, though not of so decided a character as was expected in view of the general upward trend. While the majority of countries have remained true to German cars, Great Britain and France have each bought considerably less; but this is in keeping with France's return trade with Germany. The exact figures are:

January 1 to July 31, Imports into Germany:

	1909 dcwt	1908 dcwt
Austria	570	670
Belgium	1519	1995
France	3441	4039
Great Britain	296	106
Italy	835	910
Switzerland	502	361
United States	53	140

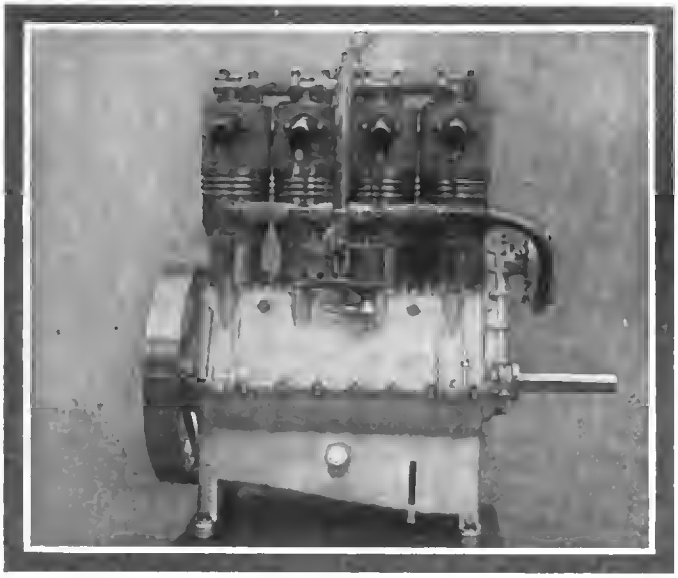
January 1 to July 31, Exports into:

	1909	1908
Austria	2297	1503
Argentine	178	144
Belgium	341	61
Brazil	1	126
Denmark	410	169
France	1209	1752
Great Britain	1196	1612
Holland	600	172
Italy	378	187
Dutch Indies	111	84
Russia	1522	1660
Roumania	318	113
Switzerland	405	241
Spain	193	161
Sweden	184	142
United States	670	240

DE LAMBERT FLIES OVER EIFFEL TOWER

PARIS, Oct. 18—The Juvisy aeronautic meet scored its first great success to-day when Count de Lambert, in his Wright aeroplane, flew from the aviation field to Paris and back, circling over the Eiffel Tower. In a straight line the distance is about 30 miles. The aviator made the round trip in 49 minutes. His greatest height, attained over the Eiffel Tower, is reported to have been 1,300 feet. Orville Wright was a witness.

De Lambert kept his plans secret from everybody except two officials of the Aviation Society, one at Juvisy and the other on the Eiffel Tower, who timed him. The crowd of 20,000 people which saw the beginning of the flight was astonished when the aeroplane started out across country and disappeared behind the hills to the northward. Fifteen minutes later pedestrians along the Seine began to stare upward at what they thought was a large box-kite. They soon saw their mistake, however. The aeroplane rounded the apex of the tower, which is over 1,000 feet high, and then sailed away to the south. Meanwhile the anxiety at Juvisy grew intense. A telephone message informed the spectators of what De Lambert was doing, and when he reappeared, flying at a height of 500 feet, the crowd went wild.



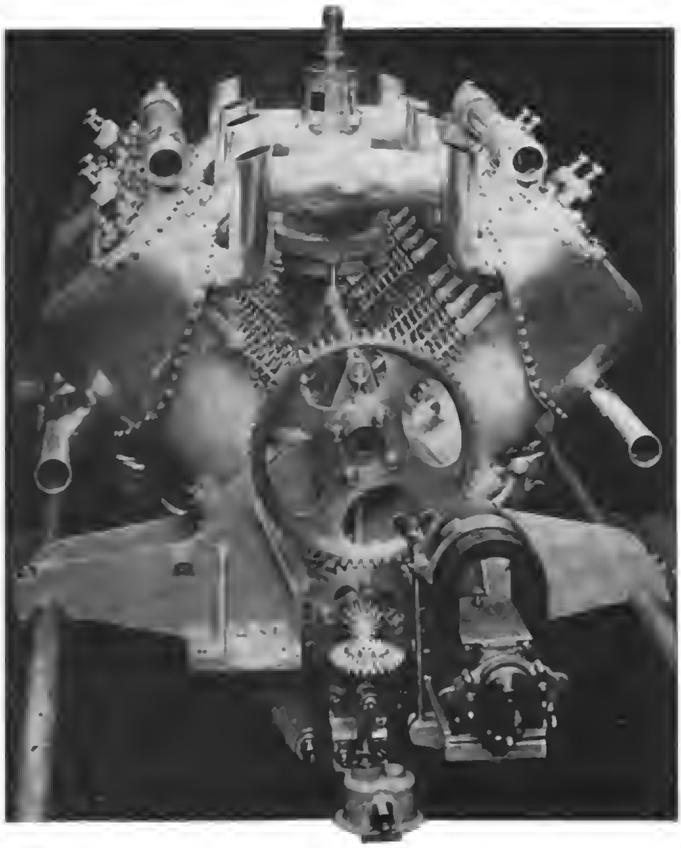
Panhard's 40-Horsepower Aero Motor Has Copper Jackets

THE WOLSELEY AERONAUTIC MOTORS

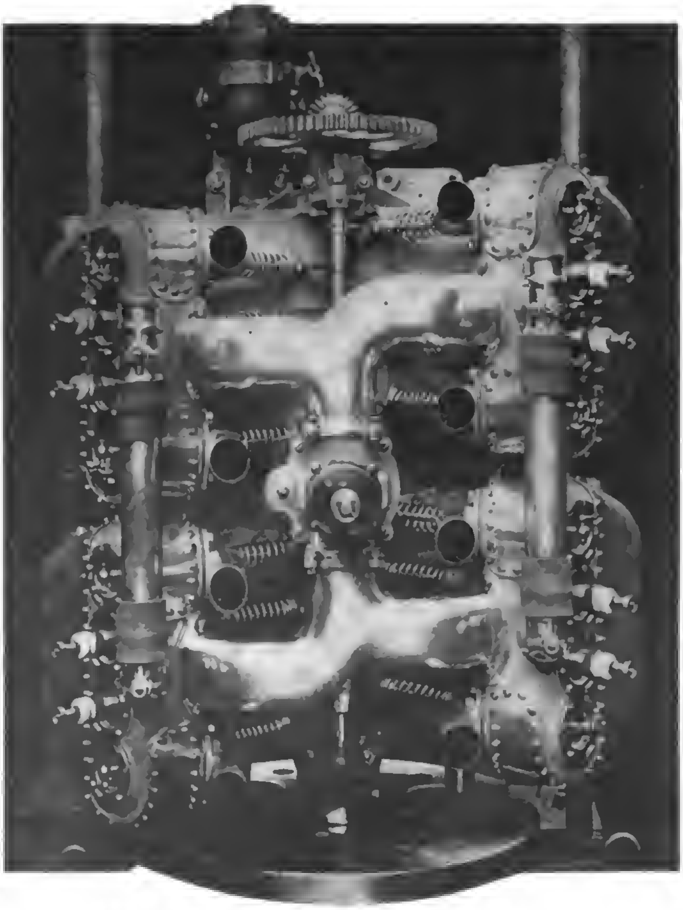
Claiming the championship of the sea with the motor-boat *Wolseley,* the famous English house of Vickers, Sons & Maxim, Ltd., has turned its attention to motors for dirigibles and aeroplanes. A complete series of these, ranging from 50 to 400 horsepower, has been brought out, and, backed by their maker's reputation in the line of cannon, torpedo-boat engines, and similar fine machine work, they should at once assume an enviable position in this new industry.

The smallest motor, particularly adapted to aeroplane construction, is rated at 50-horsepower, but is claimed to be capable of delivering 75. Its eight cylinders are arranged in a "V" to shorten the crankshaft and secure a more compact design. The ignition system, the carbureter, lubrication and water circulation follow automobile practice. The Bosch magneto is used. The carbureter has an additional air intake for use in high altitudes. Lubrication is forced by a centrifugal pump. The water packets are of sheet aluminum, riveted in place upon the cylinders. The motor turns normally at 1200 or 1400 r.p.m.; it may thus have the propeller either fixed directly on its shaft, or driven through a chain or belt affording a reduction in speed.

The dirigible motors, similar to those used in boats, all have vertical cylinders set in line on the crankshaft. They are made in three sizes: 135-horsepower, 6-cylinder, 200-horsepower, 8 cylinder and 400-horsepower 12-cylinder. A new and praiseworthy feature is the spring suspension, by means of four one-quarter elliptic springs, which should entirely prevent any vibration being transmitted to the rest of the machine.



V-Type of Wolseley Engine Has Gears in Front



Wolseley Motor from Above, Showing Peculiar Inlet

S. A. E. WINTER MEETING TO HAVE WIDE RANGE OF SUBJECTS

THE meetings of the Society of Automobile Engineers have each year more decidedly proved the value of this society to the various professional and other interests identified with the self-propelled vehicle. Many of the papers read and discussed at the semi-annual meetings show that, busy as the automobile engineer is, many a one still finds time unselfishly to give to the world in well prepared papers the result of his experience. It is a pleasant thing to record the members of this latest and most important field are as emphatically leaders in this liberal sharing of their knowledge as they are in the broad blazing of new trails for mechanical engineering generally.

No doubt many will be present during one or the other of this winter's shows at New York. Such of these as would care to be present at the professional meeting of the Society of Automobile Engineers may be assured of a hearty welcome. Their contribution to these discussions will be as welcome, as will also more complete papers; the latter should be sent in to the society's offices at No. 2 Rector Street, New York, to be in the society's hands by November 30 for printing and general distribution before the meeting. Papers and discussions from an engineering standpoint, including also matters of operating finances are in order. Among the subjects that discussion at the winter meeting has been asked for are:

"Standardization of Pneumatic Tires."
"Taxicabs—Requirements and Operating Cost."
"Carbureters—Kerosene Carbureters."
"Railway Motor Cars."
"Drawing Room Systems."
"Truck Tires."
"Valves in Head vs. T Head."
"Alcohol as Fuel in Internal Combustion Motors."
"Silencer."
"Radiator, Design and Efficiencies."
"Critical Temperatures, Cooling Curves of Alloy and Other Steel."
"Two-Cycle Motor Efficiency and Results."
"Journal Loads in Transmission Gears."
"Placing Society on More Professional Basis."
'Efficiency of Spur, Bevel Worm Gears and Universal Joints."
"Relative Efficiency of Four-Wheel Front and Rear-Drive of Commercial Vehicles."
"Detachable vs. Demountable Rims—Combination Rim."
"Commercial Vehicle Depreciation."

ROADMAKERS' GATHERING IN COLUMBUS

COLUMBUS, O., Oct. 18—Arrangements are being made to appropriately decorate Columbus upon the occasion of the annual meeting of the American Roadmakers' Association, the Ohio Good Roads Federation, and the Ohio County Commissioners' Association, all of which will meet in Columbus Oct. 26 to 29. The Chamber of Commerce will decorate the electric arches spanning the principal streets, and many business houses will decorate.

Ground has been broken on East Eleventh Avenue for building a stretch of model highway to be constructed by the Robeson Process Company, of Cleveland, from the refuse of paper mills, which is claimed to be excellent for road building. This has been successfully tried in other states, notably northern New York.

PLAN TO USE CRUDE OIL IN ENGINES

Experiments on the utilization of crude or "scalp" oil in internal-combustion motors seem to promise great economy in fuel cost, especially in large power-plant installations. Thomas A. Nevins, president of the Newark (N. J.) Gas Company, is interested in a process for turning this by-product, for which at present there is little market, into a gas of the nature of producer gas. Previous attempts to utilize crude oil in this manner have failed because of the accumulation of tarry residues and soot, which clogged the working parts of the engines in which the gas was used. No details of the new process have been published, but Mr. Nevins' engineers state that a converter of the new type has been successfully used on a motor boat. The fuel expense has been reduced to about one-twelfth that of gasoline.

THE AUTOMOBILE CALENDAR

AMERICAN

Shows, Meetings, Etc.

Nov. 6-13.........Atlanta, Ga., Auditorium-Armory, National Automobile Show, auspices of National Association of Automobile Manufacturers. Samuel A. Miles and Alfred Reeves, General Managers, 7 East 42d Street, New York City.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manfacturers.

Jan. 17-22........Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows Building.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19........Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dai H. Lewis, Manager, 760 Main Street.

Feb. 21-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 22-26........Kansas City, Mo., Convention Hall, Fourth Annual Automobile Show.

March 19-26......Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show. D. H. Lewis, Manager.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

FOREIGN

Nov. 12-20.......London, Olympia, Eighth Annual International Automobile Show, Society of Motor Manufacturers and Traders.

AMERICAN

Races, Hill Climbs, Etc.

Oct. 23...........San Francisco, Road Race, Automobile Club of California.

Oct. 28-30........Dallas, Texas, Three-Day Track Meet, Dallas Automobile Club.

Oct. 30...........Vanderbilt Cup Race, Long Island Motor Parkway, Motor Cup Holding Company.

Nov. 6-8..........Phoenix, Arizona, Road Race, Maricopa Automobile Club.

Nov. 8-9..........Savannah, Ga., Georgia Highway Reliability Contest to Atlanta, Savannah Automobile Club.

Nov. 9...........Atlanta, Ga., Track Races, Atlanta Automobile Association.

Nov. 20-21.......New Orleans, Annual Fall Meet, New Orleans Automobile Club. Homer C. George, Secretary.

Nov. 22..........Denver, Col., Start of "Flag to Flag" Reliability Run. G. A. Wahlgreen, Manager.

Dec. 29-30........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

Feb. 4-6..........New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.

PALACE SHOW COMPLETES LIST OF EXHIBITORS

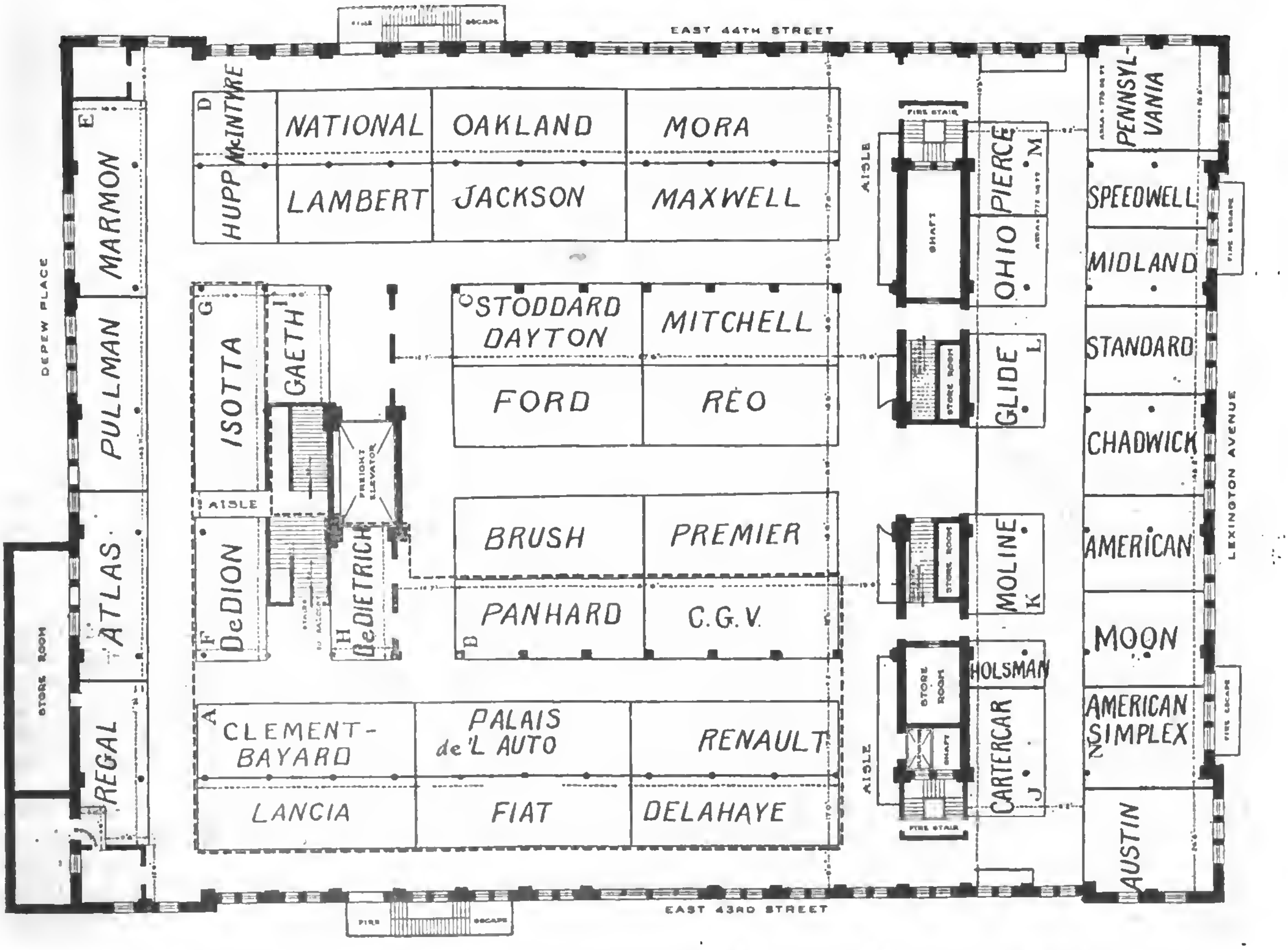
FINAL diagrams for the Tenth International Automobile Show which opens New Year's Eve in Grand Central Palace, New York, under management of the American Motor Car Manufacturers' Association, shows 72 makers of leading American cars and 15 importers of foreign cars, with six additional American cars on the waiting list, making a total of 93 makers of automobiles. This is the greatest number of automobile concerns brought together in any show in New York.

Members of the Motor and Accessory Manufacturers, totalling 110, October 22, will draw for space for the Palace affair, and with 104 accessory concerns not affiliated with the M. & A. M. and twelve on the waiting list brings the grand total up to 319 exhibitors in the Palace Show. Following is a list of the motor car exhibitors which have been allotted space in the Palace affair together with the main floor diagram. All American cars on the main floor are composed of members of the A. M. C. M. A. The foreign cars shown on the diagram are members of the Importers' Automobile Salon.

Unitt and Wickes, of New York, the official decorators of the show, have completed their drawings and models of the Trellis Garden or outdoor effect, which is to lighten the interior of the Palace, and the Show Committee are more than delighted with the result of their efforts. One of the most spectacular features of the decoration scheme will be an electric fountain at the end of the main exhibition hall where the heroic statue of "Age Instructing Youth" stood last year.

AMERICAN CARS

Name	Car	Address
American Motor Car Co.	American	Indianapolis, Ind.
American Motor Truck Co.	American Truck	Lockport, N. Y.
Allen-Kingston Motor Car Co.	Allen-Kingston	New York, N. Y.
Atlas Motor Car Co.	Atlas	Springfield, N. Y.
Austin Automobile Co.	Austin	Gd. Rapids, Mich.
B. C. K. Motor Car Co.	Kline Kar	York, Pa.
Bartholomew Co.	Glide	Peoria, Ill.
Black Manufacturing Co.	Black	Chicago, Ill.
Brush Runabout Co.	Brush	Detroit, Mich.
Buckeye Mfg. Co.	Lambert	Anderson, Ind.
Cartercar Co.	Cartercar	Pontiac, Mich.
Carter Motor Car Corp.		Washington, D.C.
Chadwick Engineering Wks.	Chadwick	Pottstown, Pa.
Chase Motor Truck Co.	Chase	Syracuse, N. Y.
Cameron Car Co.	Cameron	Beverly, Mass.
Coates-Goshen Co.	Coates-Goshen	Goshen, N. Y.
Columbus Buggy Co.	Firestone	Columbus, O.
Crawford Automobile Co.	Crawford	Hagerstown, Md.
Dayton Motor Car Co.	Stoddard-Dayton	Dayton, O.
Demotcar Sales Co.	Demotcar	Detroit, Mich.
Empire Motor Car Co.	Empire	Indianapolis, Ind.
Fal Motor Co.	Fal-car	Chicago, Ill.
Ford Motor Co.	Ford	Detroit, Mich.
Gaeth Automobile Co.	Gaeth	Cleveland, O.
Grabowsky Power Wagon Co.	Grabowsky	Detroit, Mich.
Gramm-Logan Motor Car Co.	Gramm-Logan	Bowling Green, O.
Hart-Kraft Motor Co.	Hart-Kraft	York, Pa.
Holsman Automobile Co.	Holsman	Chicago, Ill.
Houpt, Harry S. Mfg. Co.	Houpt	New York, N. Y.
Hupp Motor Car Co.	Hupmobile	Detroit, Mich.
Inter-State Automobile Co.	Inter-State	Muncie, Ind.
Jackson Automobile Co.	Jackson	Jackson, Mich.
Jewel Carriage Co.	Ohio	Carthage, O.
Kissel Motor Car Co.	Kisselkar	Hartford, Wis.
Lansden Co.	Lansden	Newark, N. J.
Lion Motor Car Co.	Lion	Adrian, Mich.
McCue Co.	McCue	Hartford, Conn.
McIntyre, W. H., Co.	McIntyre	Auburn, Ind.
Mack Bros. Motor Car Co.	Manhattan	Allentown, Pa.
Martin Carriage Works	Martin	York, Pa.
Maxwell-Briscoe Motor Co.	Maxwell	Tarrytown, N. Y.
Metz Co.	Waltham-Orient	Waltham, Mass.
Metzger Motor Car Co.	Everitt	Detroit, Mich.



Main Floor of Grand Central Palace, New York, Showing Arrangement of Exhibitors Located There

Middleby Auto. Co.	Middleby	Reading, Pa.
Midland Motor Co.	Midland	Moline, Ill.
Mitchell Motor Car Co.	Mitchell	Racine, Wis.
Moline Automobile Co.	Moline	East Moline, Ill.
Moon Motor Car Co.	Moon	St. Louis, Mo.
Mora Motor Car Co.	Mora	Newark, N. Y.
Nagant Automobile Co.	Nagant	New York City.
National Motor Vehicle Co.	National	Indianapolis, Ind.
Nordyke & Marmon Co.	Marmon	Indianapolis, Ind.
Oakland Motor Car Co.	Oakland	Pontiac, Mich.
Otto, A. T.	Saurer	New York City.
Otto Sales Co.	Otto	Philadelphia, Pa.
Paterson, W. A. Co.	Paterson	Detroit, Mich.
Penna. Auto. Motor Works	Pennsylvania	Bryn Mawr, Pa.
Pierce Motor Co.	Pierce	Racine, Wis.
Premier Motor Mfg. Co.	Premier	Indianapolis, Ind.
Rapid Motor Vehicle Co.	Rapid	Pontiac, Mich.
Randolph Motor Car Co.	Randolph	Chicago, Ill.
Regal Motor Car Co.	Regal	Detroit, Mich.
Reo Motor Car Co.	Reo	Lansing, Mich.
Schacht Mfg. Co.	Schacht	Cincinnati, O.
Seitz Automobile Co.	Seitz	Detroit, Mich.
Simplex Motor Car Co.	Amer. Simplex	Mishawaka, Ind.
Sharp, Wm. H. Co.	Sharp Arrow	Trenton, N. J.
Speedwell Motor Car Co.	Speedwell	Dayton, O.
St. Louis Car Co.	Standard	St. Louis, Mo.
Streator Motor Car Co.	Streator	Streator, Ill.
Sultan Motor Car Co.	Sultan	New York, N. Y.
York Motor Car Co.	Pullman	York, Pa.

FOREIGN CARS

American Zust Auto. Co.	Zust	New York City.
Benz Auto Import Co.	Benz	New York City.
Bowman Automobile Co.	Clement-Bayard	New York City.
Brewster & Co.	Delaunay-Bellev'le.	New York City.
C.G.V. Import Co.	C. G. V.	New York City.
DeDion Bouton Selling Branch	DeDion	New York City.
DeDietrich Import Co.	DeDietrich	New York City.
Delahaye Import Co.	Delahaye	New York City.
Fiat Automobile Co.	Fiat	New York City.
Hotchkiss Import Co.	Hotchkiss	New York City.
The Hol-Tan Co.	Lancia	New York City.
Isotta Import Co.	Isotta	New York City.
Panhard & Levassor	Panhard	New York City.
Renault Freres Selling Agency	Renault	New York City.
S.P.O. Automobile Co.	S. P. O.	New York City.

GARDEN SHOW TO EXCEL ALL PREDECESSORS

MADISON Square Garden, already the abode of nine successive automobile shows, has been forced to yield up its last inch of space to accommodate the tenth annual show under the auspices of the Association of Licensed Automobile Manufacturers. For three years past the pressure has been intense, and each year it was thought that all the space available had been allotted; yet each following year some ingenious engineering has enabled a few feet more to be secured. This year it seems as if the limit must positively have been reached. Still M. L. Downs, the secretary, is being besieged daily for further grants, which he is forced to refuse. The growth and activity of the industry were never so well expressed as by this constant pressure for show space.

As in former years, the scheme of decoration will be uniform. This branch of the show is in charge of W. W. Knowles. Every effort is being made to have the decorations quiet and tasteful, rather than ornate and gaudy; the decorators will strive for elegance and richness, and the fittings will be solid and substantial. The fact will be recognized that, after all, the cars are the show, and that the decorations are really but a frame, which serves its purpose best when it emphasizes the attractions of the exhibits, rather than draws attention away from them. The same policy of having all the furnishings and signs in charge of the managers will be followed.

One unusual feature of the show this year will be a large exhibit of motorcycles. This will be the only one of its kind to be held in New York, and will be several times larger than any previous show of the kind in the metropolis. Those who favor the "lonesome car" will be impressed by the great strides which have been made this year in this branch of the motor vehicle industry. Motor trucks and other commercial vehicles will also be present in great abundance. The managers are endeavoring to make the show not only as large as possible, but also well balanced and representative of the entire industry.

CARRIAGE BUILDERS HAVE AUTOMOBILE HOPES

WASHINGTON, D. C., Oct. 18—The annual convention of the Carriage Builders' National Association began today and will continue throughout the week. The feature of the convention is the exhibition of all sorts of parts and accessories for carriage and auto builders. A tour of Convention hall, where the exhibition is being held, demonstrates very clearly the interweaving of the automobile and vehicle industries. The exhibits of tires and automobile parts and accessories is a very creditable one, albeit it is not so large as that which marked last year's convention in Chicago, when nearly three-quarters of the exhibits included automobile material and parts. The attendance also demonstrates the mutual interests of the motor car and the vehicle trades. It is a well known fact that many manufacturers of carriages are taking up the manufacture of automobiles, and around Convention hall this week the hope was frequently expressed that the relations between representatives of the automobile and those who represent carriage building will become closer and closer in the future. Among the exhibitors who are identified with the automobile trade are the following:

Diamond Rubber Company, Akron, O., has an interesting exhibit, the feature of which is a motor buggy special tire.

A combination internal and side-wire tire for use on motor buggies is a new feature in the exhibit of the B. F. Goodrich Company, Akron. Mr. Murphy and T. D. Brewster are in charge.

A. P. Cleaveland is in charge of the exhibit of the Firestone Tire & Rubber Company, Akron, O. The Firestone side-wire and motor buggy tire is attracting attention.

The exhibit of the Goodyear Tire & Rubber Company is in charge of G. M. Stadelman.

Republic Rubber Company exhibits its regular line, with J. M. Hoffman and F. A. Hastings in charge.

The Kelly-Springfield tire holds the center of the stage at the Consolidated Rubber Company, New York. The company is represented by F. E. Holcomb, F. A. Kissell, H. S. Cox and M. G. Stockbridge.

Kokomo Rubber Company shows a line of tires in charge of D. L. Spraker.

Hartford Rubber Works Company has a complete exhibit.

Timken roller bearings and axles for automobiles are displayed in the booth of the Timken Roller Bearing Company, Canton, O. W. R. Timken, E. B. Lausier and A. N. Bingham are here for the company.

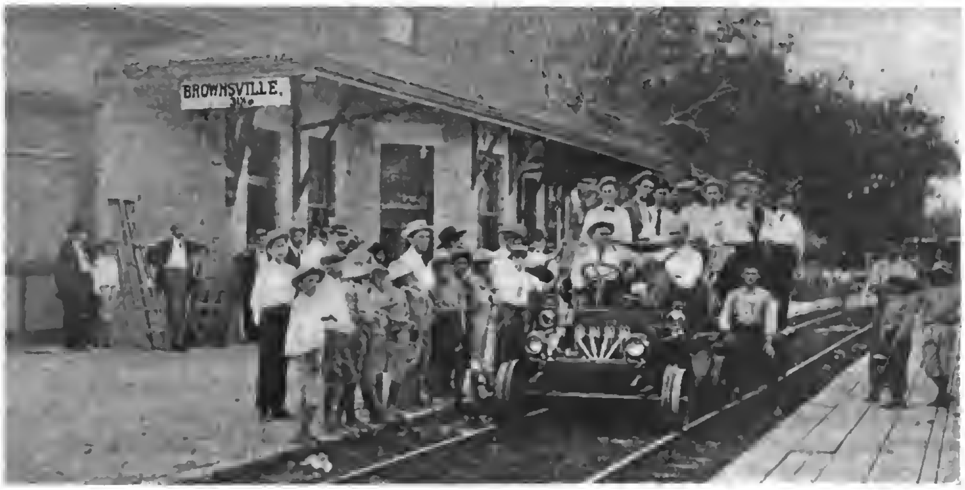
Rose Manufacturing Company, Philadelphia, have a large exhibit of Neverout lamps, with H. C. Rosenbluth in charge.

Other exhibitors well known to the automobile trade include: McKinnon Dash Company, Buffalo, N. Y.; Fairfield Rubber Company, Fairfield, Conn.; Spitzli Manufacturing Company, Utica, N. Y.; Hess Spring & Axle Company, Carthage, O.; C. C. Cowles & Company, New Haven, Conn.; L. C. Chase Company, Boston; Manufacturers' Foundry Company, Waterbury, Conn.; Fabrikoid Company, Newburgh, N. Y.

Besides the exhibition and the exhibits, those present will be entertained by a number of lectures. Among those who will speak or whose topic is of interest to the automobile world are: Second day, Wednesday, October 20, address by B. A. Gramm, Bowling Green, O., "The Evolution of the Motor Vehicle Relative to the Wagon Builder"; third day, address by Hugh Chalmers, Detroit, Mich., "The Principles of Salesmanship."

AUTOMOBILES TAKE TO THE RAILS IN TWO STATES

DELIVERY of mails is of paramount importance, and is not allowed to stop for wind, weather, or other similar obstructions. When reliance is placed upon railroads, and the mails do not materialize, it is then time to take to the automobile, as a sure means of delivery. This was exemplified by an incident in the South recently. The town of Brownsville, Texas, is connected with the world by the St. Louis, Brownsville, and Texas Railway. On the occasion of recent floods in that part of the country, the town was cut off, when the flood washed away a large bridge about forty miles north of Brownsville, and all of the railroad rolling stock was north of the break.



Franklin Fitted with Flanged Wheels Doing Train Service Out of Brownsville

"After waiting four days for mail," says C. Everson, of Brownsville, in describing the plight of the community, "we rigged up a Franklin runabout, fitted flanges to the wheels and operated this end of the road between Brownsville and the bridge.

"The train consisted of two flat cars, on which we hauled passengers and baggage. 'She' gave excellent satisfaction as a railroad engine and made better time than the regular trains over the same road."

In the illustration, the revamped car is shown pulling but one of the flat cars, although the number of men visible would seem to indicate that there were two or even three flat cars behind the sturdy little locomotive, as the Franklin became for the time being. The lack of a bonnet would identify the car anywhere.

PASSENGER SERVICE FOR CALIFORNIA MINING TOWN

MANY small mining towns of the West and Southwest are isolated, and have no regular means of communication with the larger cities nearby. This is particularly the case in the southwestern part of California and Nevada, where the mining towns have sprung up faster than any railroad, no matter how wealthy and well-disposed, could take care of them by building spur tracks from the main line.

One of the smaller mining towns of California, which is so situated is Stone Canon, which is twenty-two miles from Chanslor, itself a small place and situated two miles from Paso Robles. The latter has railroad service, said to be regular, while Chanslor has a sort of apology for service, but Stone Canon, has neither service nor apology, not even a stage line. There was, however, rails laid from Chanslor to the Canon, and Walter Chanslor, of the firm of Chanslor & Lyon, well-known automobile dealers of Los Angeles, conceived the idea of supplying the long-felt want by rigging up a touring car with steel wheels.

This was done and six cast-steel wheels were rigged up to fit a big six-cylinder Premier, which will make regularly scheduled trips between the two towns. Seven passengers will be carried, and for the service afforded, the fare is not excessive.

This service will place Stone Canon on the map and its citizens in communication with the outside world by other means than the laboring burro. When the auto line was proposed by Chanslor, who has large holdings in the town, the residents there were enthusiastic over the proposition and a right of way twenty-two miles long was speedily granted. Long stretches of deep sand intervene between the towns of Paso Robles and Stone Canon. It takes many hours to make the trip by wagon. The motor car will make the trip in an hour or even less.


Premier on Rails Looks Peculiar with Six Wheels as in Service in California

SOME STARTLING INCREASES IN AUTOMOBILE EXPORTS

IN the summary of the detailed imports and exports for the month of August, and the eight months ending with August, the Department of Commerce and Labor shows that the exports in several directions have taken a wonderful upward turn. Such items as a 400 per cent increase in our exports to France, coupled with a 10.3 per cent decrease in our imports from that country, are particularly gratifying to all who have the best interests of the automobile business at heart.

Imports totaled 194 cars, valued at $333,900, being an increase in the number of 8.4 and in the value of 18.8, showing that the average value is on the increase. These were divided as follows:

France......	109 cars valued at	$188,696,	an average of $1,730
Italy.........	52 cars valued at	83,511,	an average of 1,810
Germany....	9 cars valued at	20,589,	an average of 2,280
United K....	7 cars valued at	16,224,	an average of 2,030
All others....	16 cars valued at	24,940,	an average of 1,860

The parts imported amounted to $114,973, as against $49,676 for the similar part of last year. This gave a total value to the imports of $548,874, which the export figures of $658,556 easily surpassed. The latter were divided into parts, $100,622, and the rest complete cars. The cars show a wide diversity of distribution, being allotted as follows:

Country	Amount	Change in Per Cent
British N. America................	$306,523	+76.5
United Kingdom	103,880	—17.5
France	78,693	+406.0
British Australasia	30,969	+142.0
South America	30,256	+379.0
West Indies and Bermuda.........	28,198	+366.0
Other Parts Europe...............	23,205	+380.0
Mexico	21,564	+37.0
Asia and Oceana..................	14,416	+37.7
Germany	11,923	—17.8

Unusual describes the margin of difference in the majority of cases, as shown in the table above.

MASSACHUSETTS HAS A ROAD CENSUS

BOSTON, Oct. 18—Another census of road traffic throughout Massachusetts was taken last week by the Massachusetts Highway Commission, the Metropolitan Park Commission, Boston Park Commission, and Newton Highway Commissioner. There were established about 250 stations, and at all of these a strict count of all passing vehicles was kept for fourteen hours each day, the count beginning at 7 o'clock last Sunday morning and ending at 9 o'clock Saturday night. The arrangements for the census were practically identical with those for the census that was taken in August and which showed that 42 per cent of the total traffic was motor driven. The majority of the counting stations were on the State roads, only a few being established by the other bodies that assisted the Highway Commission.

The August census was taken purposely at a time when the traffic over the State roads was abnormal, but this week's census is expected to show the relative amounts of traffic in its normal condition. The Highway Commission does not expect to see so large a percentage of motor vehicle traffic as in the August census. The count was kept of light and heavy one-horse vehicles, light and heavy vehicles with two or more horses, automobile runabouts and automobile touring cars, and as the time of the count and the stations are identical, it will be possible to make some interesting comparisons with the August results.

OFFER OF FREE ROAD TURNED DOWN

HARTFORD, CONN., Oct. 11—The daily press is asking for an explanation of the refusal of the State Highway Commissioners to allow Morton F. Plant to construct a road through East Lyme and Old Lyme at his own expense. Automobilists, especially, can see no reason why an offer to construct $30,000 worth of macadam and tar road, absolutely free to the State, should have been turned down. There is still a lot of room for road improvement, and every little bit helps. So far the commissioners have refused to make any explanation of their position.

This is all the more inexplainable, when it is considered that the roads of the State are far from being perfect, and each new good road is not only useful, but spurs on other districts.

9,342 AUTOS REGISTERED IN WISCONSIN

MADISON, WIS., Oct. 16—According to figures published by Secretary of State James A. Frear, there are 9,342 automobiles registered in Wisconsin. Of these 40 per cent. are owned in Milwaukee County, amounting to some 3,800 machines. The automobiles in the State represent an investment of $11,677,500. It is said that about one-seventh of these belong to farmers.

ARRANGEMENTS FOR 1910 REGISTRY

BOSTON, Oct. 18—The Massachusetts Highway Commission has just signed a contract for number plates to be used in registering cars next year. The new motor vehicle law becomes effective then, but by a special provision the commission is permitted to prepare the registration and licensing blanks, plates and the like, so that they can be distributed to applicants, beginning the first of next December. This is so that on the first of January, when the new law as a whole goes into effect, everybody will be equipped with their licenses, registration certificates and plates. The contract that has been signed is for 52,790 number plates. Of this number there are 24,000 pairs for private vehicles, 475 sets for manufacturers and dealers and 20 pairs for use on the motor vehicles of foreign diplomatic representatives who may be in Massachusetts. The contract price is about $6,900. The 1910 plate will be of the same design as that used this year except that the colors will be reversed.

No decision has yet been reached by the commission as to the manner in which it will determine the horsepower of motors for purposes of assessing the graded registration fees.

Up to October 1 the State had received this year in fees for automobile registrations and licenses a total of $158,629.52, which is $43,872.52 more than for the same period last year. There had been registered 22,804 automobiles, 7,570 private operators' licenses had been issued and 8,514 licenses for chauffeurs.

FIRST AUTO SHOW IN SALT LAKE CITY

SALT LAKE CITY, UTAH, Oct. 16—The first automobile show to be held in this part of the country will open in this city Nov. 3 for a ten days' run. It will be held in the two main buildings of the Utah State fair grounds. An elaborate scheme of decoration has been prepared. Circulars with floor plans have been sent to the prominent manufacturers, and judging from the replies received, the floor space will be well filled. Rupert Fritz is president and general manager of the show.

TIME AND PLACE SET FOR BUFFALO SHOW

BUFFALO, N. Y., Oct. 18—Instead of the usual location for the automobile show, Convention Hall, the Automobile Club of Buffalo has selected the Broadway Arsenal as the place for its eighth annual show, which will take place February 14 to 19, 1910. The show will be under the highly-successful management of Dai H. Lewis, as in previous years. Mr. Lewis will also manage for the Buffalo Launch Club the third annual Power Boat and Sportsmen's Show. The latter will be staged at Convention Hall, during the week of March 19 to 26, 1910.

What the Clubs Are Doing These Days

LOUISVILLE CLUB'S CLOSELY CONTESTED RUN

LOUISVILLE, KY., Oct. 16—The endurance and economy contest held by the Louisville Automobile Club ended in what threatened to be a tie between the Ramblers driven by Prince Wells and Harry Ropke. Both had perfect road scores, but the technical committee finally penalized Ropke two-tenths of a point for a loose lamp door, leaving the *Herald* cup to Wells. The Cadillac entered by Ira Bennett won the cup offered to the most economical car, having a low score for oil, water and gasoline. Mrs. Harvey Myers, of Covington, Ky., the only woman driver in the tour, won the prize for using the least water for her Buick, and R. E. Gregory's Cadillac burned the least oil. The Standard Oil Company's booby prizes were won by Harry Ropke and Mrs. Myers for consuming the most gasoline; by Mrs. Myers and George H. Laib for burning the most oil, and by Mr. Laib for using the most water.

Twenty-seven cars participated in the run. From Louisville the course led through Lexington and Paris to Winchester, 170.2 miles, where the night was spent. The return was via Frankfort and Shelbyville, 197.2 miles. The owners' trophy, a silver cup donated by the Louisville Automobile Club, was won by Rambler No. 11, entered by Bertram H. Straus, the car being judged by both reliability and economy. It lost one-tenth point on the road.

MARYLAND CLUB'S PROGRESSIVE CAMPAIGN

BALTIMORE, Oct. 16—With the election of new officers at the meeting this week the Automobile Club of Maryland started a progressive campaign for the winter months. The officers chosen are C. Howard Milliken, president; Osborne I. Yellott, vice-president; Frank W. Darling, secretary (re-elected), and Thomas Young, treasurer. The board of directors consists of James Stone Reese, Edward S. Dickey, Hugh H. Young, Edward C. Wilson, Joseph M. Zamoiski and Joel Nassauer.

Mr. Yellott announced that the committee on road signs, of which he is chairman, has placed signboards in various parts of Baltimore county, particularly in the neighborhood of Lock Raven. Other signs have been placed in the vicinity of Catonsville and Towson, and within a short time other parts of the county will be posted.

Already show talk is in the air, and, in fact, tentative plans for the second annual exhibition under the auspices of the club have been laid out. The members favor an early show this winter. Many Baltimoreans will attend the Atlanta show, and profit by that exhibition in their plans for the local affair.

VARIED TOURNAMENT OF ONE OHIO CLUB

ASHLAND, O., Oct. 16—The tournament held by the Ashland Automobile Club met with much success. The program showed much ingenuity, embracing several novel events, such as the "hospital race," in which the contestants hit a dummy with their cars, stopped, took the dummy on board and carried it back to the judges. The "teeter board" and the "water race" also gave much amusement. Among the winners were: F. Heitz, Dean Ridgley, H. A. Mowrey, Gene Fritzinger, H. Peters and Dr. Ray Ash. The hill climb, one-third of a mile long. was won by H. B. Ridgley in thirty-four seconds.

PITTSBURGH ELECTION AND SHOW ARRANGEMENTS

PITTSBURGH, Oct. 18—The annual election of the Pittsburgh Automobile Club, which was held last week, resulted in the choice of W. N. Murray for president; Frank Saapt, vice-president; J. K. McKeough, secretary, and G. P. Moore, treasurer. The club is starting arrangements for a third automobile show.

NO CLUB RUN TO VANDERBILT FROM HARTFORD

HARTFORD, CONN., Oct. 16—At the meeting of the Automobile Club of Hartford this week it was voted not to attend the Vanderbilt Cup race in a body. Last year the club conducted a successful run to the race, but though assured beforehand of a good parking space, the participants could not see the track on account of the crowds that overran it. However, many of the club members will visit the race this year unattached, and these are already arranging for parking space, in the hope of doing better than last year.

Several new members were elected at the meeting, and the growth of the club in the last six months is regarded as most encouraging. Guy K. Dustin, former secretary of the club, but now resident of New York City, was elected an honorary member, in recognition of his services when in office. Following the regular business meeting, Hiram Percy Maxim gave a talk on his fire-arms muffler and made several demonstrations of the device.

Through the co-operation of the club a hundred elderly people were enabled to attend church service last Sunday, who otherwise would have had to stay at home. For many the "joy ride" was an innovation. Each car carried an escort, and a committee was at the church to care for the old folks on their arrival.

ELECTION TIME FOR MILWAUKEE CLUB, TOO

MILWAUKEE, WIS., Oct. 16—Clarke S. Drake was re-elected president of the Milwaukee Automobile Club at the annual meeting of the directors. Faustian Prince was elected first vice-president; George A. West, second vice-president; Arthur C. Brenkle, secretary, and Lee A. Dearholt, treasurer. James T. Drought was again chosen legal counsel. The club is in excellent financial condition, and will proceed to build its clubhouse, long proposed, in the spring. The club owns three acres of land on Blue Mound Road, which will soon become part of the boulevard designed ultimately to connect Milwaukee and Madison, the state capital. The club will also exercise an option on an adjoining acre. It is expected that the show to be held in the Auditorium next spfing will provide the necessary funds.

MICHICAN ASSOCIATION WILL LOOK TO SIGNBOARDS

DETROIT, Oct. 16—Michigan will no longer be the desolate, signboardless waste of the past if the latest effort of the Michigan State Automobile Association works out as expected. By another summer, it is hoped, travelers will be able to tour over all the main highways in the lower part of the State without fear of going wrong. The executive committee of the association, consisting of President Skae and Messrs. George, Ramsey, Warnshuis and Jackson, is back of the move. The first work will be done on the road leading from Detroit through Grand Rapids to Holland.

BOSTON ENDURANCE RUN INDEFINITELY POSTPONED

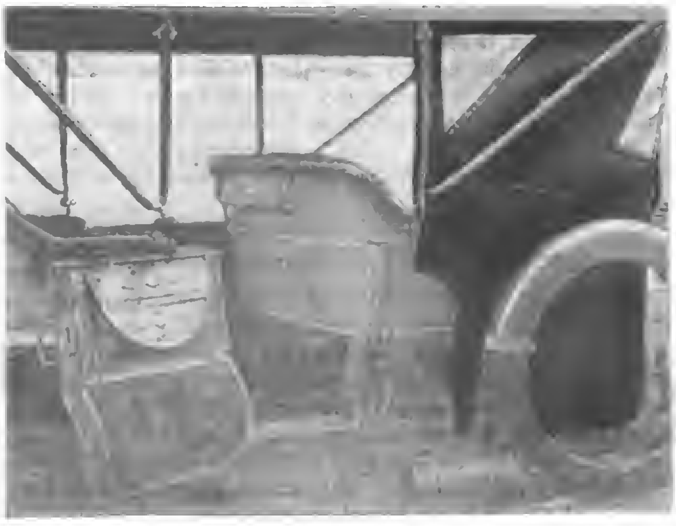
BOSTON, Oct. 18—At a meeting of the contest committee of the Bay State Automobile Association this evening it was decided to postpone the two-day endurance run scheduled for Thursday and Friday of this week. The entries were due to close to-night and only fourteen cars has been nominated. The committee considered this an insufficient number. It was stated that many automobilists had refused to enter because they had not yet secured their 1910 models. The committee will make another canvas of the trade, and if it is assured of a good-sized entry list will select another date for the run. Otherwise the event may be abandoned.

Hanch's Storm Curtains Applied to Marmon Touring Car

NEW TYPE STORM CURTAINS

Anyone who has ever stood out in a pouring rain to put up the storm curtains on his car, getting thoroughly drenched in the process, so that the curtains when put up were useless to him, will appreciate in no ordinary manner the use of a curtain which may be put on from the inside and with as little labor as the other kind. Just as a matter of doing as always has been done, all carriages and automobile curtains fasten on from the outside. A Western man, C. C. Hanch by name, having been through the experience mentioned above with carriages, decided when he purchased his first automobile to have something different.

So he had the top made so as to take inside fasteners for the curtains. This first attempt, as he says, was rather crude, but it showed him that the basic idea was all right. Then, upon the purchase of another and more modern car, a 1910 Marmon "32," he carried out the idea of inside curtains in a satisfactory manner. To quote from his own description: "The top is made with inside curtains, as before, but instead of using the ordinary celluloid storm front, I have employed a standard wind shield for the front and have made the inside curtains to match and fasten to the inside of the frame of the wind shield. The curtains are made in two pieces for each side, and join at the second bow from the front. The appearance and arrangement of the curtains are clearly shown by the annexed cut. In order properly to preserve the curtains when not in use, and still have them instantly accessible, I use a light metal tube, which is fastened with straps back of, and just below, the ledge of the front seat. The location and method of installing the tube are indicated in the second cut. The curtains are rolled and not folded, which helps preserve the celluloid windows, and when placed in the tube they do not take up any toe room and are not in the road in any way. It is only a minute's job for the driver, sitting in the front seat, to open the tonneau door, slip out the curtains and suspend them in position without getting out in either mnd or rain. I am confident that this will appeal to the motor car user who has been 'through the mill.'"



Cylinder Containing Curtains on Running-Board

RESTA WOULD DRIVE IN VANDERBILT

Dario Resta, one of the best known foreign racing drivers, is paying a visit to America, and should opportunity present itself, he would drive a car in the Vanderbilt cup race. Resta has been a successful pilot of the Mercedes on the Brooklands track, and one of his most recent appearances was at the wheel of the Lucas Valveless car, which has been attracting considerable attention recently in England. Any concern seeking a thoroughly first-class driver, would improve its chances by effecting an arrangement with Resta, whose European reputation would add to the international character of the Vanderbilt event.

Baker Electric of "First Lady in the Land"

The accompanying illustration shows a Baker Electric drawn up in front of the White House, at Washington, awaiting its owner —"the first lady in the land." It does not show the Exide battery with which it is equipped, but it is there, and the Baker vehicle with the Exide battery form a combination hard to surpass. It is also noteworthy that the King of Siam has ordered a Baker Electric with Exide batteries for his personal use.

TOLEDO AFTER TIRE PLANT

Toledo, O., Oct. 18—Indications point to Toledo's automobile industry developing rapidly. Since the location of the Overland Automobile Company in this city, two auto parts factories have been added through the direct influence of President J. N. Willys, and he has just announced that there is every reason to believe that a large tire plant will be induced to move its plant here. While definite details have not yet been announced, it is stated that the company considering a change is located in Akron, and that the Overland company is ready to contract for enough tires to insure the company of all the work it can do. The Toledo Chamber of Commerce is interested in the project, and is ready to offer inducements.

New Orleans, La.—The Parlor Stables at Canal and Galvez streets have been leased by the Glide Automobile Company, the agent for the FoFrd and Regal cars. The stables will be entirely remodeled to an up-to-date repair shop, garage, and show room.

Addition to Plant of the Speedwell Motor Car Company, Dayton, O., That Will Be Followed by Another of Similar Size

SOME NEWS FOUND DURING FACTORY VISITS

Brush Runabout Company, Detroit—The new plant of the company is shaping up and the parts of the new models are being made up at the plant of the Briscoe Manufacturing Company in the meantime. Everything is going along nicely; the 1910 car is on the road and it is attracting notice and commendation. The new balance scheme makes the single cylinder motor as smooth as a four and the power is all that any autoist will want in a runabout for general and utility service. With 10,000 cars passing through the shop in all stages of completion it taxes the skill of great shop managers to keep things from piling up, but the Briscoe plant is tried and true, having turned out automobile products on a large scale for several years.

McCord Manufacturing Company, Detroit—The best illustration of the way this company is going about it is to scan the illustration of the new addition to the already large plant devoted to turning out radiators, force feed lubricators, air propellers and other accessories. The new addition is capable of housing enough machinery to more than double the output and all the product is contracted for on this basis.

Chalmers-Detroit Motor Company, Detroit, Mich.—This company is now finishing its third large concrete building, and many other preparations are being made to put out this well-known line of cars on a basis as never before. H. E. Coffin, chief engineer, despite the load he has to shoulder in order to meet the wants of Chalmers-Detroit dealers, showed THE AUTOMOBILE man all there was to be seen, including two bears that wax and grow fat in a cage in the yard, depicting general prosperity at the plant.

Cadillac Motor Car Company, Detroit—Under the guiding hand of the veteran maker of automobiles, H. M. Leland, Cadillac cars for 1910 are being rapidly completed despite any appearance of haste in the well-equipped plant of the company. Everywhere in the vast plant materials are being whipped into shape, and the fine array of plans, patterns, templates, gauges, and other special equipment available, spells result. Readers of THE AUTOMOBILE may be interested to know that the plant of this company has over 90,000 special gigs, gauges, etc., which are used in the process of building automobiles, and they eliminate the personal equation.

Speedwell Motor Car Company, Dayton, O.—Another saw-tooth factory building has been added to the already large plant of the Speedwell people. This building is of brick and steel, with cement floor, and will be occupied by the upholstering and painting departments, which in the past have been sorely cramped for room. The greatly increased Speedwell output for 1910 is being rapidly pushed forward, and another building equal in size to the one shown in the illustration has been contracted for and will be erected at once.

Hupp Motor Car Company, Detroit—In the new plant of the company, cars are being put together rapidly and the staff is all agog with excitement as the natural outcome of moving into a new plant and building cars at the same time. The little car is becoming a more conspicuous feature in the streets of Detroit every day, and standing in front of the plant for a single hour any day in the week is enough to convince anyone that the cars are being rolled out.

Metzger Manufacturing Company, Detroit, Mich.—This new company, holding in its personnel Messrs. Everitt, Metzger and Kelley, formerly of the E. M. F., is pushing to the fore with the new model, and beyond being busy there is little to be said at the moment excepting that they are making order out of chaos and shaping things for business on a large scale.

Studebaker (E. M. F.) Company, Detroit—Studebaker-Flanders efforts are in the direction of the control of everything that goes to make complete automobiles on a large scale, and anyone who may have given the matter a little attention will readily see that it is a wise man who knows where to get parts these days. As it is, the company has plants either in operation or being whipped into shape to build everything required to make automobiles on a previously un-

New Building That Has Been Added to the Radiator-Making Plant of the McCord Manufacturing Company, Detroit heard of scale, without having to say "by your leave" to any one.

Demotcar Company, Detroit—A newcomer, with 3,000 cars projected, to be marketed at $550, is making a lot of talk. Dealers are flocking to Detroit from Texas, Oregon and Maine to have a look and the promoters of this popular priced car are playing "center rush" in a swift game.

Clark-Carter Automobile Company, Jackson, Mich.—This is a recent one, with ample capital and a well appearing model. The company has purchased the Eber L. Peek property, with its 20,000 feet of floor space, as a nucleus. The Cutting Motor Company, of Newark, N. J., will market the cars, and the first model, now on wheels, is known as the Cutting "40," and will sell at $1,600.

Rapid Motor Vehicle Company, Pontiac, Mich.—This concern will have something important to say to the users of commercials this year. Things are shaping up at the plant, and besides a small model for light delivery work the three-ton truck will probably be a feature of 1910. It is a good deal of a job to prepare the line for announcement, and at the present time all that can be said is that Rapid trucks are to be up to a fitting standard.

Oakland Motor Car Company, Pontiac, Mich.—With materials coming in from many quarters, and models ready to be duplicated by the thousand, this company is making rapid strides toward an addition to the original plant, which will increase the capacity several times. When THE AUTOMOBILE man called recently one of the large additions, about 60 x 300 feet, four stories high, was under contract to be finished within 15 days after the contractor started to raze the old wooden buildings that clogged the wheels of progress. The buildings are all to be substantial brick affairs and the showing made in five days is evidence of the fact that the contractor will lift the premium. The old Oakland plant is revamped, new hardwood floors are down, and all the plants in the vicinity are absorbed. Jesse Eccleston, representing the sales department of the Oakland, is energizing the situation, and Oakland models, as fast as they come from the shop, are given a critical eye. Automobile Engineer Brush is putting his best licks on the new Oakland $1,000 car. It is swung right, looks well and has speed.

Inter-State Automobile Company, Muncie, Ind.—Owing to increased demands for Inter-State cars, the Inter-State Automobile Company has now under course of construction an immense addition to its already large plant. The three floors of the new building are 430 feet long and 66 feet wide, which includes a spur running out from one end of the building. Its total floor space will be 85,000 square feet, which added to the old plant will make a total of over 150,000 square feet of floor space. The capacity and output has been increased to five times the number of cars manufactured in 1909 and the company expects to manufacture 2,500 cars for 1910. A spur track will run the entire length on the outside of the building and a large shipping platform will be made for handling shipments without delay. The steel work shown in the illustration was erected in less than two weeks and the same general fireproof construction will be used as used in the other buildings. This is an all steel and window construction on the sides with steel frames and window and brick construction on the ends. This will furnish the maximum amount of light, and since this building will be devoted to painting, upholstering, finishing and final assembly it will be particularly adaptable for the work. All the departments mentioned will be removed to the new building in plenty of time to get well equipped to handle the 1910 models to better advantage than formerly.

PROMINENT HOOSIERS ORGANIZE

INDIANAPOLIS, Oct. 18—An imposing group of business men and mechanical engineers forms the Indiana Motor & Mfg. Co., which was incorporated last Saturday. State Auditor John C. Billheimer has been elected president, and Don J. Hayden, a former newspaper man, secretary. The general manager will be Charles B. Riley, until recently secretary of the State Railroad Commission, and John E. Matson, former superintendent of the American Gera Company, will have a similar position in the new concern. Others interested are Charles A. Denby, former U. S. Minister to China; W. F. Crawford, James S. Cruse, Henry C. Thornton, R. A. Lemcke and Claudius C. Jones, all prominent men.

The company has leased the former plant of the American Harness & Leather Company, at Franklin, Ind. General offices will be maintained in Indianapolis. A four-cylinder, 35-horsepower touring car will be the first offering of the company.

RECENT TRADE PUBLICATIONS

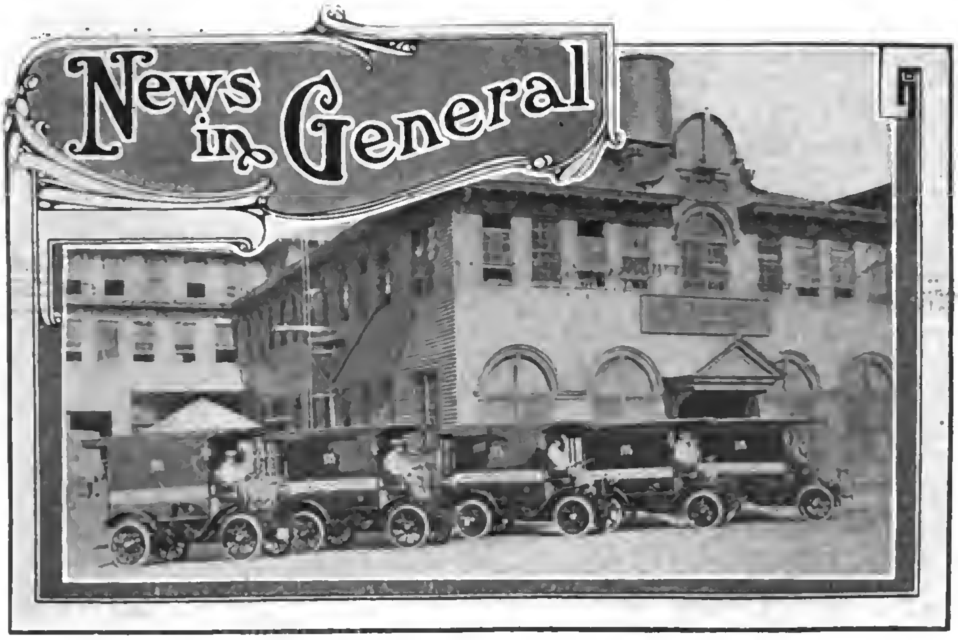
Diamond Rubber Company, Akron, O.—Two neat catalogs of medium size have arrived from the office of this well-known tire manufacturer, one devoted to solid tires for motor buggies and the other to tires for commercial vehicles. The former describes four types of tires, distinguished by their retaining devices: the internal wire, side wire, combination internal and side wire, and clincher. The rims for the first three are of channel shape and are interchangeable; but the clincher type naturally requires a different design. The names of the different types are alone almost sufficient to describe them. The internal wire has two circumferential wires imbedded in the rubber; the side wire has two circumferential wires resting on the ends of short cross wires, and the combination has four long wires as well as the cross ones. The clincher type is made under the Swinehart patent, and is of the familiar grooved shape. The catalog gives all the information necessary to order the tires, and also describes and lists the machines for applying them to the rims.

The commercial car catalog describes the new wire mesh base type, as well as the side wire. The wire mesh base tire is built up on three layers of heavy woven wire, giving it great strength, and is secured to the rim by a circular flange clamped by bolts piercing the rim. The flange is a simple flat ring of steel, and the construction is in every way the simplest and strongest conceivable. This type, as well as the side wire, is made double for extra heavy service. The stock sizes run up to 42 by 7-inch single and 42 by 5-inch double. The catalogs are good examples of printing, and are clear and concise in description.

The Waverley Company, Indianapolis—Green and gray forms the prevailing color scheme of a handsome catalog devoted to the 1910 Waverley Electric. The cover bears an embossed design of a Waverley car against a background of an Italian garden in green, with the name "Waverley" in gilt. Paper and presswork reach the high standard now expected of all catalogs, even those of the most utilitarian articles. The only important change in the mechanism of the Waverley models seems to be the new driving system. The motor and the gears giving the first reduction are carried on the body frame, their shafts lying transversely to the car. From the gear of the first reduction a short, universally jointed propeller shaft runs parallel to the rear axle to the pinion of the second gear reduction, which meshes with a gear mounted on the differential. As the second gears are placed just inside the seat of the left rear spring, the shaft runs nearly the whole width of the car between the spring seats. The movements of the motor due to spring action are thus taken up with comparatively little angularity of the universal joints. In the body design of the Waverleys, stress is laid on the drop frame, which allows the underbody of the machine to carry out the graceful curved lines of the upper work. This frame is used on the brougham, coupe and victoria models. The line is completed by a light runabout, a stanhope, a surrey and a roadster.

Winton Motor Carriage Company, Cleveland—One of the most artistic booklets that has appeared in automobile circles is the 1910 Winton catalog. It hardly seems fair to call it a catalog, as anyone who did not know that "Winton" was the name of an automobile (if any such person can exist) would at first glance take it for a Christmas edition of a popular novelette. It is bound in stiff covers of marble-tinted paper, and the reading matter is printed on heavy glazed stock, profusely illustrated with half-tones. The four full-page pictures of the 1910 Winton "Six" are particularly striking, as the figures of the car stand out boldly on shadow backgrounds of rural landscapes, showing in the distance an attractive country house or bungalow. The car itself, which differs only in the most minor details from the 1909 model, is thoroughly described, and much space is given to setting forth the merits of the six-cylinder motor, in which Winton, it will be remembered, is an enthusiastic believer.

Framework of New Addition to Inter-State Automobile Co., Muncie, Ind.



Autocar Trucks for Philadelphia's Post Office Service

The five trucks pictured above have just been purchased from the makers, the Autocar Company, Ardmore, Pa., by the United States Government, and will be placed in the Postal Service, for the collection of packages and mail in northern and northeastern sections of Philadelphia. Starting in October 1st, they replaced ten horse-drawn vehicles.

Upkeep of Hudson Runabout—The San Francisco agent of the Hudson Motor Car Company recently sent in a statement of the upkeep expense of his demonstrator, which illustrates the economical running of modern light cars. Between August 1 and September 30 this car was driven 3,634 miles, both by the dealer himself and by prospective customers; during this time a record was kept of the gasoline and oil consumed and of the time spent on the car by employees. The total bill amounted to $52.50, about 1.4 cents per mile. Not one cent was charged for mechanical repairs, and only 75 cents for tire repairs. Storage, of course, was not included. This is the more remarkable when it is considered that for a considerable part of the mileage the car was in the hands of persons more or less inexperienced in its operation.

Reminder of the Oil-Can—Insufficient lubrication is a dangerous thing in an automobile, and perhaps has cost careless owners more money than any other one cause. The engine, gears and axles are almost always lubricated automatically by reliable systems, but there are many parts where no means has been found of dispensing with the humble but useful oil-can. For the benefit of those who are wont to neglect its use, the Pierce-Arrow Company has originated a neat reminder. It takes the shape of a printed chart of instructions, which is pasted to the board under the driver's seat and glazed with material that will withstand any rough usage. The driver cannot lift the cushion of his seat without finding the reminder staring him in the face, and it is always there should the regular instruction book be mislaid.

"Exide" Tells Its Story, and More—The Electric Storage Battery Company, of Philadelphia, has issued an attractive publication on the "Exide Sparking Battery." It contains a very complete description of the company's well-known ignition cell and a rather unusual double-page illustration showing its entire construction at a glance. Every feature which makes this battery durable and efficient is clearly shown. In addition to this description of the battery three timely articles have been specially written for this publication by the editors of The Automobile, *Motor*, and *Cycle and Automobile Trade Journal*. The booklet is well worth preserving, as the articles touch upon such subjects as spark plugs, care of the automobile, etc.

Goodrich in Reliability Runs—Twenty-one cars in the recent endurance run at Kansas City were fitted with Goodrich tires, and the Franklin car which won the trophy was among this number. The tires on this car had covered four thousand miles before the run and yet went through the strenuous trip without a puncture. During the 900-mile tour not a single Goodrich tire was taken from its rim. The Elmore, winner of the Munsey tour, also was shod with Goodrichs. During the run of 1,600 miles these tires had but a single puncture; this, too, in spite of the fact that they had been used several thousand miles before the tour.

Rapid Transit in Jersey—Articles of incorporation have been filed by the Suburban Motor Transit Company, with a capital stock of $100,000. Among those interested are Edwin M. Simpson and former Senator R. F. Pettigrew, of New York City; G. H. Atkinson, C. H. Winans and others. J. A. McClary has been made manager and will make his headquarters in Rahway. The company is to operate an automobile line between Elizabeth and South Amboy in place of the proposed trolley line, which had to be abandoned. Four automobiles will be operated and the company may extend into the taxicab line.

Franklin Freight Shipments—During the year ending September 1 no less than 864 freight cars were loaded with automobiles and shipped from the factory of the H. H. Franklin Mfg. Co. The freight charges totaled $67,000. The automobile shipments had a total weight of 3,668 tons. Shipments other than those of automobiles numbered 26,518. Incoming freight cars reached the figure of 598. Merchandise inbound aggregated 10,411 tons and outbound, 5,163 tons.

Aeronaut Curtiss Also Becomes Autoist Curtiss—Glenn H. Curtiss, the well-known aeronaut, has succumbed to the blandishments of a Chalmers-Detroit runabout, possibly due to his association in Paris with R. D. Chapin, the general manager of the Chalmers-Detroit Motor Company. Recently Mr. Curtiss visited Detroit as the guest of Mr. Chapin and incidentally surcharged not a few autoists with aeroplaning enthusiasm.

New Maker of Auto Axles—The Russel Motor Axle Company was recently organized in Detroit with a capital of $100,000 to manufacture automobile axles on a large scale. The new company is an outgrowth of the Russel Wheel & Foundry Company, one of the largest of local structural steel makers. It has purchased the plant of the Wagner Tool Works and is putting in a complete equipment of machinery.

Salisbury Will Not Move—The Salisbury Wheel and Mfg. Co., of Jamestown, N. Y., denies the report that it is about to move to Peru, Ind. A company known as the Peru Auto Parts Mfg. Co. has been organized in the latter city, and S. H. Penfield, general manager of the Salisbury Company, is to be its president. This fact probably was the cause of the rumor.

Coppock Trucks Reorganized—Fort Wayne, Ind., has been disappointed in its ambition to become the home of an automobile truck factory. The Coppock Motor Car Company, which was considering a transfer to that city, has been reorganized by capitalists of its present location and will henceforth be known as the Decatur Motor Car Company.

Californians Like Racing—The Los Angeles Motor Racing Association has leased for a term of years Ascot Park, one of the best equipped mile tracks in the country, and is planning alterations. The Warner Instrument Company has been requested to arrange, if possible, to time future races on this track with its automatic timing instrument.

Marylanders Hold a Race—The last day of the Cumberland, Md., Fair was signalized by a five-mile match race between the Huffman Automobile Company's Maxwell 30 and the W. W. Garage's Chalmers-Detroit 30, on the half-mile fair grounds track. The Maxwell won in 8:03 3-4. The race was the first one held in the county.

IN AND ABOUT THE AGENCIES

Regal Will Have Boston Branch—A company has been formed to handle in New England the product of the Regal Motor Car Company of Detroit, Mich. The garage of the Regal Motor Company is being located on Massachusetts avenue and a contract has been signed with the parent concern for 300 cars for 1910. In addition to the cars the Boston concern will carry a large stock of parts and will be the New England depot for the delivery of repair parts to Regal owners. This plan will be of the greatest advantage to Regal owners, of which there are now a great number in New England. The new company is backed by N. C. Griffin and A. W. Mutty. The latter will be the active member of the firm.

Hupmobile and Chase, St. Louis—A new automobile agency has been formed here, known as the General Motor Car Company, to represent the Hupmobile and the Chase commercial cars. The office is at 1120 Third National Bank Building and the garage at 4520 Delmar boulevard.

Grout, New York City—The Imperial Motor Vehicle Company, of 212 West 76th street, New York City, has taken the agency of the Grout car, made by the Grout Automobile Company, of Orange, Mass., for Greater New York and the surrounding territory.

Oldsmobile, Oakland and Brush, Schenectady, N. Y.—H. W. Chubb will distribute the Oldsmobile, Oakland and Brush in Schenectady and vicinity during the coming season. His Olds agency includes Albany, Rensselaer and Schoharie counties.

American and Rapid, Kansas City, Mo.—The Kansas City Rapid Motor and Transportation Company, recently incorporated, has opened quarters at 1420 Woodland avenue and will represent the American and the Rapid truck, as well as the new Westcott.

Cadillac, Cleveland—The Barger Auto Company, Cadillac agent in this city, has leased the entire first floor of the new Skeel Building on Euclid avenue near East Seventeenth street, and will take posesssion soon.

Chalmers-Detroit and Hudson, Schenectady, N. Y.—B. A. Burtiss, of the Burtiss garage, will continue the agency for the Chalmers-Detroit and Hudson and will act as distributor for Eastern New York.

Overland, Brooklyn, N. Y.—C. T. Silver is to act as Brooklyn agent for the Overland, with entire control in both Kings and Queens counties. He will shortly open salesrooms at 62 Flatbush avenue.

Oldsmobile, Utica, N. Y.—Harry A. Davis and Whitney A. Clark have formed a partnership and will represent the Oldsmobile in Oneida and Herkimer counties. Their salesroom is at 12 West street.

White, Toledo, O.—In the future the business of the White Company in this city will be looked after bv the Wood-Kessler Automobile Company, which will devote its exclusive attention to this line.

Chase Truck, Kansas City, Mo.—The Western Commercial Car Company has opened a salesroom and garage at 911 East Fifteenth street and will act as agent for the Chase auto truck.

Ford, Brooklyn, N. Y.—Bishop, McCormick & Bishop, Inc., have contracted to represent the ford in all Long Island, with the standing of a factory branch. They will appoint sub-agencies.

Winton and Rauch & Lang, Atlanta, Ga.—Herrmann J. Haas, the local representative of the Winton and Rauch & Lang electric, is occupying new quarters in the Masonic Temple.

Oakland, Philadelphia—Fred Vanderhoff, formerly connected with the Ford and Bergdoll companies, has taken the agency for the Oakland and will locate on a salesroom soon.

Fal-Car and Woods, Atlanta, Ga.—The Jackson-Cerf Motor Company has been formed to handle the Fal-Car and the Woods electric, with a temporary office at 12 Whitehall street.

Haynes and Matheson, Atlanta, Ga.—The Corker Motor Car Company has opened a salesroom at Fairlie and James streets, where it will show the Haynes and Matheson cars.

Lozier, Kansas City, Mo.—The E. R. Hunnewell Motor Car Company, of 3816 Main street, has contracted for the representation of the Lozier during the coming season.

Haynes and Detroit, Denver—The Krebs-Covington Company has opened a salesroom at 1620 Broadway and will represent the Haynes and Detroit electric.

Rider-Lewis, Birmingham, Ala.—James J. O'Toole, sales manager of the Rider-Lewis Company, has placed the agency for his car with T. S. Smith & Sons.

Baker, Kansas City, Mo.—The Flack Automobile Company will henceforth act as agent for the Baker electric, at its salesroom at 3816 Main street.

Empire, Boston.—The S. M. Supplies Company, of Lincoln street, has taken the agency in this city for the new Empire runabout.

Cadillac, St. Louis—The Bagnell Company, local agent for the Cadillac, has removed to its new salesroom at 4160 Olive street.

PERSONAL TRADE MENTION

Ezra Kirk Rejoins Rainier—Ezra E. Kirk has resumed his former position with the Rainier Motor Company as Western manager of sales. Mr. Kirk is one of the hest-known automobile men in America, having been identified with the industry from its infancy as a manufacturer and later in various executive capacities. He was maker of the Yale car, which was put out by the Kirk Bicycle Company, of which he was one of the owners. He later became sales manager for the E. R. Thomas Motor Company, and then factory manager for the Rainier Motor Company. Recently he was Western manager of the Herreshoff Motor Company, terminating that connection to resume his place with the Rainier. The Rainier Motor Company anticipates marketing 500 big cars during the season of 1910, and 200 of these cars have been assigned to New York; the remainder will be marketed through new agencies now being established in various large cities.

Allen Shelden, president of the Motor Company, Philadelphia agent for the Premier, received a unique tribute last week. Unknown to him, some fifty local Premier owners gathered to banquet him, delegating to H. E. Grant the job of abducting Mr. Shelden for the occasion. The unconscious guest of honor accepted an invitation to ride. While driving leisurely along, Mr. Grant suddenly swerved the car onto the sidewalk and through a hotel door (which had been prepared for the occasion) and landed Mr. Shelden in the midst of the banqueters.

Edward S. Korbel has been appointed press agent of the Tenth National Automobile Show, to be held in Madison Square Garden, New York. Arthur N. Jervis, the former occupant of the position, is now devoting his entire time to the duties of advertising manager of the American Locomotive Company. In view of the fact that Mr. Korbel in the past was Mr. Jervis' assistant, it is assured that the work will be capably handled.

D. E. MacCarthy has sold the controlling interest of the General Mfg. Co., parts makers, of Elkhart, Ind., of which he was president, to A. T. Welles, of Elkhart. Mr. MacCarthy has been connected with the Burroughs Adding Machine Company and the Westinghouse Electric Company. His future plans are unknown, but it is safe to say that he will locate in the automobile industry.

R. S. de Mitkeiwicz, member of the Gas Power section of the A. S. M. E., has become connected with the Alden Sampson Mfg. Co., of Pittsfield, Mass. Mr. de Mitkiewicz will be associated with the New York office, 115 Broadway, as power sales engineer.

"Archie" Hughes and W. J. Foss, who constitute the Foss-Hughes Motor Car Company of Philadelphia, have opened a branch in Newport, R. I. This company also operates branches in Baltimore, Providence, R. I., and Wilmington, Del.

Raymond S. Joo, formerly with the B. F. Goodrich Company in New York, has assumed the management of the New England branch of the Rainier Motor Company, in the Motor Mart, relieving George T. Gould.

George Crittenden, who has been connected with the Whitten-Gilmore Company, of Boston, has joined the sales department of the American Automobile Company, of that city.

Irvin G. Berryman, formerly assistant superintendent of the Simplex Motor Car Company, Mishawaka, Ind., has been promoted to superintendent in place of Mr. Moore, resigned.

H. C. Henderson, for several years connected with the E. R. Thomas Motor Company in Buffalo, N. Y., has joined the selling force of the Boston branch of that company.

G. Hilton Gantert, who represents the Stearns in Philadelphia, has taken the Quaker City agency for the Herring-Curtiss aeroplane.

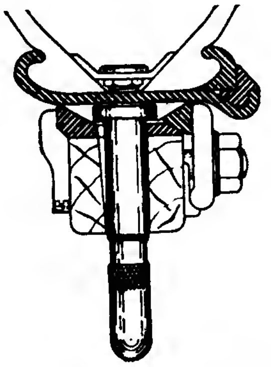
BOSTON TRADESMEN HAVE OUTING

Boston, Oct. 16.—The annual fall dinner and outing of the Boston Automobile Dealers' Association was held Wednesday afternoon and evening at Ferncroft Inn, and in many respects it was the most successful gathering ever held by the organization. More than sixty members and guests were present and most of them took advantage of the glorious autumn afternoon for the run to Ferncroft over the old Newburyport turnpike. At the inn secretary Chester I. Campbell had perfected the arrangements in advance, and about seven o'clock the members sat down to one of the famous chicken dinners for which Ferncroft is famous. At the after-dinner exercises President John H. MacAlman presided, and in his usual vigorous fashion, called upon different members for contributions of speech, song, or story.

Among those who responded were E. A. Gilmore, of the Whitten-Gilmore Co.; C. J. Bailey, J. W. Maguire, of the J. W. Maguire Co.; A. B. Henley, of the Franklin branch; C. P. Rockwell, of the Rambler branch; F. P. O'Brien, of the J. W. Maguire Co.; C. A. Gilmore, of the White Co.; J. W. Bowman, of the J. W. Bowman Co., and members of the press. Among others present were J. S. Hathaway, of the White Co.; George H. Lowe, the veteran of the local automobile trade who has been ill for a year or more and who was given a great ovation; F. E. Wing, of the F. E. Wing Motor Car Co.; S. H. Baker, of the Fiat Branch; V. A. Charles, of the Inter-State and Empire agency; H. L. Johnson, of the Premier Branch; J. H. Johnson, of the Buick branch; Harry S. Howlett, of the United Manufacturers; Howard Limric, of the Goodrich branch; William Gray and A. Hollander, of Gray & Davis; Fred Ayres, of the Fisk Co.; John Cooper, of the Ajax Co.; A. P. Underhill, of the Underhill Co.; F. A. Hinchcliffe, of the Winton branch, and others.

Information for Auto Users

Newest in Demountable Rims—At the Southern show, to he opened in Atlanta, Novemher 6, the first showing of the new demountable rims will be made hy the Firestone Tire & Rubher Company, Akron, O. This new rim works on an entirely new principle and has many commendable features. It may he used with regular quick detachable tires, in fact, its greatest feature lies in its having been designed for this purpose. It may he used the same as any quick detachahle tire after the usual demountahle rim changes have all heen made, and the ex-



SECTION OF FIRESTONE'S NEW RIM

tra supply of demountable rims used up. This is made possihle hy fitting over the regular tire valve a sleeve. This is interposed between the dust cap and the hase of the quick detachable rim, as the cut shows. No locking nut is used, the dust cap on the valve stem serving to hold the spreader in place or release it when the autoist desires to remove his tire and tuhe. During this operation the sleeve remains unchanged in its position in the hole through the felloe. When the rim is demounted in the regular way the sleeve, dust cap, etc., slide through the hole in the felloe. This gives the new rim a double value to the motoring public, in that it may first be used as a demountable rim to the extent of the numher of spare tires owned or carried, in which it possesses all of the many features of a demountahle. Beyond that the second and different feature of using the tire itself and independently of the rim, as a quick detachahle tire comes into use. This douhle purpose rim and tire comhination should meet with instant favor. On account of the trouble and hother with stayholts this concern has practically dropped the exclusive clincher demountable rim, so it announces. At the same show the new tires will also he exhibited. On all of the 1910 tires the thickness of the tread has heen increased.

Alumaloyd, a New Sheet Metal—In seeking a substitute for sheet iron and sheet aluminum for various automobile purposes, each of these possessing some defect, the Spark Rolling Mill Company, Canton, O., hit upon the happy combination of a special analysis rolled sheet steel, with a smooth, velvet-like coating of aluminum. This comhination gives all of the strength and rigidity of the ordinary steel sheet, as well as the admirahle surface and appearance of aluminum. The hig advantage to the hody builder in the use of this metal is that the sheets are ready for instant use, and need not the slow and costly sorting, cleaning, and other preparing actions that the steel does. In the paint shop this metal is a money saver, since its use eliminates sand-papering, filling, rough stuff, putty-glazing and pumice-stoning operations. Each one of these represents an outlay of time as well as money, so that in saving them the total represents quite a large economy. The sheets of Alumaloyd are availahle in all standard U. S. gauges from 16 to 28, and come in four sizes of sheet.

New and Different Tire Mold—Just so long as experts differ on the relative merits of the molded and the wrapped tread processes for manufacturing automohile and other tires, just so long will the Akron-Williams tire mold, made hy the Williams Foundry & Machine Co., Akron, O., enjoy much popularity. The reason for this is because the mold includes the hest features of hoth processes without any of their disadvantages. The cut shows the construction of this mold. It consists of two halves, pierced hy numerous holes, which permit the circulation of steam, and the escape of the water of condensation as well as gases which form. The inner surfaces are corrugated, and against these corrugations is inserted a brass wire gauze. The latter is tightly stretched and is held in place by the circumferential wire soldered to it. It is also held hy the additional steel locking rings. Next to this is a layer of duck or canvas, while the tire heads and side walls are formed hetween the iron side mold and the core. The tread is formed between the fabric and the core,

AKRON-WILLIAMS TIRE MOLD

while the profile of the corrugations forms the desired shape of the exterior of the tire. The hig advantage of this mold is that it gives full mold pressure to the side walls and head of the tire, This mold gives the resulting tire a fabric-like appearance, while actually it is ruhber. Besides a pleasing appearance, this partly roughened surface wears very well.

Very Handy Size of Meter—With the increasing use and appreciation of the value of accurate testing instruments for the ignition current, has come a demand for different sizes of such instruments from those previously made. In response to this demand, or rather, anticipating it, the Hoyt Electrical Instrument Works, Penacock, N. H., has brought out a pocket ammeter. This is shown in the cut and possesses all of the valuahle features of larger and bulkier meters, besides being approximately the size of a

POCKET SIZE HOYT AMMETER

No. 16 gentleman's watch. Since this small and very convenient size will allow of carrying it around in the vest pocket, a large demand for the size is anticipated. Aside from the size, a novel feature of much value is the silver plated metal scale, which comhines accuracy and durahility with tastiness in design. Despite its small size, this meter is made from carefully standardized parts, designed and finished with unusual accuracy. The lettering on the dial has heen changed to make it more legihle, a valuable thing in conjunction with the reduction in size.

New Form of Clutch—There are several inherent disadvantages in each and every form of clutch now in use, which inventors and designers have sought to eliminate but without success. These are large diameter and heavy weight. If the clutch is made small, it must he heavy, and if made large so as to reduce the weight, the rotating force, or inertia, which tends to keep it spinning, is increased in proportion, being dependent upon both the linear speed and weight. A new form of clutch, for which it is claimed that it may be light with very small diameter, is that invented and just put on the market hy W. L. Archer, Burlington, Vt. It is claimed hy the inventor that a rotating memher eight inches in diameter and weighing less than ten pounds all told, will take care of a forty-horse motor without slipping, or seizing. The principle is a combination of an external contracting and an internal expanding band on the same drum, but so arranged that centrifugal force in one is neutralized by that in the other, and that both clutches positively follow the lever, nothing heing left to springs, so that the clutch can be handled without strains, noise, or hother. It is very cheap and simple to build and maintain, is not sensitive to oil or water. The same principle is applicable to hraking effects, in which case the common drum on the rear wheel may be reduced in diameter without sacrifice of braking surfaces.

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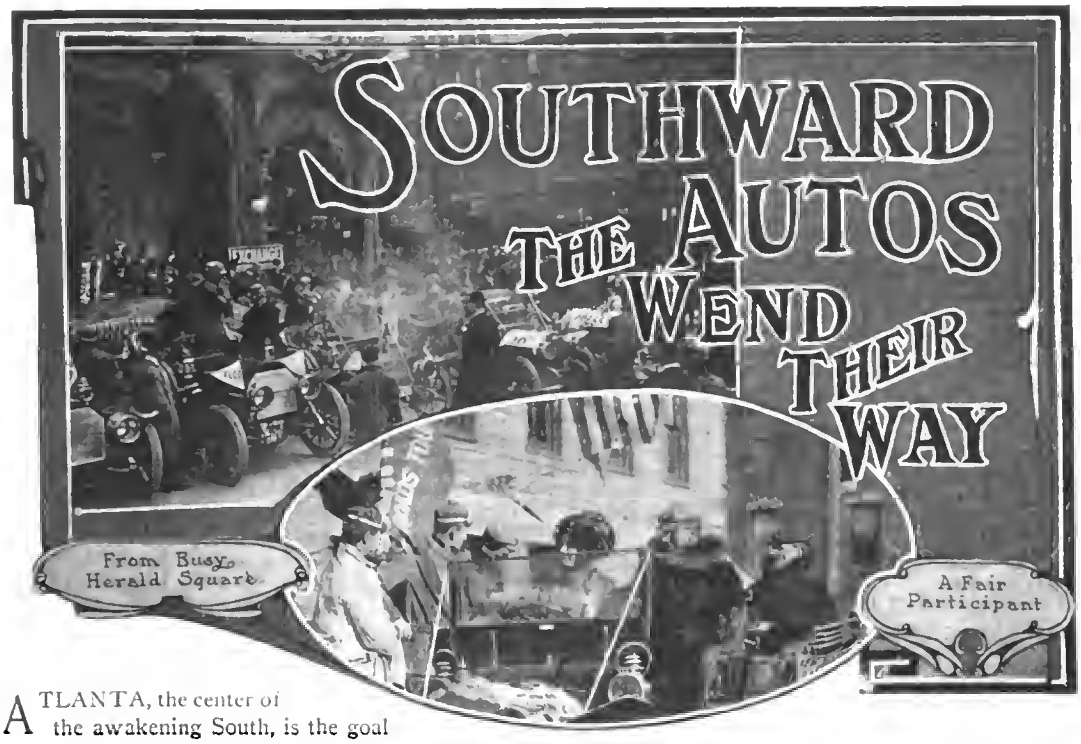
THE AUTOMOBILE



From Busy Herald Square

A Fair Participant

ATLANTA, the center of the awakening South, is the goal of forty-seven automobiles which left New York last Monday, prepared for a ten days' struggle with roads of the best and worst, and all the intermediate varieties. Under the auspices of the New York *Herald* and the Atlanta *Journal*, these pioneers, the advance guard, it is hoped, of many thousands, have undertaken to blaze the touring way between the metropolis of the North and that of the South, enduring what hardships may befall for the sake of the automobilists' watchword, "Good Roads!"

At 9 o'clock of the bright Autumn morning Herald square flaunted bunting and pennants from three-score cars, and a solid line stretched up Sixth avenue in the shadow of the elevated tracks. Then the escorting cars of the New York Automobile Trade Association swept down Broadway, and the waiting column turned into their wake. Not until Fifth avenue was reached did the line reveal its full length; then, freed from the press of traffic, it drew up in close order, still ten blocks long, and charged for the Battery.

Unusual in a tour of this sort, and indicative of the interest and enthusiasm with which the South has taken up the good roads movement, are the many entries by the cities along the route and by their boards of trade or of commerce. Atlanta, Lynchburg, Va.; Charlotte, N. C.; Roanoke, Va.; Moultrie, Ga.; Anderson, Ga.; Spartansburg, S. C.; Winston-Salem, N. C., and Commerce, Ga., all find representation in the line. Georgia, the Carolinas and Virginia will welcome the tourists as forerunners of almost a new era; an era of prosperity and activity, and of free intercourse with the neighboring States.

The tourists include many notables, both of automobiling and other circles. Recipient of a most flattering attention was the great "Ty" Cobb, whose trusty bat has twice helped Detroit to win a pennant. The speedy player, who may now be regarded as one of the automobile fraternity, was at the wheel of the Chalmers-Detroit official car. Frank X. Zirbies, who drove a Mitchell across the continent on a military expedition, headed the line as pacemaker. Many of the cars were gay with Paris millinery and other feminine accessories, for several of the contestants took their entire families with them. One of these parties was that of Jacques Futrelle, the story writer and originator of "The Thinking Machine." Mrs. Joan Cuneo, who has often demonstrated her skill at the steering wheel, brought out her favorite

Through Classic Washington Square

The Blue Book Car, N. H. VanSicklen, Sr., and E. R. Mixer

Mr. and Mrs. "Reolte" Owen Hold a Reception

Rainier for the occasion, and had as a passenger Lewis Disbrow, the daring driver of Rainier racing cars. Alexander Schwalbach, also touring *en famille*, entrusted the guidance of his Locomobile to his daughter, Miss Mildred Schwalbach, who is a driver of no mean skill.

CLASS 1—CARS COSTING $4,001 OR MORE

4 Thomas, J. J. Woodside, Atlanta, Ga.
6 Stearns, Col. Wm. L. Peel, Atlanta, Ga.
17 Thomas, J. Lee Barnes, Atlanta, Ga.
22 Oldsmobile, Henry J. Lamar, Jr., Atlanta, Ga.
23 Thomas, Charles I. Ryan, Atlanta, Ga.
30 Renault, Renault Freres Selling Agency, New York City.
35 Matheson, Matheson Automobile Company, New York City.
44 Benz, Chamber of Commerce, Atlanta, Ga.
49 Apperson, Automobile Blue Book, New York City.

CLASS 2—CARS COSTING FROM $3,001 TO $4,000

9 Thomas, Mrs. Elizabeth de Giers, New York City.
38 Pope-Toledo, Chamber of Commerce, Lynchburg, Va.
48 White, Walter C. White, New York City.
54 Franklin, W. C. Cleveland, Greensville, S. C.

CLASS 3—CARS COSTING FROM $2,001 TO $3,000

20 Premier, City of Charlotte, Charlotte, N. C.
25 Pennsylvania, Pennsylvania Sales Agency, Atlanta, Ga.
34 Knox, W. A. Kelly, New York City.
39 Selden, Evelyn Harris, Atlanta, Ga.
46 Oldsmobile, E. B. Douglas, Miami, Fla.
52 Corbin, Chamber of Commerce, Roanoke, Va.
53 Oldsmobile, Frederick Weiss, Brooklyn, N. Y.

CLASS 4—CARS COSTING FROM $1,251 TO $2,000

2 White, Board of Trade, Commerce, Ga.
5 White, Chamber of Commerce, Anderson, Ga.
7 White, Board of Trade, Moultrie, Ga.
8 Chalmers-Detroit, F. D. Hughes, New York City.
10 Buick, Chamber of Commerce, Spartansburg, S. C.
14 Studebaker, Board of Trade, Winston-Salem, N. C.
16 Buick, William Oldknow, Atlanta, Ga.
21 Jackson, Jacques Futrelle, Scituate, Mass.
26 Maxwell, Maxwell-Briscoe Motor Company, Tarrytown, N. Y.
27 Maxwell, Maxwell-Briscoe Motor Company, Tarrytown, N. Y.
29 White Star, White Star Auto Company, Atlanta, Ga.
43 Chalmers-Detroit, Read Holliday, New York City.
50 Franklin, George H. Storck, Jacksonville, Fla.

CLASS 5—CARS COSTING FROM $851 TO $1,250

18 Maxwell, Automobile and Commercial Ass'ns, Charlotte, N. C.
19 Studebaker, W. J. Stoddard, Atlanta, Ga.
31 Reo, R. M. Owen & Company, New York City.
42 Regal, E. D. Crane & Company, Atlanta, Ga.

CLASS 6—CARS COSTING $850 OR UNDER

28 Maxwell, Maxwell-Briscoe Motor Company, Tarrytown, N. Y.

OFFICIAL CARS (Non-Contesting)

Pacemaker Mitchell, Frank X. Zirbles, Racine, Wis.
Judges' Car, Chalmers-Detroit, A. L. Westgard, New York City.
Official Car, Alco, American Locomotive Company, New York City.
Official Car, Stearns, Wyckoff, Church & Partridge, New York City.
Checkers' Car, Chalmers-Detroit, T. R. Cobb, Detroit, Mich.
Press Car, Rainier, Mrs. Joan N. Cuneo, New York City.
Press Car, Locomobile, Miss Mildred Schwalbach, New York City.
Tire Car, Craig, Ajax-Grieb Rubber Company, New York City.

Although a number of the original entrants had been withdrawn, or failed to appear for various reasons, it was still an imposing procession.

Crossing New York Harbor to Staten Island—The police arrangements had been so admirably planned that the parade made its way downtown with scarcely a check, and drew up at the Battery at half-past ten. Two special ferryboats were in readiness, and on these the tourists were soon embarked. The trip across the harbor was quickly made on the speedy boats. At the St. George, S. I., slips the cars were met by the Richmond County Automobile Club, headed by President Charles A. Schultze, which formed an honorary escort during the brief run across Staten Island, and sped them with best wishes.

Several trips of the ferry at Perth Amboy were necessary to carry the tourists across from Tottenville. Mayor A. Bollschweiler, of Perth Amboy, met the procession at the ferry, and after the ranks had been formed a quick run was made to the Packer House for luncheon.

Through Jersey's Hills and Valleys—At half-past one the tourists were called from their tables, and E. L. Ferguson, of Buffalo, the starter, assisted by the checkers, Mortimer Reeves, of New York City, and Inman Gray, of Atlanta, began sending away the cars at intervals of one minute. New Jersey's hills were glowing in red and brown Autumn foliage, and the crisp air was neither too warm nor too cold for comfortable touring. The cars soon broke ranks, each proceeding at the pace most suitable to its driver, with regard only for the schedule that called for checking in at Philadelphia at a given time.

From Herald Square the Tourists Wended Their Way Southward

Of Course the Perth Amboy Ferry Had a More Than Busy Morning

Near New Brunswick a gang of workmen was found busied in repairing the highway, with a steam roller in full swing crushing down the broken rock. The tourists greeted the sight with cheers, taking it as a good omen that they should so soon meet with a substantial evidence of the progress of the good roads gospel.

Dayton, Cranbury, and Hightstown were traversed in turn, and then Windsor, which proved its loyalty to the cause by displaying a big steam roller busied in resurfacing the macadam. Near Trenton many of the signs which had been posted for the tour had been torn down, partly, it was said, by the town authorities. This unnecessary piece of vandalism caused some confusion among the branching roads just outside the city.

Philadelphia End of First Day's Run—Over the big steel bridge spanning the Delaware River the tourists sped into Pennsylvania, seeking new states to conquer. Active road building operations were in progress near the villages of Trevose and Bustleton. Beyond the latter village, and just on the outskirts of Philadelphia, Pacemaker Zirbies met the scout car of the Quaker City Motor Club. A little further on, near the Widener Memorial school, the police escort provided by the Philadelphia authorities, together with a number of cars of local automobile enthusiasts, awaited the tourists. It was a quarter past four when the vanguard rolled in, and all waited a time to allow the trailers to catch up. Contestants and official cars came dashing in at frequent intervals, and when the line was nearly complete another start was made and the procession swept into the Quaker City, down Broad street to the City Hall.

The checking officials unfurled their standards in front of the quarters of the Quaker City Motor Club, in the Hotel Walton, and were soon busy taking the time of the contestants as each in turn came up. Only two cars failed to appear on schedule, the Oldsmobile, driven by Henry J. Lamar, Jr., of Macon, Ga., and the Pope-Toledo, in charge of Powell Glass, of Lynchburg, Va.

The two delinquents appeared in short order, however. The Oldsmobile driver reported three tire blowouts, for which no time allowance is made under the rules, and in addition a twenty-minute hold-up by a leisurely freight train on a railroad crossing. He received a penalty of twenty-four points. The Virginian escaped with six points marked up against it.

Gettysburg, Pa., Oct. 26—The second day's run of 120 miles ended this evening when the tourists sped into the city that gave its name to the battlefield on which the tide of rebellion was finally turned. Thirty-seven of the thirty-eight contestants arrived on time and without penalty. The thirty-eighth, the Pope-Toledo entered by the Chamber of Commerce of Lynchburg, Va., and driven by Powell Glass, met with mechanical trouble, and was reported to have returned to Philadelphia, thus withdrawing from the tour.

To-day's trip gave additional proofs of the hold the good roads movement has taken on the country. In every city and village the tourists met with an enthusiastic greeting, and the inhabitants showed that they appreciated the purpose of the run, as well as enjoying the holiday for which it gave excuse.

If all the roads on the route to Atlanta were like those which gladdened the autoists for the first hour or two out of Philadelphia, the tour might have disbanded on the spot. Through Ardmore, Bryn Mawr, Villa Nova, Rosemont and other suburbs of the Quaker City, the highways were beautifully smooth, and the cars rolled along their oiled surfaces as if on rails. The Southerners were loud in their praise, one and all asserting that these were the sort of roads they wanted in their own states.

But after Exeter, Pa., had been passed, conditions changed. and the ubiquitous water-break held sway. Progress was by a continuous series of bumps, which would form an admirable subject for a Coney Island side-show. The official Knox car. driven by Joseph W. Jones, with Referee Scarritt as passenger. fell a victim to the extent of a broken spring. The referee was forced to take passage with R. M. Owen, who came by in his Reo most opportunely, and offered his servicees.

All contestants had been warned to look out for police traps


Major John S. Cohen, Managing Editor Atlanta "Journal"

Mitchell Pacemaker With a Notable Cargo

Miss Schwalbach Successfully Copies Late Paris Styles

at Lancaster, Pa., for it was said that the authorities of that town had failed to appreciate the purposes of the tour, and had threatened to have an extra force of constables on duty. No one had any trouble, however, and policemen did not seem unusually numerous.

York, Pa., was the noon stop, ninety miles from Philadelphia. For the rest of the day's trip the roads were of the worst. A heavy toll was called for at the mile-long bridge spanning the Susquehanna, between Columbia and Wrightsville; the fee was forty cents, plus twenty additional for each passenger in excess of four.

Gettysburg turned out en masse to receive the tourists. The town officials took the visitors in tow, and after the cars had been checked in, many made a trip to the battlefield. The contestants and their guests posed for a photograph on Little Round Top, which was one of the most desperately contested points in the historic three-day struggle.

To-morrow's run, from Gettysburg to Staunton, Va., will be the longest of the tour, the distance being 180 miles.

DETROIT MAY HAVE A SPEEDWAY

Detroit, Oct. 25—There is a strong likelihood of Detroit becoming the possessor of a motor speedway similar to that recently put in commission at Indianapolis. Such a project has been talked of for some time, but nothing definite was done. Now it is being revived, and the matter has progressed to a point where two sites are under consideration by those interested in the undertaking. One of these is on the east side and the other in the north end, both easily accessible from all the factories in the city. The plan as outlined is to not devote the speedway to racing events, but have it utilized by manufacturers for testing purposes, each concern participating to pay a proportionate part of the cost. With the rapid increase of the industry and the need of more adequate testing grounds than now exist it is argued that the enterprise could not fail.

"Ty" Cobb, Famous Ball Player, Is Touring Southward

VANDERBILT CUP RACE COMES NEXT

Saturday morning at 9 o'clock the Vanderbilt Cup race will be again contested over the revised and shortened Long Island course. Twenty-six cars will start in the three events: fifteen racing for the cup itself, over 22 laps of the course, four in the Wheatley Hills sweepstakes, over 15 laps, and seven in the Massapequa sweepstakes, going 10 laps. The three races, according to the fashion which is growing in popularity, will be run simultaneously. Preliminary practice, which has been constant for the past week, shows that the predictions made for the course were by no means unfounded. Tuesday morning Bert Dingley, driving his Chalmers-Detroit, set the record for the circuit at 11 minutes flat, a speed for the 12.64 miles of 68.9 miles an hour. The complete entry list follows:

VANDERBILT CUP RACE

Classes 1 and 2—Distance 22 Laps—278.08 Miles

Practice Number	Car	Driver
1	Simplex	L. A. Mitchell
2	Isotta-Fraschini	Joe Seymour
3	Chalmers-Detroit "40"	Bert Dingley
4	Chalmers-Detroit "40"	L. B. Lorimer
5	Fiat	Lewis Strang
6	Alco	Harry F. Grant
7	National	John D. Aitken
8	National	Charles C. Merz
9	Apperson "Jack Rabbit"	Hugh N. Harding
10	American Roadster	Willie Haupt
11	Buick	Louis Chevrolet
12	Fiat	E. A. Hearne
14	Fiat	E. H. Parker
15	Marmon	Harry Stillman
16	Mercedes	S. E. Wishard

WHEATLEY HILLS SWEEPSTAKES

Class 3—Distance 15 Laps—189.60 Miles

31	Moon	Philip Wells
32	Marion	George L. Reiss
33	Marmon	E. A. Harroun
34	Columbia	R. W. Wilcox

MASSAPEQUA SWEEPSTAKES

Class 4—Distance 10 Laps—126.40 Miles

41	Chalmers-Detroit "30"	William Knipper
42	Chalmers-Detroit "30"	Joe Matson
43	Maxwell	Martin Dooly
44	Maxwell	Arthur See
45	Maxwell	Thomas Costello
46	Hudson "Twenty"	George Ainslie
47	Atlas	Elmer Knox

AMERICAN ROAD MAKERS IN SESSION

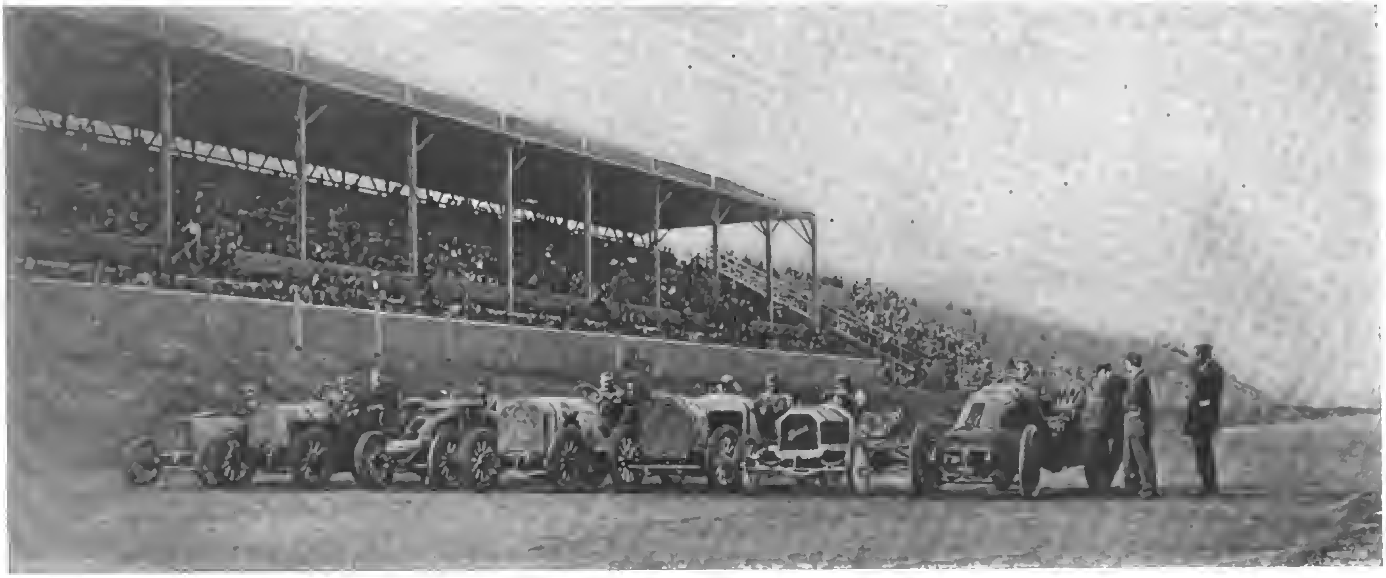
Columbus, O., Oct. 26—Delegates to the number of 900, representing 33 States and territories of the United States. attended the first day's session of the Good Roads Congress, which is a joint meeting of the American Road Makers' Association, the Ohio Good Roads Federation, and the County Commissioners' Association of Ohio. Automobile owners and auto clubs are in evidence in the meeting, but their efforts are only contributory.

Because of the death of a relative, Governor Judson Harmon, of Ohio, did not deliver the welcoming address. His secretary, George L. Long, substituted pleasingly, and was followed by Mayor C. A. Bond, and Secretary J. Y. Bassell of the Chamber of Commerce. The responses were made by James H. MacDonold, president American Road Makers' Association; William M. Hager, president Ohio Good Roads Federation, and O. J. Townsend, secretary of Ohio County Commissioners' Association.

One of the principal addresses of the day was that of Logan Waller Page, director of the office of public roads, U. S. Department of Agriculture, who talked on "The National Government as a Factor in Road Improvement."

Hon. Nahum J. Bachelder, of Concord, N. H., master of the National Grange, discussed the matter of co-operation in road building from the standpoint of the agriculturalist.

The sessions willl continue Wednesday, Thursday, and part of Friday. One of the features of the program for Friday is the opening of the question box in which many interesting matters will be brought up. Automobiles are to be used to transport the delegates to the fair grounds, to view the large exhibit of road building machinery.



First Line-Up of Notable Racing Craft on Atlanta Automobile Speedway, Robertson, Oldfield, and Basle Being Included

ON GEORGIA'S RECORD RACE TRACK

ATLANTA, GA., Oct. 23—The Atlanta automobile speedway has demonstrated that it is ready. At any rate, five miles in 3:52 3-5 looks very much like it. The demonstration was made this afternoon with a few of America's fastest cars and some of America's best drivers here to see that the thing was well done.

In order that the publicity end be properly taken care of, newspaper men were the invited guests of the day, and before the races they were served with a real old Georgia barbecue, with Brunswick stew and some exceedingly "near" beer as a side-line. More than a hundred Georgia newspaper men, along with some Associated Press and United Press notables, were on hand to lend an air of *eclat* to the occasion.

When the cars were put on the track there was no formal program for them to follow. They were merely sent against time, with Fred Wagner behind the stop watch, and no prizes up for broken records. But records were broken, all right. Oldfield, in his 120-horsepower Benz, was the star performer, for he made five miles from a flying start in 3:52 2-5. This is the time as taken: 2 miles, 1:31; 3 miles, 2:21 3-5; 4 miles, 3:03; 5 miles, 3:52 3-5.

The most brilliant performer was Robertson in his 90-horsepower Simplex. He did the five miles in 3:59 4-5. His fractional time was: 2 miles, 1:34 3-5; 5 miles, 3:59 4-5; 6 miles, 4:34 4-5.

Ben Kirschner, under orders not to smash up his Darracq machine, took things easy. His best time was a mile in 53 seconds, which shows the speed possibilities of the track.

A creditable showing was made by Florence Michael, a Georgia driver who goes by the racing name of "Cliquot." This youngster, who never drove a racer before in his life, hooked up wtih the ancient and terrible Pope-Toledo recently acquired by Asa G. Candler, Jr., and christened by him "The Merry Widow," and made good time. Here are the figures: 2 miles, 1:36; 3 miles, 2:45 2-5; 4 miles, 3:38 2-5; 5 miles, 4:34 3-5; 6 miles, 5:21 4-5; 10 miles, 8:42 3-5.

A remarkably good showing was made by Ed. Durant, one of the capitalists who built the track. He drove a stock Renault five miles in 5:08.

Charles Basle was not having much luck wtih either of his Renaults, but for all that managed to reel off two miles in 1:50.

The final event of the afternoon was a three-cornered friendly race, in which Robertson, Michael, and Basle took part. They finished in the order named. Michael, in the Pope-Toledo, led for two miles, but then Robertson made a runaway of it. Basle in his stock Renault was nearly lapped.

POPE-HARTFORD BEST IN PORTOLA RACES

OAKLAND, CAL., Oct. 23—Although somewhat marred by accidents, the races run here to-day were marked by the high average speed maintained and by the walkover in the longer contest, the winning car finishing with a lead of nearly forty miles. Three races were going on at once, all of the cars being started at approximately the same time. More than this the cars of the lowest class were eligible for the other two, and it was the rule rather than the exception that the cars were entered in all three of the races.

Thus the winning Pope-Hartford won the third race also, and only lost the second through the failure to enter in that. The Apperson, which came in second in the longer distance also won at the middle distance, so that each of these cars won two prizes.

The course consisted of a twenty-one mile circuit over dirt roads, but as subsequent events proved, it was very fast.

Cars of a piston displacement of from 231 to 450 cubic inches were elegible for the first race which consisted of seven laps, or approximately 150.5 miles. In the second race, all cars were eligible with piston displacements from 451 to 600 inches. In this class the competition extended over ten laps, making the distance 215 miles. In the big car class, the big race of the day, all competitors covered 12 trips around the circuit, making the total mileage approximately 258 miles. This class was open to cars having a displacement in excess of 600 inches, but smaller engines were not barred.

The times made were fast throughout, a Stearns car, driven by D. A. Bonney, making the fastest lap of the day, 18 minutes and one-fifth seconds, which is in excess of 71 miles per hour.

Of the fifteen starters, about half finished. The big race was won by Fleming in the Pope-Hartford number 4, time 3 hours 58 minutes and 15 seconds, an average of 64.51 miles per hour. Second place was taken by Apperson number 13, driven by Hanschue, two laps behind Fleming. Third place was won by Lozier number 12, with Harry Michener at the wheel, one lap behind the Apperson.

Fleming was also awarded the 7-lap race, the time not being given out. To the Apperson was awarded the 10 lap race, the time for that distance being 3 hours 12 minutes and 33 seconds. The Lozier was given second place in this race.

Several accidents to contestants served to mar the day's sport, thus, A. G. Linz, the machinist of the Maxwell, was painfully injured by the breaking of the flywheel of his motor. Early in the race the Chalmers-Detroit car sustained a broken wheel and Howard Warner, the driver, and his mechanic, James McCauley, were thrown from the machine and badly bruised.

Count De Lambert in His Wright Aeroplane Flying Over the River Orge During the Juvisy Meeting

TWO MEETS START AVIATION PROGRESS IN ENGLAND

LONDON, Oct. 23—Donchester and Blackpool have held rival aviation meets during the past week, each boasting a goodly roll of English and French aeroplanes and aviators. The two towns have been engaged in a rather undignified controversy, each accusing the other of underhand methods in securing contracts, and as a result several of the astute Frenchmen have reaped a golden harvest. The quality of the sport, although not, of course, equal to that at Rheims, has been on the whole very good, and it seems there was room for both.

Doncaster was first away, opening nominally on October 15, but a strong gale kept the aeroplanes in their sheds. The following day Col. S. F. Cody went up about noon in his biplane. After flying about 1,000 yards he miscalculated his distance from the ground on a turn; his front wheel struck, and the machine turned a somersault. Cody was not hurt, but the machine was badly smashed, and was withdrawn for repairs.

In the afternoon the competitions started with an event for five circuits of the course, the distance being five and a half miles. Delagrange, in a Blériot monoplane, was the first to complete the trip, his time being 11 minutues 20½ seconds. Sommer, in a Farman biplane, ascended while Delagrange was still in the air, and for the first time in England two aeroplanes were seen flying together. Sommer completed 9 miles and 1,350 yards in 21 minutes 45 seconds.

On the Field at Juvisy—Indicating that Autoists Are Interested in Aeronautics

The Blackpool meet opened October 18. On the first day Farman led in the speed contest, covering 17 1-2 miles in 23 minutes. Rougier made the longest flight, 22 1-2 miles in 32 minutes. The following Friday Hubert Latham, in his Antoinette monoplane, made one of the most daring flights on record. He went up in the teeth of a thirty-mile gale, twice circling the course. With the wind ahead the machine seemed at times to stand still; but when Latham came about he was driven at terrific speed at least 80 miles an hour. At one time he barely escaped being carried to sea.

A surprising feature of both meets has been the number of English-built machines which have appeared. Although these have not been able to compete successfully with the well-tried French craft and their experienced pilots, they have demonstrated that England is not so far behind in the progress of aviation as might have been supposed. Henry Farman carried off the $10,000 prize for the longest flight and $2,000 for the fastest three laps, and Latham took the prizes for general merit and for the slowest lap.

AMERICA VICTORIOUS IN BALLOON RACE

PARIS, Oct. 20—The Gordon-Bennett cup for spherical balloons was won by Edgar W. Mix, who sailed from Zurich, Switzerland, to a point north of Warsaw, in Russian Poland. His distance is estimated at 680 miles. Alfred Leblanc, the French pilot, was second, with a distance of 520 miles. Mix was arrested by the Russian police on his landing, but was soon released. Owing to a report that he made a landing near Dettva, Hungary, the award of the cup was suspended, but the commission finally decided in his favor. As a result, the race will be held in America next year.

BISHOP RETURNS WITH AERO TROPHIES

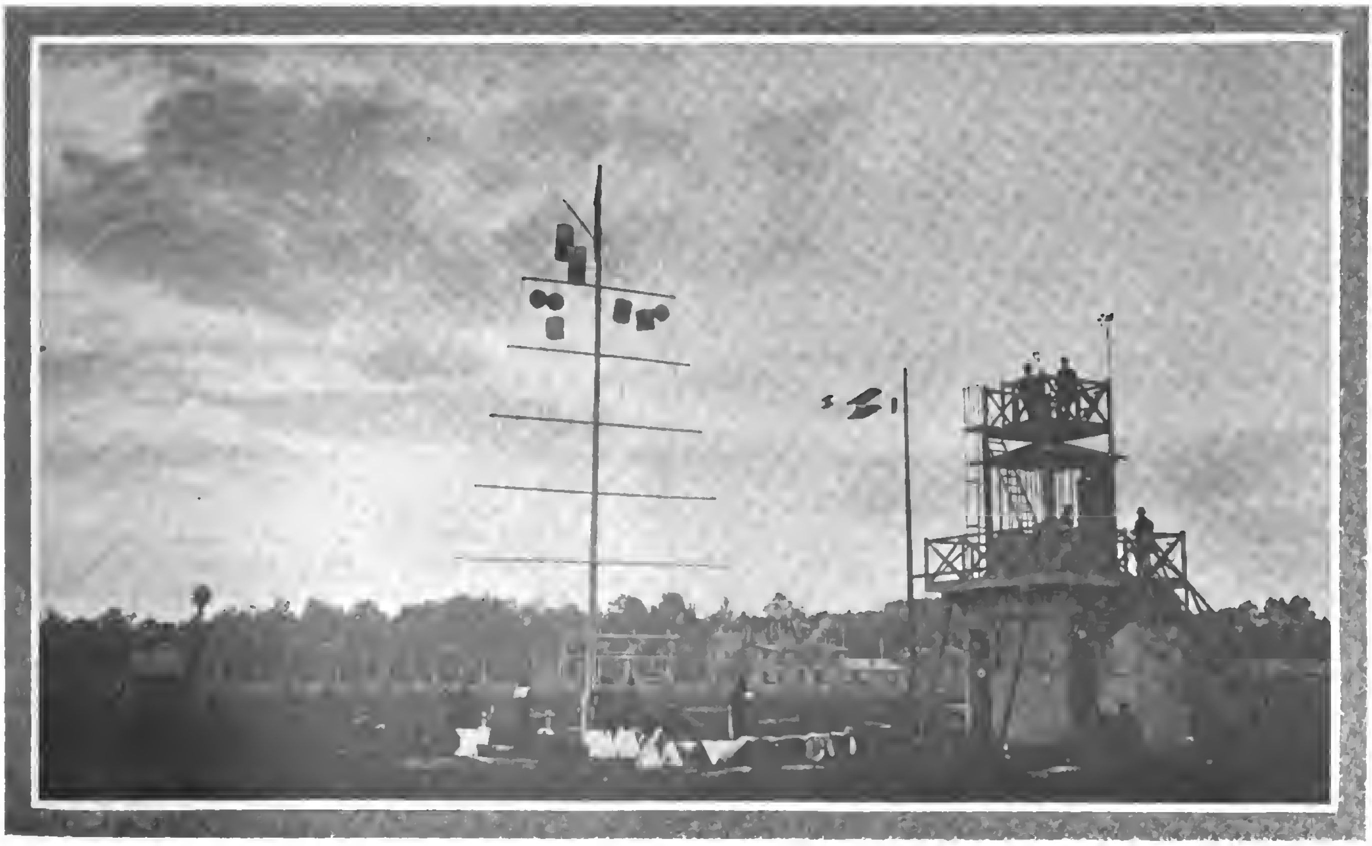
Cortlandt F. Bishop, president of the Aero Club of America, arrived in New York October 24, bringing with him the Gordon Bennett trophy for aeroplanes won by Glenn Curtiss. Mr. Bishop has been abroad for six months, during which he covered 20,000 miles in his automobile, and witnessed all the aviation meets. He was elected vice-president of the International Aero Federation. One of the reasons for his return is the approaching election in the Aero Club of America.

WRIGHT'S MILITARY PUPILS FLY ALONE

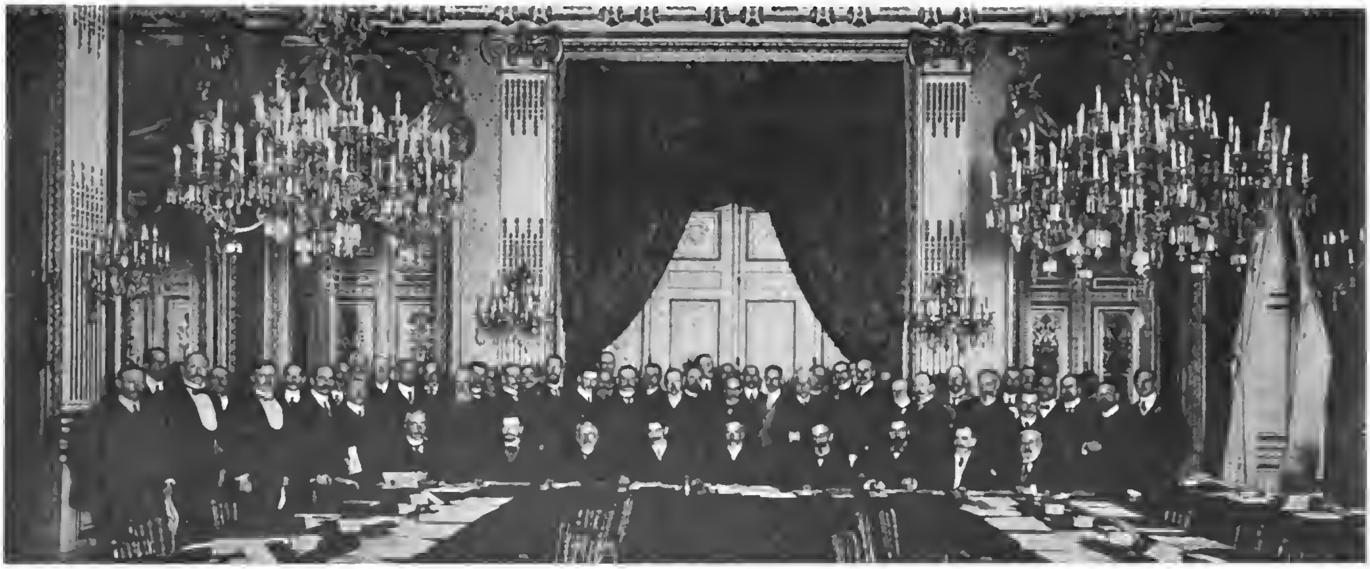
WASHINGTON, D. C., Oct. 26—Wilbur Wright this morning allowed his pupils, Lieuts. Lahm and Humphreys, to ascend alone in the army aeroplane, with which they have been making trial flights at College Park, Md. Lieut. Humphreys went up first, at 8:16. He rose easily and made two circles of the field, alighting easily. Lieut. Lahm, after a false start, got away at 8:41, and circled the field half a dozen times, turning several short circles. He stayed up thirteen minutees. Then Lieut. Humphreys tried again. He, too, made a false start, but ascended at 9:22 and remained in the air eight minutes, equaling his comrade's total time. Finally, Professor Wright took the levers and gave a short exhibition. He cut off the motor while at a considerable distance from the ground, and glided down gently.

President Bishop and Winner Mix at Aero Club de France

The training of the two officers, which has been in progress for nearly three weeks, is now practically completed. Hitherto Mr. Wright has always accompanied his pupils, although often allowing them to hold the levers. Five flights were made October 8. The following day Mr. Wright, alone, made a record of 58 3-5 seconds for a kilometer flight in a closed circuit. Most of his ascensions were made without the starting apparatus.



Fortnight of Aviation at Juvisy—How Aeronautical Contests Are Conducted—Timers' Box and Signal Poles



Delegates to the International Touring Parliament in Session at the Ministry of Foreign Affairs, Paris

NINE COUNTRIES AGREE TO UNIFORM TOURING REGULATIONS

PARIS, Oct. 20—The United States possessing varied automobile laws and regulations, was unable to take an active part in the international parliament held in Paris recently for the purpose of unifying regulations governing auto traffic throughout the world. This inability created considerable comment.

The net outcome of the meeting is that nine nations: France, Germany, Italy, Belgium, Bulgaria, Roumania, Montenegro, Servia, and the Principality of Monaco have signed an agreement which will materially simplify international automobile touring. In order that a car of any one of these nations may be allowed to enter free and without formality into any of the nine countries, all that is necessary is that it shall obtain an international road certificate from its home authorities.

What the Certificate Requires

The certificate, which is good for one year from date of issue, is issued for both car and driver on the fulfilment of certain requirements. The machine must be up to a certain standard, which is practically that of the Service des Mines in France, the points of which are safety from fire and explosion, effective steering, two independent sets of brakes, and simplicity of control. The driver must not be less than eighteen years of age, and must give proof of his ability to handle a car in a safe manner to the satisfaction of the examining authorities.

With driver and car up to standard, the automobilist may go forth into any or all of these nine countries without any other driving license or the necessity for any other registration number than that issued by his own country. The move is an important one, and will be specially appreciated by those visiting France, Germany, Belgium, and Italy, which are the most extensively toured countries in Europe.

England and America Not Included

It will be noted that England, in addition to America, has failed to join the international group. English regulations are very similar to those of America: any car can be put on the road providing taxation is paid, and any man can have a driving license on making application for it and paying the necessary fee. To come into line with the others it would have been necessary to institute an examination of cars, with a special registration other than that for taxation purposes, and further it would have been necessary to establish an examination for drivers with an accompanying registration, as is now done in France, Germany and other countries. The English delegates, evidently, could not guarantee that their government would do this, and were consequently unable to sign. There is a possibility of Great Britain coming into line at a later date. In fact, it approaches a certainty.

Pass to the Right and Keep to the Left

A proposal was brought before the congress that a universal rule of the road should be adopted, all vehicles keeping to the left and passing on the right, as is done in England and certain portions of Continental Europe. The disturbance that would be caused by such a change prevented it being adopted, but it was significant that the proposal gained much favor among delegates of countries where the American rule of the road is in vogue, and that M. Millerand, minister of public works in France, expressed the opinion that later the whole world would have to come to the English method.

Among the other matters agreed to by the international conference was that no automobile should be permitted to travel in foreign countries allowing the use of its national registration tag unless in addition the cars carried special plates with letters indicative of the country of their origin.

Signals That Find Most Favor

A loud sounding horn was agreed upon as the proper signal to be used by an automobile, with mechanical hooters allowed in the open country. At nightfall every automobile must carry two lights in front and one at the rear. Dazzling headlights must not be used in towns.

A few modifications were made for the benefit of motorcyclists, the rear light being considered unnecessary, the size of registration numbers could be reduced and a reverse gear was not required.

All the governments signing the agreement resolved that in their countries a uniform system of road signs would be employed. These will be the four signs recently adopted by the international road congress in Paris, and originated by the Automobile Club of France. The warning is given by means of a figure, without any wording whatever. In addition to these four it was allowed to add a fifth not included in this series, to indicate a customs office or frontier station.

It is certain that this first conference will not be the last. The high standing of the delegates sent by the respective govrnments is an indication of the importance attached to the proceedings. The desire not only among automobilists but in official circles is to make automobile laws and regulations uniform throughout Europe, so that international touring may be as free from formalities as travel in the native land.

Up-to-Date Features of Radiators and Pumps

Part 2

By Thos. J. Fay

GEAR pumps have other characteristics and fortunately a series of tests were made at the Thomas plant at the time of making tests of centrifugal types, and since this is an assurance of equality of conditions, the gear-pump tests will be of greater value than would be possible were there chances of changing conditions. Fig. 11 represents the performance of the type of gear pump used on one of the 1909 Thomas models and the water in gallons per minute was in direct proportion to speed, thus showing that the pump was well made and that leakage was not a factor within the limits. The horsepower exerted was found nearly parallel to increase in head beyond 600 revolutions per minute and to increase at a rate in excess of the increase in capacity of the pump with increasing speed; the pump performance in view of the results differs but little from that of the centrifugal-pump test, in that the amount of water moved at speeds below 600 revolutions per minute is below the desired point and the increase is in direct proportion to speed. In the centrifugal pump the increase is a little more than in direct proportion to speed, but is nothing like what is usually supposed.

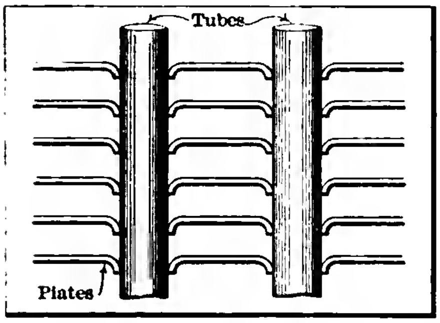


Fig. 7—Section showing how the gill-plates are flanged over tubes to increase surface of contact with tubes

As between the two types of pumps there is little or no choice; they both do the work under substantially the same conditions unless it is that the gear type of pump is more likely to make noise. When it comes to wear it is difficult to make any comparison at all for the reason that design features are likely to obscure the results so that a comparison will be futile. There is ample reason to believe that both types of pump last as long as the motor when they are properly designed and built. In conclusion of this phase of the subject it is just possible that Fig. 12 presents the efficiency of the gear type of pump and will add a desirable increment to the knowledge in store for future guidance of designers.

Pump and Radiator Must Be in Harmony—It is useless to employ a pump of large capacity unless the radiator is capable of abstracting all the heat that is taken from the motor. On the other hand, since the radiator should be large enough to do the required work, it is self-evident that the pump should move as much water as the radiator can handle and sponge all the heat units out of it that come from the motor. If the pump is sufficient in capacity the radiator will have to be larger for a given work assuming that steaming is to be avoided. It cannot be shown readily that there is much danger in adopting a pump that is too large, and in selecting a pump for this work, considering the small amount of power consumed in moving the water, it would seem to be the better choice to have the pump a little large for the work. The probabilities are that it is desirable to use a pump that will move 1.33 pounds of water per horsepower per minute when the motor is running at about 400 revolutions per minute. This is but approximation to be sure, but it is so near the requirement (on the safe side) that it is a better guess than to risk a restricted capacity of the pump and have to use a large radiator or put up with steaming.

Comparing the Thermo-Syphon System—The old idea of the thermo-syphon system of cooling was that it was the "system of natural circulation," which is true, perhaps, under certain well-defined conditions. In the radiator, as shown in Fig. 3, the circulation is far greater than that due to the natural difference in weight of heated and cooled water. In order to bring out the point to be made it will be necessary to present a sectional drawing of the radiator which was kindly furnished by the Regal Motor Car Company and is here given as Fig. 13. The water enters at a point near the top of the radiator from the motor (see section A) and is impelled by energy from steam which forms over the domes of the cylinders. When the water and entrained steam enter the pocket some of it passes up to the space b and the balance down to the lower chamber c. The water that passes up to the chamber b, together with the entrained steam, is reduced in temperature during its passage and it then passes down through the outside rows of tubes d. In its downward migration it is cooled more perfectly and is there mingled with the heated water which passes down directly from the pocket a to the chamber c. The cooled water passes along the pipe e back to the water jackets of the cylinders of the motor, thus completing the cycle.

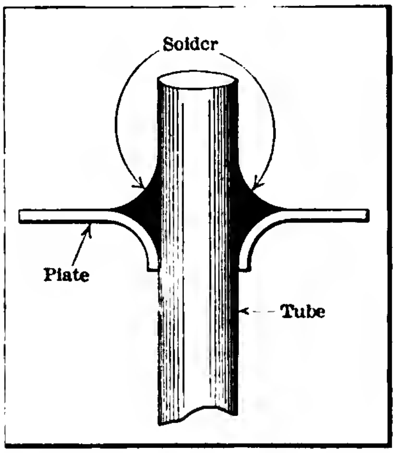


Fig. 8—Illustrating the way the solder runs down and forms a fillet at junction of tubes and plates, thus increasing conductivity

In this is evidence of the equivalent of a pump, it being the idea to utilize the energy in the steam. That steam does form over the surfaces of the water jacket is now a well-established fact and all that remained was to so contrive a radiator that advantage could be taken of this available energy. Of course, this system is thermo-syphon in name only, and while it matters very little as to the designation, even so, it more properly belongs to the "injector" family.

The true thermo-syphon radiator would be the same as shown in Fig. 2 were the pump omitted. In other

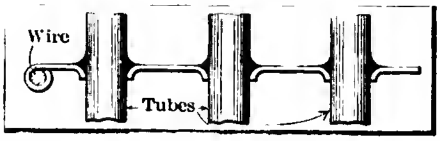


Fig. 9—Section depicting the wire binder in the plates to make them rigid and to enhance appearance

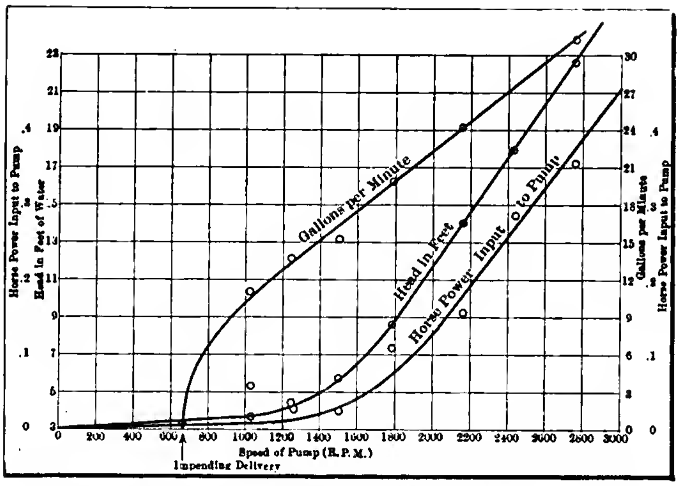


Fig. 10—Test of centrifugal pump used for water circulation by the Thomas Motor Company.

words, there is only two differences between radiators as used with a pump and when used without a pump—a, the radiator must be larger and advantageously placed if the pump is not used, and b, the piping system must be more commodious, so as to accomplish the desired results.

Determine the Ratio of Surfaces—After all the great question beyond an efficient radiator is to determine the ratio of flame-swept to radiating surface, and while this ratio will not be the same for thermo-syphon systems as it must be when an enforced circulation is taken advantage of, it should be ascertained with much certainty unless it is that the radiator can be fixed upon by trial of a number until the right size is found. By determining the exact flame-swept surface all the uncertainties are reduced to a minimum and dealing in horsepower rating becomes unnecessary. If account is taken of the wide disagreement between engineers when it comes to determining actual horsepower of the several makes of motors, it is easy enough to see that any such method of determining as to the required capacity of radiators is quite out of the question. Each case must be considered separately and the amount of power given full consideration.

In a general way it is possible to say that the limits of the ratio of radiating to flame-swept surface of cylinders will lie between one and two. In certain cases the situation was found to be as follows:

CASE "A"

Radiating surface (exterior of cylinder)......298 square inches
Flame-swept surface of cylinders.............168 square inches

$$\text{Ratio} = \frac{298}{168} = 1.78$$

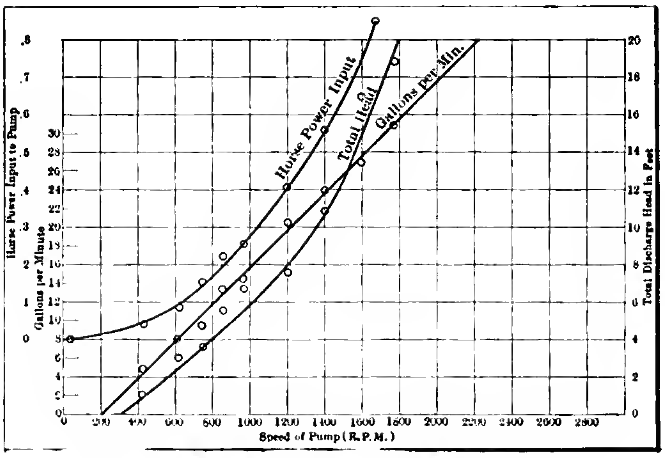


Fig. 11—Test of a gear pump used for water circulation; another Thomas undertaking

CASE "B"

Radiating surface (exterior of cylinder).......464 square inches
Flame-swept surface of cylinders...............273 square inches

$$\text{Ratio} = \frac{464}{273} = 1.70$$

In the above it is understood that the radiating surface of cylinders is that (covered with circulating water) outside and facing the flame-swept surface with the cylinder wall between.

The relation of radiating surface of radiators to radiating surface of cylinders will depend upon the effectiveness of the later and the efficiency of the former. If the radiator is efficient it is possible to realize good results with thirty-three times the cylinder radiating surface. If the radiator lacks in efficiency it may be necessary to increase to even 45 square inches of radiating surface per square inch of cylinder radiating surface.

What the Situation Portrays—The story, if it tells anything, rather goes to show that accessories (in the form of complete units) may be made by specialist quite as well, if not better, than in any other way. To bring about the best results, however, it is desirable to do the work in shops that are especially fitted out for the purpose and cost should be second to quality. This is not to infer that cost, if it is high, is a guarantee of quality;

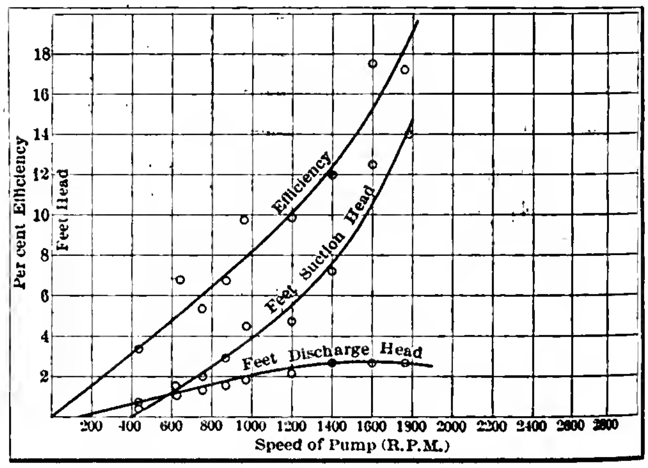


Fig. 12—Curve of efficiency of a gear pump used for water circulation as determined in the Thomas laboratory

on the contrary, the very increase in cost, if it is brought about by doing things in a bungling way, is a sign of absence of quality.

Referring to radiators in accessory shops, it is certain that a thorough investigation of the motor to be cooled is an absolute necessity and, as before stated, the flame-swept surface must be carefully determined. But this is not all; the compression must be taken into account on the ground that the temperature prevailing will not be the same for all compressions. Then, the timing is of importance, for, if the hot gases are retained for a lengthened period more heat will be absorbed by the jacket water, and as this heat is increased, so must the surface of the radiator be augmented, and this, too, in excess of the radiator surface which would be indicated by counting the area of flame-swept surface.

There is no reason why the timing question should complicate the situation very much, since it is possible to time all motors in such a way as to realize the best results, but there is but one way to prevent motorists from running on a retarded spark, and that is to so design the ignition system that the spark will be fixed. True, a fixed spark does not give the highest attainable results, but it does afford higher values than are usually attained by the average driver of a car. At all events, it is futile to charge the raditor with lack of ability if the motorist persists in running on a retarded spark, and this point should be explained to every motorist when he purchases a car.

EFFICIENCY TEST OF McCORD RADIATOR

HEIGHT, 28.5"; WIDTH, 25"; THICKNESS, 3.25"; WEIGHT, 60 POUNDS. MADE UP OF 144 VERTICAL WATER TUBES ¼" DIAMETER

Time in Mins.	R. P. M. of Motor	Pounds on Scale	Temperature F.				
			Water		Air		
			To Radiator	From Radiator	To Fan	From Fan	In Room
00	1000	20.00	160.00	152.00	90.25	95	86.0
05	1000	20.00	181.00	172.00	91.75	99	87.8
10	1000	19.75	189.00	180.00	91.75	100	88.5
15	1000	20.00	193.00	184.00	91.75	102	89.0
20	1000	19.75	195.00	185.00	91.75	109	89.6
25	1000	20.00	197.00	187.00	92.50	104	90.3
30	1000	20.00	198.00	188.00	92.50	104	90.3
35	1000	20.00	197.00	187.00	92.50	103	89.9
40	1000	20.00	197.00	187.00	95.50	103	90.1
45	1000	20.00	197.25	187.25	92.50	102	90.1
50	1000	20.00	197.00	187.25	92.50	102	89.6
55	1000	20.00	197.00	187.25	93.25	104	89.6
60	1000	20.00	197.00	187.00	91.75	102	90.5
65	1000	30.00	207.00	196.00	94.00	105	91.0
70	1000	30.00	211.00	201.50	96.25	107	92.5
71	1000	30.00	212.00	202.00	96.25	107	92.8

Note.—144 pounds of jacket water per minute.

The test as above given was made by one of the makers of cars to ascertain as to the ability of the radiators of this make, and the excellent results realized sufficiently voices the situation to render further discussion along this line wholly unnecessary. The table shows, among other points of interest, that it took 25 minutes before the water reached a constant temperature, after which the radiator abstracted 1,431.4 B. T. U. of heat from the jacket water, with a difference in the water between inlet and outlet of 9.94 degrees Fahrenheit, working between the limits of 197 and 187 degrees Fahrenheit. The amount of water circulated was (as given in the table) 144 pounds. Since the temperature did not reach the maximum allowable in practice (the boiling point of water) it is a fair inference that the capacity of this radiator can be taken as about equal to 1,500 B. T. U. (British thermal units of heat) under the conditions of this test, considering round numbers.

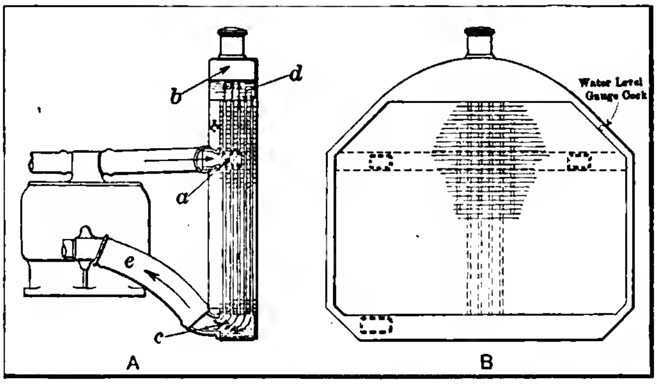


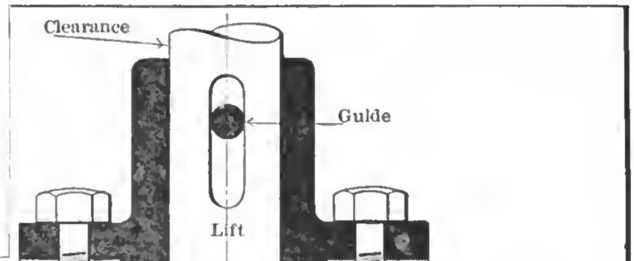
Fig. 13—Section of a Regal radiator offered to show how the water is directed under the force of steam

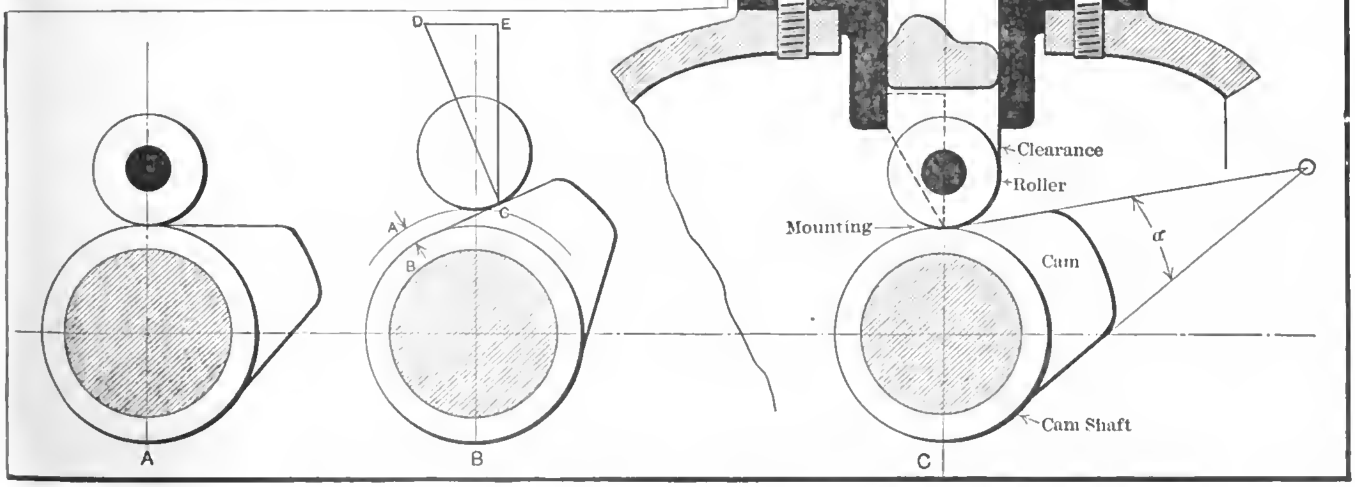
NOISE EMANATES FROM THE VALVE LIFTS

DIFFICULTY is frequently experienced in locating noises in and about the power plant, probably because there are so many of them that it is difficult in determining where to begin. The best way, perhaps, is to go about it in a systematic manner, starting with the most likely sources, as in the valve lifts, since in them the cause of the noise is of a mysterious nature. Referring to the accompanying figure. A depicts the lift-roller on the vertical center line just before the roller begins to mount the cam; and at B the roller has mounted the cam by an amount represented by the radial distance A B, thus bringing the roller where it contacts with the Cam at C and the line C D is at 90 degrees with the face of the cam, which brings the line C E out of the true plane of lifting by an amount equal to D E, but since C E is parallel to the lift, it follows that there will be a side pressure on the lift, the magnitude of which will be equal to D E if the vertical pressure is equal to C E, which pressure will be due to the gas pressure on the valve augmented by the pressure of the spring used to close the valve.

If the lift is not a snug fit in the guide it is a natural sequence that a noise will emanate from the lift every time the cam mounts the roller, and the manner in which this is brought about is best shown at C of the figure, where it will be seen that the lift in its bearing, having too much play, tilts diagonally and clearance is indicated at the two diagonal points effected. There is no take-up provided for valve-lift guides, and in order that they will not become noisy it is good practice to lubricate them, particularly in view of the manner in which the pressure comes on when the roller mounts the cam, for if play is engendered noise will follow and the only cure is to procure new parts.

The amount of noise which will follow if the lift becomes loose in the guide depends very largely upon the shape of the cam, diameter of the roller and length of the guide. If the motor has a plurality of cylinders the same trouble will be experienced with each cylinder and something of a clatter may be the due reward of allowing the guides to run without oil and with sand or other foreign substances present.





Showing How Lost Motion Creeps In if the Lifts Are Slack in the Guides

Solutions of the Private Garage Problem

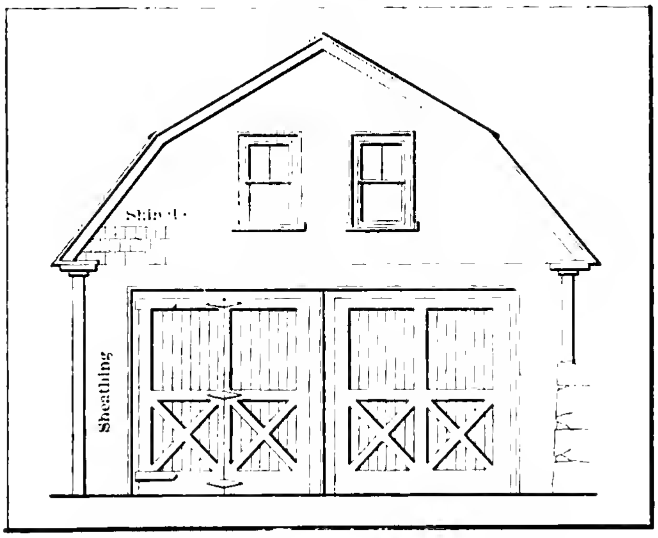
By Morris A. Hall

Part 2

Of All Materials, Concrete Meets with the Most Favor—Two Types of Concrete Garages, One Small, One Large

ONE of the most important reasons why the cost of garages may not be analyzed in detail is because costs are not available. In many cases the cost so overlaps the original estimate upon the basis of which the construction was started that the builder is ashamed to give out the figures. Another reason is that the man starts in to build a very modest structure, to cost very little. The addition of this feature and that feature so adds to the size or scope that extension is necessary, and again the cost is exceeded. In many cases the owner and amateur builder forgot some very important part in the original plans, necessitating redrawing the plans and altering the building. This, through shame or otherwise, causes the cost to be suppressed. Then others withhold figures on the assumption that it is no one's business but their own. This mistaken notion has done much to hold back the universal construction of the ever-necessary private motor house or garage.

Some few costs are available, and these will be given, preparatory to taking up the subject of the various forms of construction. Thus, the small frame garage shown elsewhere on this page was built from the design of a Massachusetts doctor, who also let the job out by the day and superintended the construction himself. This would require an amount of time which the ordinary man could not give to it, and in considering the figures this should be taken into account. The reason why this must be considered is that, with all due respect for the ordinary laborer and other workmen, more work is obtained in any given time through personal supervision than in any other way.



Front Elevation of Doctor's Garage Built for $500

Garage Large Enough for Two Cars—Less Than $500—So, in thinking over the figures and applying them to your own case, if you cannot oversee the job yourself, add something to the cost as given. This garage was intended for but one car, although it was made very large, 20 by 28, which again influences the cost through the amount of material needed. In addition to the large size of the house, a very large cement washing platform was built outside of the house, in front of it, in fact, and upon this all washing was done, in fair weather at least. This also added to the cost. The material and cost was as follows:

Material or Work	Cost
Lumber and Carpenter	$398.63
Foundation	12.00
Blinds	6.60
Drain Pipe and Hardware	8.90
Sink Piping and Work	14.87
Cement and Laying	16.50
Painting Foundation, etc.	7.50
Painting (Estimated)	25.00
Total Cost of Garage	$490.00

An inspection of these figures shows that the largest item of all is lumber and labor of erecting the same, this amounting to over 81 per cent. of the total. From this it is apparent that if the cost is to be reduced materially the size of the house must be cut down. The cement washing stand in front of the structure could not have influenced the cost to any great extent, as even considering it to have an area equal to that of the interior, so as to be equivalent to half of the whole cement work, eliminating the same would only halve the cost, or take away $8.25. It would appear, upon giving the matter a little thought, that the above assumptions could not hold true, so that the most that one might save in this direction would probably be $7. Again, one might say that blinds were unnecessary in a garage, but cutting them out reduces the cost by only $6.60, which, added to the other saving, totals but $13.60. As this is but 2.5 per cent. of the total, we are forced to repeat the first statement, that to reduce the cost of this garage it will be necessary to reduce its size, the saving as per blinds and cement platform being less, much less, than those two features are worth.

As was stated, this garage is plenty large enough for two cars, and a person liking the layout, but being economically inclined, either from preference or choice, might like to figure what one similar to this, but of a size to accommodate but one car, would cost on the basis of the above figures.

So, the cost above has been very carefully figured over on the assumption of cutting the size down to 14 by 20, that is, as wide as this one was, but having only half the length. Figured over on that basis, it would appear as if the maximum amount to be saved would be about $150, which would reduce the whole cost as above to $340.

This, then, forces one to the conclusion that a garage to be low in price must be very small, and as near to the size of the car as is possible. This is a conclusion which is not very pleasant, and so it is a source of gratification to be able to give some figures on another garage, in the construction of which space was used freely, resulting in a very large garage, even larger than the one just described. Despite this fact, the whole cost was less.

What One Doctor Accomplished—As shown on this page, it is rather spread out, but, as will be explained later on, this was due more to its method of construction than anything else. Like the first, it is located in Massachusetts, and, like the first, also, much of the work was done under the supervision of the owner. More than that, the rest of the work he did himself at odd times. In this way the construction was extended over a long period of time. To offset this, the money saved was very considerable, and the work itself was well worth while, as it provided both exercise and recreation. Moreover, as will be brought out later on, this method of construction allowed the addition of numerous little conveniences which cost but the price of a plank and a few nails, practically nothing. But with a carpenter doing the work, even these very small items assume a large proportion, and figure prominently in the final cost.

The resulting garage incorporates two old buildings, an old carriage house at the left (upon which are placed the reference letters A, T, J, J, S, K and G), as well as a hen house and hen yard (lettered M and L, respectively). To the right of the old barn was built a lean-to, which added 286 feet of floor space, being 26 feet long by 11 feet wide. The size of the original carriage shed was 15 feet wide by 26 feet long and 9 feet high. This gave a floor space of 390 square feet, the total being just under 680 square feet. Some of the costs are approximate, as they were made up afterwards from memory, but in the main the figures are reliable. The whole cost was divided as follows:

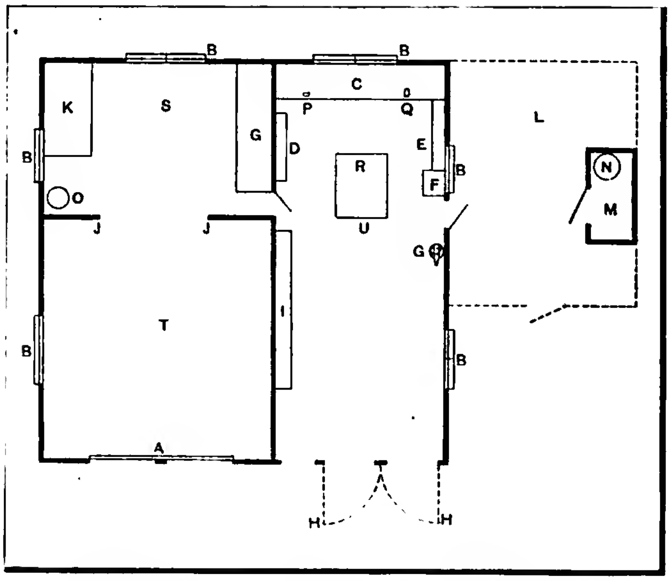
Material Only	Cost
Original Shed	$100.00
Cement Floor for same	30.00
Lean-to, including Cement Floor	110.00
Partitions, Benches, Lockers, Shelves, Pit, Etc.	25.00
Hot Water Heating, Incidentals	26.00
Total Cost	$290.00

Since the details are of more interest than the exterior features or the plain facts of cost, it will be well to describe the whole interior arrangement, referring to the letters on the floor plan. The letter A at the front represents a pair of rolling doors, one rolling past the other. This arrangement, coupled with the size of the doors themselves, gives easy access to the room, and plenty of light to work there once the car is inside. The interior lighting is much improved by the two large windows B, B, facing the south. One of the doors carries a large pane of glass (it could hardly be called a window), which adds to the interior light when it is necessary, owing to weather conditions, to keep the big doors closed. T is the space where the car stands normally, and this is separated from the space S back of it by means of the rolling doors J, J. These make the space S into another room and add to the convenience in many ways. This latter is a sort of living room, in that it has a bunk, K, in the corner, which is used by the chauffeur who may be kept waiting for a long time, or upon other occasions. This is not stationary in the ordinary sense of the word, but may be folded up against the wall and out of the way when not in use.

As located, it is close to the hot water heater, O, which furnishes the heat for the whole structure, pipes running through into the lean-to and heating that. The size of the heater was carefully selected so as to use the smallest one that would heat the two buildings comfortably. In this way the fuel consumption is kept low.

That this room is not a resting place pure and simple is shown by the presence of the anvil, G, in the opposite corner. This is very handy for straightening out bent parts, as well as doing small and simple forging jobs. In the latter case, the heater is used as a fire, so the usual smith's fire is not necessary.

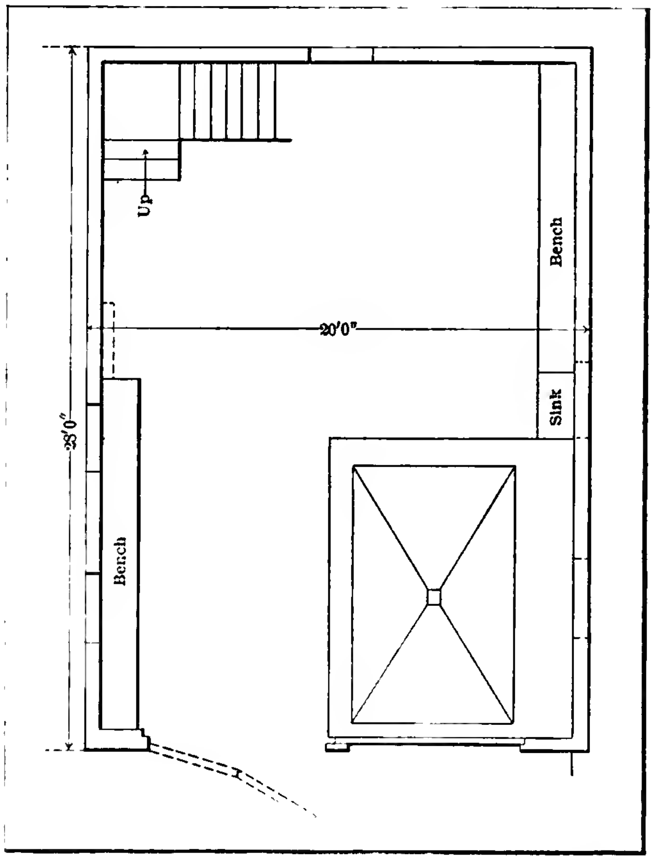
L represents the space formerly occupied by the hen yard, and M the hen house. The latter has been converted into a



Another Doctor Built This From an Old Barn for $300

gasoline storage shed by the simple process of cleaning it out, and installing a large tank. This has a capacity of 100 gallons, and by buying the fuel in such large quantities a rather noticeabl· saving is effected, so that the old hen house serves a double purpose. This tank has a faucet which can only be opened by means of a key, while the house itself is always kept locked. Beyond these two precautions the house is enclosed by a five-foot fence, so that to get into it and get gasoline would be quite a task, more so than the value of the fuel would warrant.

No Danger from Fuel Being Near Fire—To insure that the gasoline never approaches the fire very closely, the room in which the latter is located is so constructed as to be shut off from the other room, U, into which the fuel might be brought. R is a pit 3 feet wide, 4 feet long and 3 1-2 feet deep, with brick walls



Plan of Garage Shown on Page 720. Note Washing Platform

Concrete Garage Built in Connection with a Large Residence

and cement floors. In stocking the whole house the owner was not sure that he would be able to do much of any repair work himself, so did not get any tools, but as time progressed and he found time, inclination and ability to make his own repairs, he made a practice of noting down a particular tool which would be useful. Then, upon the next trip to town (some distance away), this tool was purchased. In that way a large stock of useful tools was accumulated without incurring any large immediate expense. Strictly aside from the expense, only the tools known to be of immediate use were purchased, and no money was wasted.

Carrying the greatest weight in the whole erection of the building, its outfitting and subsequent use was the idea of getting all that was possible out of every dollar expended. The owner's personal ideas relative to the private garage are best expressed in his own words. He says, in part:

"During the past five years my garage has more than paid for itself by saving me large sums in repair bills. You have a place to do the work, and the supplies are on hand, so that you attend to your repairs as soon as needed rather than wait until a larger expenditure is needed. You have no storage bills; you pay the repair man for actual time spent on your work, rather than paying for all the time the car is in the shop, whether they are working on it or not (this the writer had to do before he built his garage). Cars are handled much more carefully in a private garage than in a public one, and there is no chance of things being stolen. Tools can be bought as you find you need them, and in that way you will get just what you need, and buying them a few at a time will not feel the cost."

Very Marked Influence of Size of Car—It is immediately apparent from a consideration of the above figures of actual buildings that the size of the car exerts a large influence upon the cost of the garage. Since the wheelbase of the car determines the length of the whole car, it will be interesting to look into the matter of wheelbases and overall lengths.

Data on this subject is very scarce, as the extreme overall dimension is one that is seldom required except in shipping a car, so that this is not very often measured. One of the leading manufacturers compiled such a table several years ago. This only includes the cars built by this firm, but it must be taken as an average value. Moreover, in the scarcity of similar figures, even this has value, for the heights and lengths with top are given.

Table Showing Principal Dimensions of Typical Modern Cars

H.P.	Type Remarks	Wheelbase Ft.	Wheelbase In.	Length Ft.	Length In.	Width Ft.	Width In.	Height Ft.	Height In.
14-16	side entrance	8	4	12	6	5	2	5	3
14-16	side entrance (hood up)	8	4	12	6	5	2	7	5
14-16	side entrance (hood folded)	8	4	13	6	5	2	5	6
14-16	single landaulette	9	0	13	0	5	2	7	0
14-16	limousine	9	0	13	0	5	2	7	0
14-16	city carriage	6	10	10	8	5	5	7	4
16-20	side entrance	9	0	13	0	5	3	5	5
16-20	side entrance (hood up)	9	0	13	0	5	3	7	7
16-20	side entrance (hood folded)	9	0	14	0	5	3	5	8
16-20	seven-seater side entrance	9	9	13	10	5	3	5	5
16-20	three-quarter landaulette	9	9	13	10	5	3	7	7
16-20	limousine	9	9	13	10	5	3	7	7
26-30	side entrance	9	3	13	4	5	7	5	5
26-30	side entrance (hood up)	9	8	13	4	5	7	7	7
26-30	side entrance (hood folded)	9	8	14	4	5	7	5	8
26-30	three-quarter landaulette	10	0	14	1	5	5	7	8
26-30	limousine	10	0	14	1	5	7	7	8
40	side entrance	9	8	13	8	6	0	5	6
40	side entrance (hood up)	9	8	13	8	6	0	7	8
40	side entrance (hood folded)	9	8	14	8	6	0	5	9
40	seven-seater side entrance	10	4	14	4	6	0	5	6
40	three-quarter landaulette	10	4	14	4	6	0	7	8
40	limousine	10	4	14	4	6	0	7	8

N.B.—In some cases the lamps mean a further increase in length.

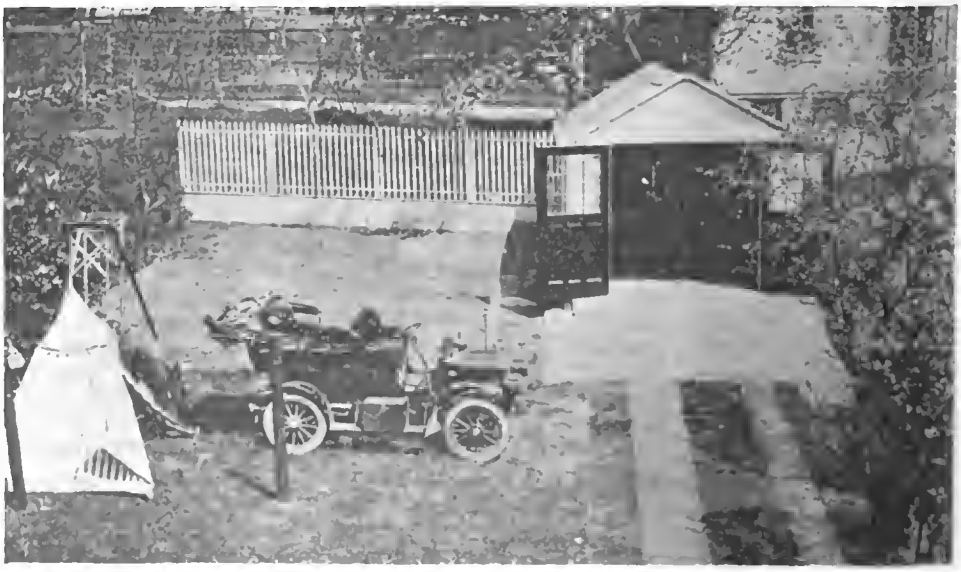
From these figures it is possible to deduce the fact that the average additive quantity which the car projects beyond the centers of the wheels is 4 feet 4 1-2 inches. Taking this at 4 feet 6 inches, it is possible to compute the overall length of any car.

As throwing some light upon the garage problem in an indirect way the table given in THE AUTOMOBILE last winter in connection with the New York show issue has been gone over. From this the average wheelbase in each class has been figured.

For the cars classified between $1,000 and less, 17 different ones average 91-inch, or 7-feet 7-inch wheelbase. In the next class, $1,000 to $1,500, the wheelbase averaged from 19 cars increases to 106 inch, or 8 feet 10 inches. In the $1,500 class, that is from that figure up to $2,000, the average of 24 cars yielded a result of 110 inches or 9 feet 2 inches. Continuing the steady increase, the class of cars selling at from $2,000 to $3,000 yields the figure 114 inches, or 9 feet 6 inches. In the next class, $3,000 up to $4,000, a total of 26 cars averaged 118 inches, or 9 feet 10 inches. The $4,000 to $5,000 class yields a length of 124 inches, or 10 feet 4 inches. In the $5,000 upward division, 128 inches, or 10 feet 8 inches, result. Applying to these the additive quantity, namely 4 feet 6 inches, the overall length for these averages becomes: $1,000 and less class, 12 feet 1 inch; $1,000 to $1,500, 13 feet 4 inches; $1,500 to $2,000, 13 feet 8 inches; $2,000 to $3,000, 14 feet; $3,000 to $4,000, 14 feet 4 inches; $4,000 to $5,000, 14 feet 10 inches; above $5,000 15 feet 2 inches.

In applying these figures to the design or construction of a motor house or private garage, the owner of the car should add to the overall car size such an amount as his personality and attitude toward the economy question would dictate.

(To be Continued.)



Suburban Lots Allow Floral Effects Which Enhance Appearance of Frame Garages

How The Power of an Old Engine was Increased

By Oliver Light

FROM the first crude internal combustion engine, developed by Gottlieb Daimler nearly a quarter of a century ago, to the present, efficient, and highly specialized form, has been a huge advance, marked by slow and very gradual steps.

The principles entering into the consideration of the design and construction of the efficient motor were not as well known to early engineers as they are at present, and, as a result, their productions, while practical and efficient for the time, make but a poor showing when compared to our modern forms. It was found by early designers that theory was one thing and its practical application another, and in many cases it was difficult to reconcile them in practice or to explain the results obtained. In contrast, at the present time, the general principles which govern design (thanks to the information presented in the trade papers and more experience) are well understood by engineers, and many laymen have more than a rudimentary knowledge of the gas engine.

As an example of what may be accomplished by an intelligent application of principles, the writer proposes to describe a change which was made on an engine designed nearly a decade ago which change increased the power produced by 50 per cent more than previously obtained, this without any change in piston displacement and in a simple and practical manner.

Minor Details Held Old Motors Back—Many of the earlier motors when contrasted to present forms have not proved satisfactory because of some minor detail or part which had not been properly considered by the designer, and the point on which they most often erred was undoubtedly in valve proportions and location. Modern engineers have learned that valve placing and size have a material bearing upan the efficiency of the internal combustion motor. The fundamental consideration often overlooked is that the gas be admitted to the cylinder as quickly as possible. Also, after it is burnt, the inert products of combustion which can serve no useful purpose after the first expansion during the power producing stroke should be expelled promptly, and with minimum back pressure.

Back pressure results in the retention of useless gas in the cylinder which means that the quantity of fresh gas taken in will be reduced and its quality impaired by dilution with the non-combustible residue. Reduction of back pressure is important in all kinds of expansion engines, and on some the efficiency will be seriously impaired if there is any resistance to the prompt expulsion of the inert products of combustion. It is not only important that the cylinder be cleared promptly, but the fresh gas must be given every opportunity to fill it to full capacity.

Valve sizes have a material bearing upon the rotative speed of the engine, and recent experiments and racing experience has shown that some methods of valve placing enable the designer to use larger valves and give higher efficiency than do some other positions. While speed of rotation is an important factor in determining the power output of an internal combustion motor, it is not the only consideration nor the only advantage which large valves have over smaller ones. Prompt charging of the cylinder and rapid expulsion of the gas, made possible by the use of large valves, also results in increased flexibility and improves the "pulling" qualities at low speeds.

The writer has from the first held rigidly to certain tenets, one of these being that valves should be located directly in the head so that the opening would lead to the combustion chamber without pockets to retain heat or prevent free gas flow, another being that the valve diameter should be as near half the cylinder bore as the design would permit.

Description of Car and Engine Experimented Upon—An associate of the writer owns a small runabout of well-known make and somewhat ancient pattern, of which many thousands have been sold in past years. The motor employed is of the single cylinder type, 4 1-2 inches bore and 6 inches stroke. The cylinder head is a separate casting, being attached to the cylinder by means of studs, a packed joint insuring both the retention of compression and cooling water. The appearance and details of construction are clearly shown at Figs. 1, 2 and 3, and the sectional line view presented herewith, and will be easily recognized by automobile mechanics the world over, who will undoubtedly have fond(?) recollections of the difficulties met with in making a packing hold which would be both water and gas tight.

In this head, the valves are vertically disposed and actuated by peculiarly shaped rocker arms which in turn were lifted or depressed by the action of a cam upon the rollers at their outer ends. The valves were but 1 1-8 inches in diameter with about 3-8 inch lift, and the speed of such engine was low, rarely exceeding 850 revolutions per minute, at which they were rated at 4 1-2 horsepower. As will be evident, while eminently satisfactory at the time of their general production and sale, after several years development of multi-cylinder forms which have greater speed and hill climbing ability, their somewhat limited power in proportion to weight took away much of the pleasure of driving them. The low speed was often needed, even on minor gradients of barely ten per cent which other cars surmounted with ease.

While they lacked power, they were well made and have proved more than ordinarily enduring and capable of withstanding abuse and wear and tear of constant operation. Economical maintenance, simplicity of mechanism, and method of operation combined to make them very popular, and thousands were manufactured and sold at a very reasonable price. My friend, who is a mechanical engineer with some experience on gas engine work, was in every way satisfied with his car which had been remodelled and brought up to date in looks, at least, except that it lacked power, and, as must be evident, the little that was originally obtained when the engine was new did not augment with age and wear of components.

Experiments were made with the valve timing and some improvement was noted when a new cam, keeping the valves full open for a longer time, was fitted. Later, an accident made the replacement of the head necessary, and then opportunity was obtained to try an experiment which was interesting, and which improved the capacity of the engine almost beyond belief. In order that the change made may be followed intelligently by those who have not had experience with this make of car, a brief description of the old head and method of valve operation is necessary.

What the Old Cylinder Head Was Like—Fig. 1 shows a three-quarter view of the cylinder head, showing the exhaust valve and port, as well as the operating levers. Figs. 2 shows the inside or front of the head, making clear the limited port area leading into the cylinder from the combustion or valve chamber, also the small space between the stud holes and the inside flange, as well as the small amount of metal outside of the water passages, making it almost impossible to make a packing which would be enduring and satisfactory. The head was partly water-cooled in that the valve chamber was surrounded by water spaces. Fig. 3 shows a direct back view, making clear the placing of the valves and operating levers. The hole immediately under the exhaust valve lift is the cam shaft bearing, this shaft running along the side of the engine and parallel with it,

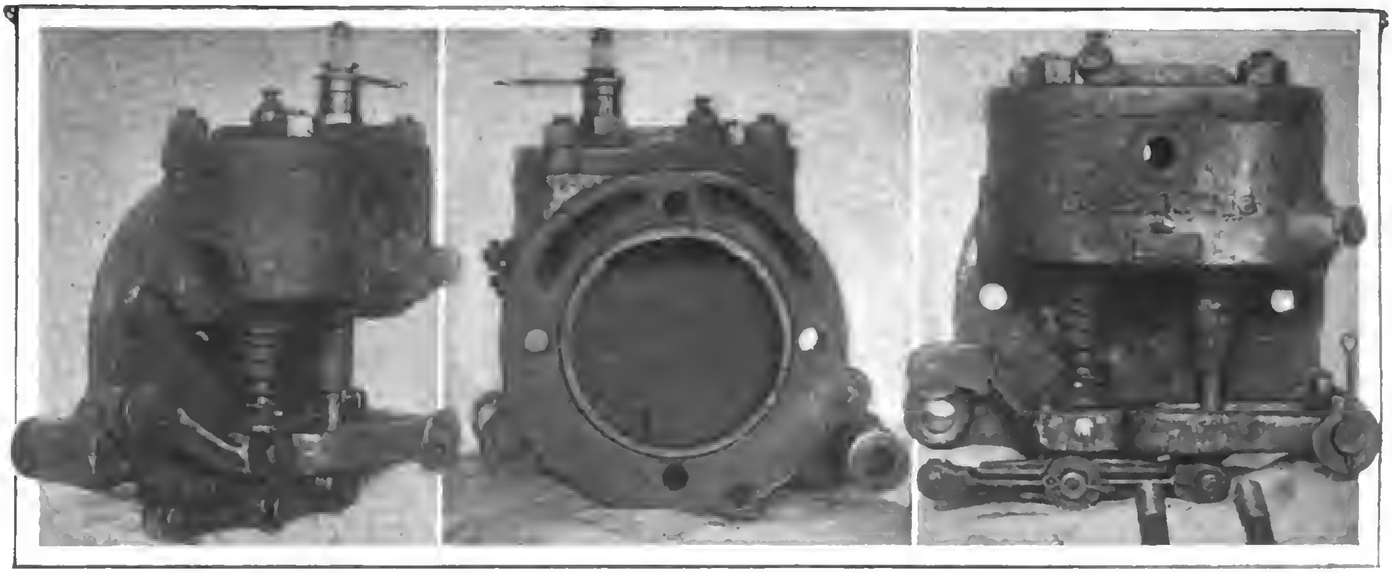


Fig. 1—Three-quarter view of old head Fig. 2—Front end, showing small passages Fig. 3—Another view of the old head

being driven from the crankshaft by a pair of exposed worm gears which gave the required reduction in speed.

In the exhaust valve seating a crack developed, a not uncommon occurrence with this form of engine design, in which part of the head was cooled by water, the remainder by air, probably owing to uneven cooling and poor distribution of metal. This opening penetrated the water space, and not only was the compression destroyed after the head had become slightly heated, but water was admitted to the cylinder as well. The effect of this upon engine efficiency can be imagined.

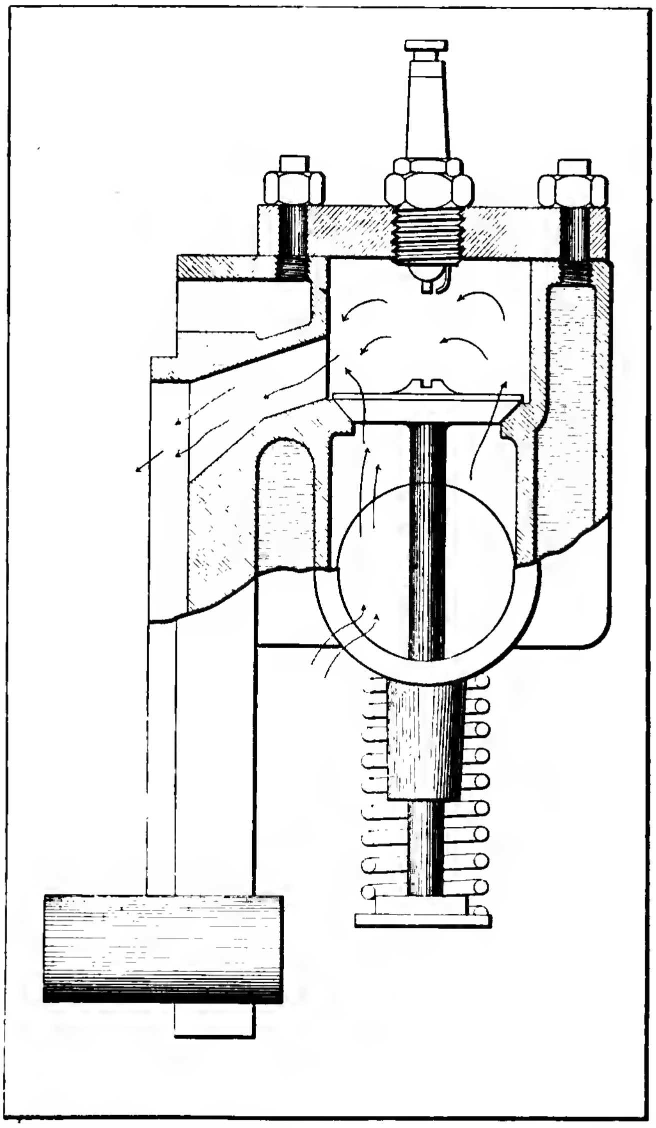


Fig. 4—Sectional arrangement of old cylinder head and passages

Upon investigation it was found that a new member would cost $25, and as restoration of the old head was not possible it was decided to scrap it, and instead of ordering a new component of similar design from a factory several thousand miles away, it was decided to try the effect of larger valves and more advantageous placing by designing a new head which would go in place of the old one without too much change. This was made possible by the detachable construction of the defective member.

Latent Possibilities of the Old Engine—As the writer had long been of the opinion that many of the old engines could be made more serviceable and efficient by refinement of detail or the incorporation of up-to-date features, and as this was shared by the owner of the car, a new type of head was evolved and applied to prove our pet theories. In designing this member. there were several considerations which made it necessary to proceed carefully. Among these low cost, simplicity and interchangeability with the old pattern were important considerations A more efficient and doubtless more satisfactory construction could have been designed than the form finally selected, but it is doubtful if this could have been done without expensive alterations. In the first place, it was found that the cost of a water jacketed head pattern was more than one would feel justified in expending when it was considered that but one casting was to be made. Detachable valve cages and large valves involved machine work and more costly patterns, as well as making it difficult to operate the valves from the old camshaft.

After a number of forms had been proposed the type shown at Figs. 5, 6 and 7 was selected. As so large a part of the old member was not cooled by water, without any overheating having been manifest, and because of the greater simplicity and lower cost of the pattern, an air-cooled head was made in which the valves seated directly, the detachable construction making it easy to remove same should the valves need grinding. It was found that if the valves were placed at the top of the head, as shown, that there would be no difficulty in operating them, and no changes in muffler or intake piping would be necessary.

As will be seen, fairly large valves were employed, directly actuated in a manner that was simple and mechanical. These members were made 1 1-2 inch clear opening, the valves themselves being about 1 3-4 inches in diameter, of the conventional bevel seat type. The lift was 3-8 inch, as in the old head. A comparison between Figs. 4 and 8 will serve to show the difference in size of valves, as well as the improved method of charging the cylinder or allowing the old gas to escape. In the old head not only were the valves of insufficient diameter, but the gas flow was retarded by the devious passages through which they gained access to the cylinder or to the muffler, as the case might be.

Sharp Bends Reduced Amount of Charge, and Consequently, Power—Several sharp bends prevented prompt charging or expulsion, and except at low speeds it was difficult to properly fill or clear the cylinder. For this reason the motor was slow running, and developed but little power when in the best of condition. It will be evident from an inspection of the sketch of the old head that there was a large portion that was not water-jacketed.

In making the new head, it was thought that the better clearing of the cylinder because of the valve placing would make the use of a water jacket at this point unnecessary, and this has been borne out by practical experience with the new construction. The gas entrance is direct into the cylinder, there being but one bend or corner for the gas to flow around, either in coming into or going out of the cylinder. The irregularly shaped combustion chamber has been dispensed with, the inside of the head being clean and smooth, there being no sharp corners to retain the heat or cause trouble otherwise.

While the compression has been raised to some extent by cutting out the pocket, because of the better opportunity offered by the larger valves for prompt cylinder clearing, absolutely no difficulty has been met with in cooling. Runs of fifty miles have failed to heat up the head sufficiently to cause premature ignition. The head gets hot, as is natural, but does not attain a high enough temperature to show the slightest color when examined after a hard run at night. The exhaust pipe is red hot, but the exhaust valve chamber does not show that it is unduly heated. The inlet side of the head has not even become discolored, the valve chamber, which is not provided with flanges, not having heated enough to burn off the graphite paint with which the head was daubed after machining, and this after over 500 miles of running. The new member went right into place without trouble, the only change that was necessary was the removal of two short studs and the substitution of longer ones, because they passed through the valve chamber, the old ones not being long enough.

Fig. 5 is a three-quarter view of the new member, showing the method of valve placing, the flanges on the exhaust valve chamber, the bevel gears used to drive the short auxiliary camshaft carried on the cylinder head, and the bronze tappet levers or walking beams which actuate the valves. As will be evident, a large roller is fitted at the lower end of each tappet, this bearing directly upon the cam, carried by the short shaft. Threaded plugs are used at the upper end as a means of adjustment of clearance between the valve spring retaining collar at the end of the valve stem and the tappet.

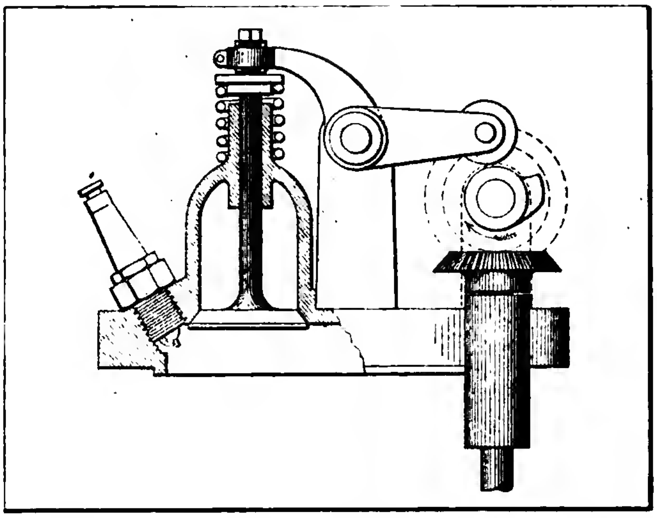


Fig. 8—Method of operation of new valves through rocker arms

The rocker arms are fulcrumed at the center, and operate upon a short stud supported by a suitable lug cast integral with the head. Fig. 6 shows the front or inside view of the new member, the valve to the left being the inlet, the other the exhaust, while the spark plug hole is shown directly above and between them. The spark plug placing is advantageous, as the spark takes place directly in the cylinder, which should be an improvement over the method employed in the old head, where the gas in the combustion chamber was first ignited, after which the charge in the cylinder was fired by the flame shooting through the port into the cylinder.

New Spark Plug Location Fires Charge Quicker—With the new method of placing, flame propogation is undoubtedly more rapid, and better results would be obtained at higher engine speeds than with the old method of igniting the charge. Objection may be made that the placing of the spark plug in an uncooled mass of metal would be extremely hard upon the insulation, but it should be remembered that even with the old head the spark plug was placed in an uncooled plate which served as a cover to the valve chamber, and but little trouble was experienced with it.

In the direct back view, Fig. 7, is shown clearly the design of the head. The auxiliary cam shaft is carried by a pair of lugs

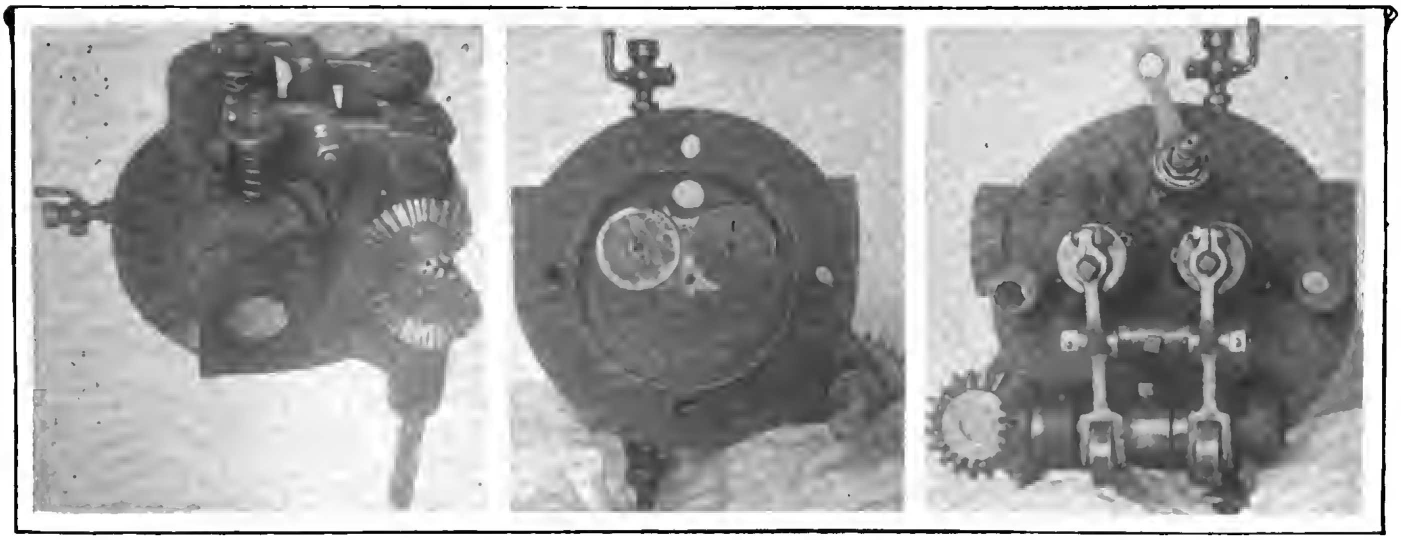


Fig. 5—Three-quarter view of new head Fig. 6—Inside showing size of valves Fig. 7—New head showing mechanism

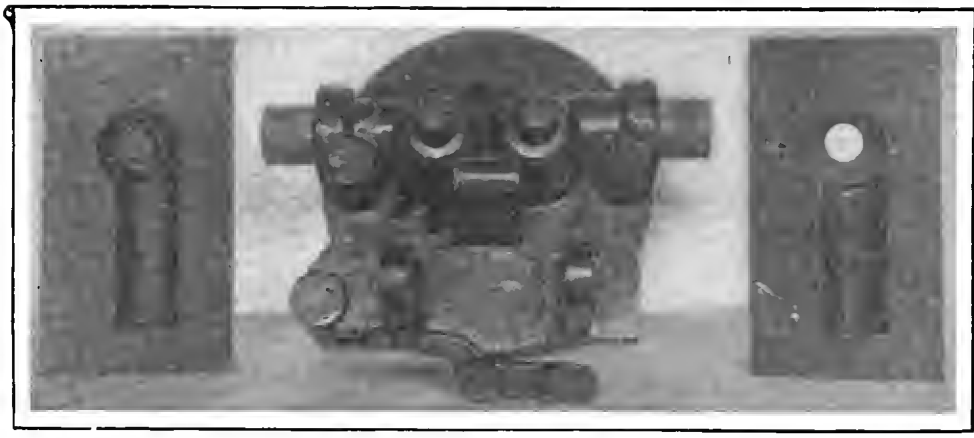


Fig. 9—Pattern of cylinder head and core boxes for valve cages used in making the change

which are bronze bushed and which are cast integral with the head, while the tappets or rocker arms are supported by a large bolt passing through a central lug. The spark plug placing and the valve chamber construction is clearly shown. At the top is placed a compression relief and priming cock, while at the bottom of the head a pet cock for draining out the accumulations of oil (which invariably collect in the bottom of the combustion chamber of a horizontal cylinder) is fitted. While in this view the cams are seen attached to the shaft by set screws, this was only temporary means of fastening during timing, they being permanently fastened by taper pins. In order to show the appearance of the head casting before machining, at Fig. 9 is shown the pattern from which the head was cast, as well as the halves of the core box for the valve chambers. The smaller pattern in the immediate foreground is that of the rocker arms, which for convenience were made bronze castings.

Through the use of the new head, the change in engine operation obtained is remarkable, and that power has been increased, admits of no controversy. The little car, which weighs over 1,100 pounds, and which is geared but a little over 3 to 1, will climb a 20 per cent grade on the high speed without a falter, pulling excellently at low speeds, and answering the throttle with a responsiveness usually associated only with multiple cylinder engines. The speed of the engine has been increased as well, and the car can speed well above the legal limit of 20 miles per hour.

Around the cylinder a water jacket is still used; and absolutely no trouble has resulted from overheating of the head. It was advanced by some before the change was made that the engine would never work satisfactorily under the conditions imposed by an air-cooled head because the valves would warp and fail to hold compression, and again, the head itself would become distorted by the high temperature to which it was subjected. While not as clean a piece of designing as the writer's associate is usually credited with, the distribution of metal was more uniform that the irregular outline of the head would indicate, and compression is as good after the engine has become heated as when first started, a little better if anything. The head answers the purpose and has served to make a very able car, which asks no odds of any other single cylinder, out of an old model which never had sufficient power even when new.

Amount of Power and Speed Increase—The larger valves and improved placing have made possible an increase of engine speed of 400 revolutions per minute. and the surmounting of a good 20 per cent grade on the high speed, which was not taken on the low any too easily with the old head, is evidence enough that the power has been increased by a substantial margin. This experiment has served to prove clearly that large valves, combined with a location directly over the piston will give one all the power that is possible to obtain by burning an amount of gas determined by the cubical contents of the cylinder.

The valve mechanism is not noisy, nor has any undue wear been noticed. The exhaust and inlet cams have been shaped so as to give a gradual opening, a long period of full opening and a rapid closing, and the original timing as determined by the flywheel marks has been adhered to. The exhaust valve opens about 40 degrees (crank travel) before the end of the expansion or power stroke and closes about 10 degrees past the top of the expulsion stroke. The inlet valve opens 20 degrees past the beginning of the suction stroke and closes about 15 degrees beyond the commencement of the compression stroke, or past dead center.

One trouble which the air-cooled head has entirely eliminated is the replacement of packings between the head and cylinder. As will be evident by referring to Fig. 6, a good bearing is obtained for a packing, there being plenty of metal between the edges of the stud holes and the head. The elimination of water passages has removed another weakness of the old design. In making a packing, a piece of well softened Mobiline was placed between two pieces of thin copper, about .005 thick, held together by turning in little lips which had been left on the inner and outer peripheries of one of the pieces when it was cut out of the sheet. This makes a packing which will hold compression with ease, and which serves to prevent water leaking from the cylinder jacket. The sheet packing is preserved because it is insulated from the direct heat and from the hot water flowing around the cylinder by the thin pieces of copper.

Various parts are easily reached, spark plug can be changed without trouble. The valve springs are out in the air and the temper of the springs is not lost as there is every opportunity for free air circulation around them. No change was made in piping, muffler or carbureter placing. The short auxiliary cam shaft and bevel driving gears are not liable to give trouble. Lubrication of components is not difficult, as a little graphite is mixed with the oil, which remains on the bearings after the head has become sufficiently hot to vaporize the fluid, and even the exhaust valve stem is coated with a thin film of graphite at all times. The valves have been made especially strong at the head, and no warping has been noticed or has grinding in the seatings been necessary, proving that there has been no distortion.

OPPORTUNE COLD WEATHER PRECAUTION

A large number of motorists who store their cars away for the winter do not take proper care of their tires. According to the Fisk Rubber Company, a good many tires are allowed to deteriorate in this way, and when the cars are put into commission again in the spring, the casings do not give the service that they should.

When a car is laid away for the cold months, the wheels should be jacked up and the tires deflated. It is essential that they should be kept in a place where no sunlight can penetrate; a cool dark place being preferable. The company advises owners of Fisk tires to examine their rims and cleanse them of any rust, which of course necessitates the removal of the tires, following which a little graphite should be applied to the rims before replacing the tires.

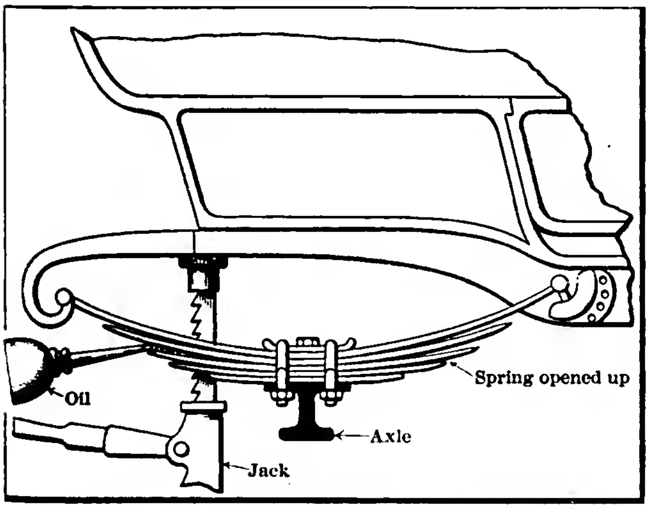
A little attention to spare casings and tubes before putting them away will mean added service in many cases. If there are any cuts in the shoes, they should be filled with a good cement and if there are any spots where the fabric is exposed, it should be seen to that these are perfectly dry.

By far the best plan, when the car is to be withdrawn completely from service, is to remove the tires and lay them away in a closet. They may to advantage be wrapped in burlaps. These precautions will insure their good condition in the spring.

GOOD SPRING ACTION DEPENDS UPON CARE

LIFE in springs will be prolonged if they are properly lubricated, since, *a*, rust will be aborted, and when springs are allowed to rust up the pitting which follows marks the point of failure, simply because the rust indentation has the same effect as a notch which is made in a test proof to make it fracture easier and to mark the point of rupture; *b*, real (desired) spring action will follow, and unequal strains will not take place. Take half-elliptic springs for illustration; they are made up of a plurality of flat leaves, each shorter than the other, all of the same width, and all given a bow so contrived that the extreme fiber strain will be the same in each plate when the spring is deformed under the load it is designed to carry.

The reasons for using several plates is to limit the extreme fiber strain, considering a given span of the plates, and a given action in the transverse plane, as well as to absorb energy and put a quietus on the motion of the body. It would be possible to use a spring made of one plate only were the same tapered from the center out in such a way as to afford such limber qualities as the word implies; the amount of energy the spring so made would absorb would depend upon the amount of molecular work engendered, and the spring would reach the end of its kinetic life the sooner simply because all the energy that could be absorbed would be in the form of molecular work.



Illustrating Method of Lubricating Plates of Spring

Spring makers understand the necessity of long life, knowing full well that molecular work, unaided, would not represent enough loss of power, as it were, and they hit upon the happy expedient which resulted in the use of a laminæ of flat plates, each one shorter than the other, and all of them so thin that the extreme fiber strain would be limited to a safe point, taking into account kinetic life rather than rupture under the incidental load of the moment. In this scheme, in order to increase the power absorption, the plates are made to press against each other with a considerable force, and since in action there is relative motion of the plates, friction is set up between them.

The amount of friction see up depends upon the pressure on each unit of surface of the respective leaves, and, as will be readily understood, the plates must lay against each other at all points to afford the maximum result. This condition will obtain if all the plates are bowed to the same radius, irrespective of lengths, and pressure will then be considerable, while the extreme fiber strain will be the same in each plate, irrespective of the length, so that the kinetic life of the respective plates will be the same.

The amount of energy which can be dissipated by friction alone, which is the property to take advantage of, will be in direct proportion to pressure and the surface offered between pressing plates, and it follows that the greater the number of plates, the greater will be the energy dissipated. If a large number of plates are used, each one of them may be relatively thin, and the extreme fiber strain will then be a minimum, which is a guarantee of kinetic life and another way for saying the springs will last for a long time.

Lubrication Is Necessary to Engender Easy Action—When springs are properly made, the plates press on each other with sufficient force to cause them to seize, and the action will then be "fierce." At the instant of seizing the local strains set up in the fiber of the plates is enough to cause rupture in many cases, and the only way to abort this very undesired performance is to lubricate the spring, which to do requires that it be relieved of its load, when it will return to its open position in the manner as shown in the figure. If all the plates are bowed to a common radius, since each one is different in length from the other, the ends will open up just as the figure shows, and an oilcan may then be used to squirt oil on the plates forming the laminæ.

Since spring-plates are rolled with a concave surface, so that there is room for the oil between them, and in conformity with the behavior of the lubricating oil, it will tend to stay on the plates, rather than to be squeezed out, since it will flow to the center, away from high levels, when it is heated or put under pressure. An acid-free mineral oil, such as is used in cylinders of motors, is suitable for the purpose for reasons as follows: (a) It will not gum or evaporate; (b) it will not etch the material; (c) it will afford the requisite lubricating properties.

Long life, when flat plate springs are considered, would seem to be due to the use of very wide, thin plates, rather than relatively narrow, thick plates. Makers of springs sell them on a pound basis, and the thicker the plates, the lower will be the price, simply because the number of plates which will have to be handled per hundred-weight will be lowered as the thickness is increased. Matters of this sort, while they involve the commercial side of the situation, have to be taken into account when users of cars are trying to get all they can out of the springs. Retainers, if they are properly placed, will help out marvelously, especially if the plates are thick and a limited number of them are used. It might look as if lubrication is not desirable under such conditions, but it is only necessary to remember how fiercely a clutch will behave if the lubrication is awry, and how well the same clutch will pick up and hold its load when attention is given to the lubrication. It is the same problem; the clutch refuses to work properly when the metal contacts and seizes, and the springs act in precisely the same way.

PISTON VELOCITY IS NOT CONSTANT

The ratio of connecting rod length to stroke influences the velocity of the piston, and the following will hold:

Let,

l = eccentricity of crank (half the stroke).
L = length of connecting rod.
v = linear velocity of crank-pin.
θ = crank angle.
S = piston velocity in feet per minute.
r = ratio

when,

$$r = \frac{l}{L}$$

and,

$$S = v\ (\sin \theta \times 1|2\ a \sin 2\ \theta).$$

In the above expression for the piston velocity, all terms higher than $2\ \theta$ are neglected because of their small value, which affects the result so little, and only makes the formula more and more cumbersome.

LETTERS INTERESTING

REPAIRING CYLINDERS

Editor THE AUTOMOBILE:

[2,065]—Is it possible to repair a small crack in the top of the water jacket of a horizontal cylinder (caused by freezing) by the use of some preparation made for that purpose? And if so, what is it, and where is it obtained?

Why are some cars made with only 55-inch tread? In such cases are not the tires chafed on the inside when driving over country roads?

Where is the Shawmut car, which participated in the New York to Paris race, made? W. N. HEDBACK.

Cumberland, Wis.

Cylinder cracks may be repaired by the use of several cast iron cements, these being applied in the form of a stiff paste. Without mentioning all of them, you probably will recall having seen one of them advertised, namely, Smooth-On. This material would not do for a crack of any size, say larger than 1-8 inch in width, if it could be applied with success for one as large even as that. Since this is in the nature of a temporary repair, it would be advisable to do a better job and have the cylinder brazed. The process of brazing, or at least, welding cast iron has been developed to a very great extent, and there are many places where work of this sort may be done. The expense of sending the casting, having a weld made, and return charges would be far below the cost of a new cylinder, the amount being, of course, dependent upon the size and character of the crack. The company making a cement and located nearest to you in the S. H. Brand Company, Chicago.

In the issue of Oct. 21 of THE AUTOMOBILE you will find something on the subject of various treads, the inquirer there asking why the different ones were used. As far as the chafing action on country roads is concerned, we presume that you have taken it for granted that all wagons have exactly 56 1-2 tread and that all of them run in exactly the same track on the road, so that two very narrow ruts are formed of just that distance apart. This assumption is, however, far from the case. Not all wagons have exactly standard tread, there being a slight difference among them, just as among automobile manufacturers. More than this, the wheels of a huggy or wagon get out of true easily and quicker than do those of an auto. Being out of true, the wheels do not make tracks exactly standard tread distance apart.

Taking a real bad case, let us assume that all buggies are of standard tread. Let us further assume that the tires are not over 1 inch wide, and never over 2 inches out of true. That is, one inch inside of standard and one inch outside. The tracks in the road will then measure 54 inches inside to inside and 58 inches outside to outside, and will be each 3 inches wide.

Now, let us assume the worst possible case for an automobile, namely, the narrowest tread and the smallest tires. Suppose we take 55 inch tread and 3 1-2 inch tires. The inside to inside measurements will be 51 1-2 inches and the outside, 58 1-2. The one wheel will then run in a rut, but the other will not, since the width will not allow it, rather it run on the high part of the road inside of the rut, but overhanging the latter somewhat. Due to the limited actual width of the tire in contact with the road, which in turn is due to the circular shape of the outer part of the tire, this overhang will suffer little if any injury from the road ruts. As we assumed the worst possible case, it seems only fair to conclude that there will be very little tire injury from this cause, the wheels varying more than we assumed on buggies, while the tires run wider than 1 inch. So, it will be the ordinary case that the ruts will be about 4 or more inches wide. Larger tires than 3 1-2 are now the case, and the higher tire-inflation pressures now common have both done much to render this form of tire depreciation very small.

More than this, the much larger tires now used would span the narrow ruts, and not drop into them as you have suggested.

The Shawmut car was built in Stoneham, Mass., but its manufacture has been discontinued for some time. There was talk of reorganizing the company at the time of the successful run across the country in the race you speak of, but to our knowledge, this has not yet been effected.

SMALL ELECTRIC HORN

Editor THE AUTOMOBILE:

[2,066]—Will you please advise me of the name and address of the maker of a small horn run by electricity and similar to the Klaxon, both in principle and sound, except that it sells for $10.00. It is a much smaller horn than the latter, and the sound is more subdued. It makes a very nice horn for city use. A party who toured here from St. Louis had one, and I understood him to say that it was a Klaxon. They deny making anything of the sort, however. The horn I have reference to has a short bell, which flares somewhat, and the working part of the horn is small. It also works with an electric button. As I wish to get one of them, I would appreciate it very much if you will help me. H. M. HALL.

Washington, D. C.

While we cannot help you out in so far as telling you the name of the horn in question, we can be of some assistance to you by giving a list of the makers of electric horns. Taking this list as a basis, you can readily find out which firm makes the horn you wish. The firms making electric horns, aside from the company you mentioned, are as follows:

Elkhart Dry Battery & Signal Co., Elkhart, Ind., Electro-Corno.
Theodore H. Gary Company, New York City, Grack-Unicum.
Holtzer-Cabot Electric Company, Brookline, Mass.
O'Brien Electrophone Company, Hallowell, Me.
Russell Electric Company, Danbury, Conn., Treco.
Sireno Company, New York City, Sireno.
S. Smith & Sons, New York City, Crack.

PHONE MAGNETO IGNITION

Editor THE AUTOMOBILE:

[2,067]—I am a constant reader of "The Automobile" and seem to remember, but can not find, an article on the subject of converting a telephone magneto into one for an automobile; that is, so that it can be used for ignition purposes. Will you please tell me in what issue or number that article can be found? E. B. GARRETT.

Knoxville, Tenn.

While not exactly as you describe it, the matter referred to will be found in the June 17 issue of THE AUTOMOBILE, at the head of the first page of letters, under the head of "Gas Engine Ignition." A man located out West asked about converting a small dynamo into a magneto for the purpose of igniting a gas engine, with which he has had some ignition trouble. Our advice to him in part was as follows: "The ordinary current generator gives too low a voltage and at too high an amperage. If your voltage and amperage were correct, the addition of a spark coil and a timing device would give a spark that would run the engine in a satisfactory manner. The ordinary magneto producing a true low tension current (which is intensified by means of a spark coil) gives about 35 volts at less than one ampere. If this be taken at exactly one to allow of some figures on the subject, the coil output will be, disregarding losses, say 20,000 volts at .15 ampere. This is upon two assumptions, namely, that the dynamo is a direct current machine, and that the field is separately excited, at least for starting. The latter statement is plain, if you consider that for starting purposes with a self-excited machine, a spark sufficient to ignite a charge is practically impossible, because of the very slow speed (comparatively) at which the operator can turn the engine over with the consequent slow speed at which the current would begin to build up. Next, as to the exact time of the spark produced by the outfit, if the engine does not already include such an apparatus, you will have to construct one yourself. To be exact, the current supply must be interrupted just before the point in the stroke at which the spark is desired in the cylinder. This might be done by purchasing an ordinary timer on the market and rigging it up on the machine so that the speed is correct for the engine in question." This might also have been arranged with a homemade timer, if you preferred.

If the above does not help you, or is not what you wanted, write again and let us know. We aim to be of as much assistance to our subscribers as is possible. Questions, in particular for the department of "Letters Interesting, Answered and Discussed," are always welcomed.

ANSWERED AND DISCUSSED

CHANGE IN POWER PLANTS

Editor THE AUTOMOBILE:

[2,068]—Will you please tell me why it is that you do not see many two-cycle engines in automobiles? I have a two-cylinder, four-cycle engine in my car and would like to make a change to a three-cylinder, two-cycle engine. Would you think this change a good one to make? Please answer in the next issue of "The Automobile."

EMIL JIRANEK.

Muskegon, Mich.

As to the relative merits of the two different cycles upon which automobile engines work and the reasons for the popularity or lack of popularity of either one, that has been discussed so many times in these columns, that we do not feel warranted in using the space for a repetition here.

If your idea is to secure better balance, the two-cycle two-cylinder would be superior to the present engine, but if you wish additional power with superior balance, the three-cylinder two-cycle would give it, providing you selected the dimensions of the engines in a proper manner. The balance of a three-cylinder two-cycle motor should be as near perfect as a six-cylinder four-cycle engine, which is universally considered to have the best balance of any engine now built or possible to build.

It has long been the idea among automobile builders that perfect balance or an approximate approach to it, was a necessity, but it would appear as if the success of aeronauts abroad with engines which were badly out of balance must lead to a revision of our ideas on the subject of balance. For an instance of this, the Anzani motor has three cylinders arranged radially from a central crankcase, the angle between any two of them being 60 degrees, so that the whole angle between the first cylinder and the last is 120 degrees. This engine is of very poor balance, the firing order being 1, 2 3, then a very long interval, then repeat.

WEIGHT OF AEROPLANES

Editor THE AUTOMOBILE:

[2,069]—Will you please inform me as to the average and maximum weight supported, per square foot of plane surface area, by the successful aeroplanes of to-day?

P. S. CROMER.

Bessemer, Ala.

The weight supported per square foot of surface varies widely in different machines. The Wright aeroplane is the lightset, carrying 1.7 pounds per square foot, and the R. E. P. monoplane, a French production which has actually flown, although never for any great distance, attains the maximum figure of 4.1 pounds per square foot. The heaviest machines which have ever had much success are the Blériot monoplanes. M. Blériot's XI, in which he crossed the English Channel, had a ratio between weight and surface of 3.0. His models XII and XIII, designed to carry two and three people respectively, are about the same. The Antoinette monoplane, familiarized by the exploits of Latham, has a ratio of 2.4, and the Voisin biplanes, piloted by Paulhan, Rougier and others, figures out at 2.6 pounds per square foot. The Curtiss biplane belongs in the light-weight class, its ratio being 2.2. It is impossible to make any average figure, as your letter suggests, because no two people could agree on which machines were of sufficient importance to be considered in the averaging process.

The power of the motor is very important in considering the unit weight. As a rule, the greater the weight per square foot, the greater will be the power required of the motor. The Wrights use a motor of but 25-horsepower in a machine weighing empty 880 pounds. Blériot uses the same power motor in a machine of half the weight, after cutting down his plane area.

The beginner who is making a machine should of course make it as light as is consistent with the necessary strength. That leaves a margin to counteract the effect of wrongly shaped planes or insufficient power. The art of properly curving and proportioning the planes is one of the most valuable assets of the old and experienced makers.

NO-FREEZE SOLUTIONS

Editor THE AUTOMOBILE:

[2,070]—What do you use in a radiator to keep the water from freezing in winter?

W. W. RISHELL.

Montgomery, Pa.

This subject has been pretty thoroughly covered in these columns, but as the subject is one of constant interest we will summarize again. The commonest materials in use are mixtures of alcohol (wood or denatured) or glycerine with water; solutions of calcium chloride in water, and light mineral oils. The proportions of the mixtures and the strength of the solutions vary according to the temperature which the cooling medium is desired to withstand without freezing. In the issue of September 30, in answer to letter 2,029, a diagram is given showing the freezing points of various mixtures of alcohol and water; and in the issue of October 7, letter 2,045, may be found a similar table for solutions of calcium chloride. Mixtures of alcohol and glycerine are discussed in answer to letter 2040, same issue. Of the two different alcohols, wood is by far the better to use, since it contains less water and impurities.

HIGH OR LOW, WHICH?

Editor THE AUTOMOBILE:

[2,071]—Will you please advise me through the columns of "The Automobile," which is the best, from an all around point of view, the high or low tension magneto? What are the disadvantages of the two?

JORDAN HARDWARE CO.

Gordon, Neb.

Your question is too broad to receive an exact answer. If we should ask you which was the better, ten-penny or thirty-penny nails, you would not be able to give a definite answer either.

Each type has its advantages and its faithful adherents, who swear by all the gods that it is the best and that the use of any other is arrant foolishness, etc. However, it would appear from the modern tendency, that is, the most modern, that each has its own field. In support of this, it may be stated without fear of contradiction, that the high tension type seems to be increasing in favor for high speed work. On the other hand, the majority of magneto-ignited gas engines, all of which are slow speed units, use the low tension, with make and break.

It is hard to decide just what you mean by "an all-around point of view." Certainly to throw at the dog, neither one would be more advantageous, since the weight and bulk are approximately equal. From the point of view of igniting the charge, it may not be said that either one has superiority.

Disadvantages of each system vary according to who tells about it. If one of the faithful adherents, it has none; if one of the opposition, it has nothing but disadvantages. This is no more than human nature, which is expressed in the same way with reference to another matter, in the familiar saying "What is one man's meat is another man's poison." So, too, with the ignition cranks, one man's make-and-break low tension system is meat to him, but poison to his neighbor, who has a decided preference for the supposedly simpler high tension system.

RUST IN WATER JACKETS

Editor THE AUTOMOBILE:

[2,072]—Kindly advise me how to prevent the water spaces around the cylinders from rusting when the water is drawn off during cold weather.

S. N. BERLIN.

Kewanee, Ill.

The insides of the water jackets of the cylinders are usually given a coat of some rust-proof paint by the maker of the car, before it is delivered, just for such contingencies as you mention. We do not understand from your letter whether you are merely raising a hypothetical question, or whether you have found that the cylinders of your car do actually rust. If the former, you are quite safe. Even if the maker of your car did neglect to coat the inside of the jackets, however, the small amount of rust that will form will not be enough to do any damage. Anything that you might put in the water to prevent rust would do more harm than good.

Studebaker Electrics on a Large Scale

Fig. 1—J. M. Studebaker, Sr., only survivor of the original five Studebaker Brothers, driving a Studebaker Victoria-Phaeton

SOUTH BEND, IND., Oct. 25—Before launching into a description of Studebaker electrics, it may not be out of place to cite history to show that carriage men are quite alive to the advances being made in transportation methods. The best evidence, perhaps, of Studebaker ability to keep in the lead of the times, lies in the very fact that the blacksmith shop started by the five Studebaker brothers, in 1852, was lost to significance when the founders built up a stupendous carriage business which has lasted from that day to this.

It was progress when the Studebakers embarked in the blacksmith effort, and it was progress when they went into the carriage business. This same progress has its monument in South Bend, Ind., taking on the shape of a plant which covers 101 acres of floor space, in which everything required in the line of horse-drawn vehicles may be had, and for whatever purpose is desired.

When the new transportation came into vogue, it found Studebaker Brothers alive to the possibilities, and President J. M. Studebaker, Sr., who is depicted in the title illustration, driving an electric Victoria-phaeton, of the Studebaker make, offers evidence of the convincing character of Studebaker alertness. Mr. Studebaker is the only survivor of the original five Studebaker brothers.

Some years ago, when it was apparent that electric vehicles would have a wide use, the Studebaker company engaged Hayden Eames, then chief engineer of the Electric Vehicle Company, to undertake the task of designing and marketing a class of electric vehicles such as would add to Studebaker prestige. Mr. Eames, following out his invariable plan, undertook the large task in a quiet way, preferring to do the work and let others do the talking.

By a systematic process, and a proper display of skill, the plan has prospered, and it will come as a news item of more than a little purport to most people, that the Studebaker Automobile Company will now go into the building of electric vehicles on a large scale, and in view of the other efforts, in the shape of gasoline automobiles, now well under way, it has been decided to make a separate department of the electric vehicle work. C. H. Tyler, one of the able men of the Studebaker staff, will hold sway over the destiny of this separated project.

Expansion After Several Years of Exacting Work—Let it not be supposed that the present move is as a bolt from a clear sky; on the contrary, the amount of electric vehicle work already done by the Studebakers might be classed as large. The car, as offered in the title illustration, is really a last year's model, but it will be continued in response to a brisk demand, for the company has to its credit a vast output of electrics, spreading over several years of consistent endeavor.

The new idea is to take advantage of experience gained, build cars in accordance with the dictates of this same experience, and place the whole matter on an independent footing, holding a department head of wide experience responsible for the result. Mr. Tyler is in the saddle, the work is being pressed in all directions, and Studebaker electrics are being turned out at a rapid rate.

Fig. 2. is of one of the new models, representing a Victoria-phaeton, and is technically designated as Model 17-D. The illustration depicts the lines and work of the designer sufficiently to demand no further word picturing, excepting that it can not be made to show how carefully the work is done at the plant for making bodies, at South Bend, and a word in this direction may not be too much.

Those who may have had experience with electric vehicles are aware of the differences that must be coped with when bodies are for this class of work rather than for use on gasoline automobiles. No matter how well the battery is constructed, it is prone to spread vapor over the surfaces of the body, and many are the failures which may be directly traced to lack of the necessary precaution in this direction. Knowledge of the corroding influence of gases that may be emitted when batteries are undergoing charge stands in good stead when bodies are being made, and this is a strong point in Studebaker practice. Every particle of material used in the body work is absolutely selected with a view to long life, even though, with proper care, batteries may be so charged as to eliminate substantially all this class of trouble. The idea is not to rely upon the men who charge the batteries, and it is better to assume that the work may not be well executed; in this way chance, and its near residence to failure, is done away with.

Chassis Shows Progress in All Directions—Referring to Fig. 3 of the Model 17 chassis it will be observed that the battery is divided into four sections, and two of these sections are placed forward and back, respectively, on the chassis. In this way the sections are so reduced in weight that they are not difficult for the workmen to handle when they have to be removed from the chassis; and it is equally true that the weight is properly distributed over the chassis, and the riding qualities of the car are therefore superior. This weight distribution has other advantages, as, for illustration, the chassis frame does not have to be heavy, and the spring suspension is relieved of weight.

The sections of the battery are nested in trays made of seasoned oak, which has the property of resisting the action of electrolyte, and the trays are so securely bound, by means of iron bands, that there is an entire absence of cell breakage, while, to protect the iron bands, they are given a substantial coating of an acid-proof compound. The wiring system, connecting the battery with the controller and the motor, is well installed, using a superior grade of especially insulated copper wire for the purpose, taking care to select such sizes of wire as will reduce losses to a minimum, even when the current flowing is that due to very slow speed work with soft going, on a grade, and, of necessity, very high indeed.

Exide Battery Augurs for Mileage and Life—It is true that the size of the battery must be selected in view of the work to be done, but it is a matter of more than a little experience that dictates the right selection. If the battery is intended to give an unusual radius of travel, it must be at the expense of its life, and it is the Studebaker policy to make a happy selection, rather with the expectation of affording an adequate radius of travel of the car, and to trade in favor of every possible increment of life of the battery.

Fig. 2—Model 17-D Victoria-Phaeton with extra seat, divided battery of the Exide type, interlocking control and standard finish

To conserve the battery, ball bearings are used at every point in the transmission system and in the road wheels; but this in itself is not enough. Every car is machined in all its parts with the greatest care, and in the assembling men of skill and a fine sense of discrimination are set to inspect every part. If there is a noticeable addition of friction at any point, the whole undertaking is gone over, and the cause of the friction is eliminated or the parts are cast out.

The motor is so designed that it affords the maximum twisting moment per watt of energy, and, besides reducing the "fixed" losses to the minimum possible, the I^2R losses, so called, are kept within bounds by the judicious use of the right amount of copper wire on the armature and field. The armature is properly laminated, using discs of soft Norway iron, of a special mixture. These, as well as being annealed, are subjected to an aging process, so that the "hysteresis" losses are not only low at the start, but they hold low for the life of the motor. Each disc of iron in the core of the armature is insulated from the other to eliminate "eddy" currents, and, what is more to the point, the insulation is of a permanent character, capable of sustaining all the heat and work to which it may be subjected while under the strain of a load.

The insulation on the wire of the armature is of the finest sea island cotton, wrapped with protecting braid at all necessary points, and each layer is separated from the other by means of insulation of a permanent character. In the same way, the field windings are so protected that they are proof against heat, dampness, and vibration, and retain the high insulation which is necessary if efficiency and long life are to be partners in the enterprise.

The commutator is built up of specially processed segments of copper, so that a uniform hardness is assured for all. The mica used to insulate the segments from each other is of the finest selections from India, of a micrometered thickness, and the whole structure is assembled under great pressure, after which it is chucked and turned to a true diameter. All connections are soldered with a special hard solder, and in the process the joints are scraped to brightness to assure perfect metal-to-metal contact in an electric sense. It is the aim, wherever a joint is made, to have the resistance far less than the normal section of the metal.

Motor Suspension Holds Certain Advantages—The location of the motor is at a point on the chassis just under the seat, and a pair of yoke-like suspenders pass over and around the motor, fastening to a pair of cross members, which in turn fasten to the chassis frame. Shackles, which pass up from the motor frame, on the center line, engage with members which pass down from the pair of yokes, and the motor so suspended is free to respond to adjustment, as the occasion requires, it being the case that the transmission is made, primarily, by means of a Morse "rocker" chain, and finally through a regular sprocket chain.

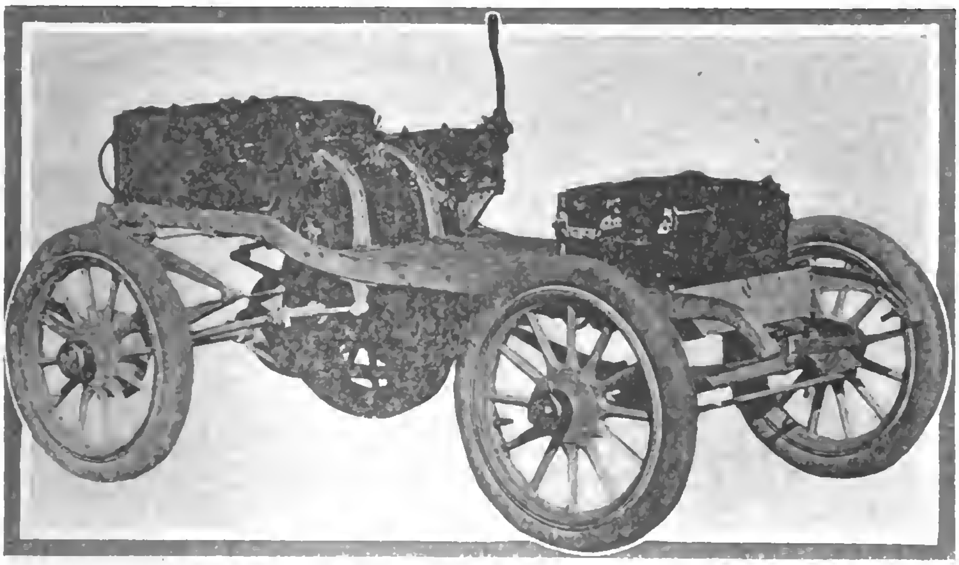


Fig. 3—Model 17 chassis, showing battery in front and rear, motor suspended from yokes, means of adjusting chains, and shaft drive

Fig. 4 shows the chassis from the rear, and the sprocket chain will be seen passing into the housing of the live rear axle, while the Morse chain is enclosed in the "boot" in front of the axle, passing up to the motor. Noise is eliminated, by good mechanical work, but it is insured against by placing oiling devices at every point of vantage, and by the use of suitably contrived chain "boots."

The rear axle is of the floating type, and the driving jaws are of large diameter, with liberal faces and enough of them to assure long life. The material used in the gears, shafts, and other parts of great responsibility, are selected with a view to kinetic work, and by suitable heat-treating, all parts rendered fit.

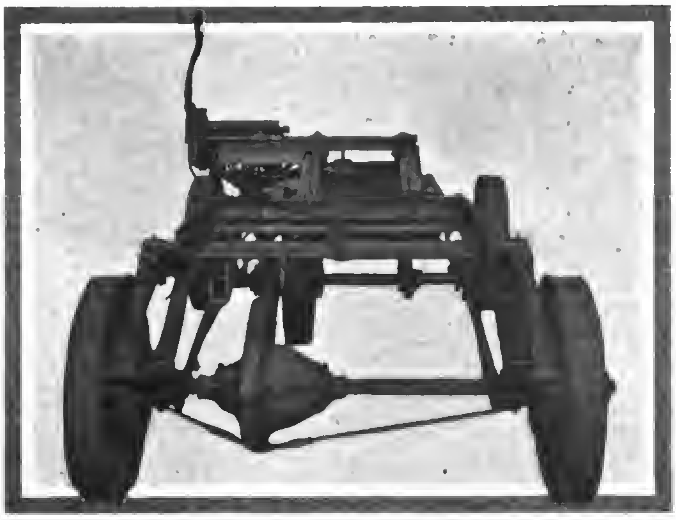


Fig. 4—Rear view of Model 17, showing sprocket chain to live rear axle, boot enclosing Morse "rocker" chain, and full elliptic rear springs

The control system, including its links and levers, is of the straight line design, which is free from "diagonal strains." Considering the use of selected grades of material, ease of manufacture, and ability to determine as to the magnitude of the factor of safety, it conforms to its promise, and the measure of satisfaction is up to the most exacting requirement.

Safeguards for Absent-Minded Users—There are two classes of users who have to be protected against themselves, i.e., the beginner and the operator of much experience who becomes absent-minded. In any event, the design of Studebaker electric vehicles is such that either of these operators will find it impossible to do damage to the cars or hurt themselves. There is only one way that the cars can be started, and that is the right way. By an inter-locking system the five speeds ahead are available progressively, and even if the driver does throw the electrical switch to close the circuit, when the speed lever is out of neutral, nothing will happen. Before the speed lever becomes operative it is necessary to throw it into neutral, release the locking device and close the switch, unless it has been closed at the wrong time.

In starting, suitable resistances are interposed, the idea being to gradually accelerate the car. Watching the ampere meter, which, together with the voltmeter, occupies a place in easy range of vision, discloses how well the control is worked out. There are no sudden and violent fluctuations of current, and the voltage remains practically constant at all times, a feature that will be appreciated by the novice driver as well as by the experienced automobilist.

A dual set of brakes assures ability to stop the car within a short distance, at will, and one of the brakes works by throwing the speed lever back, which is very convenient. The remaining system of brakes works from a foot pedal, which actuates the brake bands in the hubs of the rear wheels within enclosed drums. There are many other nice features of Studebaker cars, the discussion of which will have to be reserved for another time.

SUCCESS FOLLOWS CLOSE ATTENTION TO DETAIL

By C. H. Tyler, Manager Electric Pleasure Vehicle Department Studebaker Automobile Company

IT has long been well appreciated that electrics, as a class, are reliable, primarily due to the continuous twisting moments of the motor (usually designated as "torque"). This torque has a maximum when the motor is starting, and as the motor moves the car the torque, or twisting moment, responds automatically to the demands.

The source of the electric being a battery, it follows that one of great capacity is desirable; but since the life of the battery is involved with the capacity, it also holds that skill, born of experience and judgment, must be the sole guide to success, taking into account the radius of travel of the car which will best serve the ends, and, by limiting the capacity of the battery to the reasonable requirement, produce the maximum of life and the greatest possible return per dollar expended.

If it is true that the motor supplies the requisite twisting moment, taking from the battery the necessary energy, it is also clearly true that a means must be afforded by which the energy may be controlled, and, too, without the exercise of undue care and skill on the part of the operator.

Considering this control requirement as being one of the first essentials, it is necessary to take into account the enormous difficulties involved, in order to appreciate why electric vehicles may have supplied a quota of indifferent success. While on this phase of the subject, it may be as well to point out that the poor success realized in past years was absolutely the product of indifference rather than lack of knowledge, and a display of skill in connection with the motor and battery to the neglect of the controlling system. Perhaps it might be well to add that a fine display of discriminating skill in connection with the leading features as here depicted will fall short of the present high requirement, in the absence of a chassis suitably designed, taking into account the proper suspension of the motor, the right disposition of the battery, and the nesting of the controlling system, as well as proper methods of wiring.

The electric vehicle lends itself so thoroughly to use in the many walks of life, that it would seem almost a crime were the petty faults to remain and the service to be thereby marred. Success in its broadest aspect depends absolutely on the exercise of skill in the design, construction and maintenance of the individual units; but a harmonious corelation of the units must also exist, if the greatest measure of success is to be realized.

From what has been said, it would seem that nothing ever stood in the way of the entire success of electric vehicles, basically considered. But it is also self-evident that this success, in its broadest aspect, is only to be realized in a shop adequately fitted out under the guidance of a corps of engineers, each one of great competence, which, alone, would amount to failure, due to lack of co-operation.

The shop and its facilities, together wtih a corps of engineers, must then, if success be assured, be under the guidance of business men of acumen, and they, in turn, must have at their disposal the potentiality which is only present if ample funds and a wide reputation may be counted upon.

The future of the automobile, which is the matter of the moment, is absolutely assured when all the conditions as enumerated above are thoroughly satisfied.

In the Studebaker establishment, which spreads over 52 years of business in a large way, involving trackless transportation, it has always been the Studebaker idea that a consistent adherence to methods involving conservative but positive advance bring success of the character which accumulates permanence, and in the electrical venture, which started in the Studebaker establishment a few years ago, these same methods were adhered to, and while it looked for a time as if they were not sufficiently aggressive, they have proven to be safe, and Studebaker electrics are now accepted for their sturdy service qualities.

British Automobile Imports and Exports—For September imports of automobiles into Great Britain and Ireland the number of complete cars reported aggregates 243, valued at £81,351; chassis, 358, valued at £101,190. The exports were: 253 complete cars, valued at £103,223; and 17 chassis, valued at £6,269.

Miniature Tonneau Body, the Popular Equipment of the Standard Six—A Clean-Cut Design Throughout

STANDARDIZATION is the keynote of the design, material and workmanship, as well as being a part of the name of the car produced and marketed by the St. Louis Car Company's automobile department, which will be known as the Standard Six.

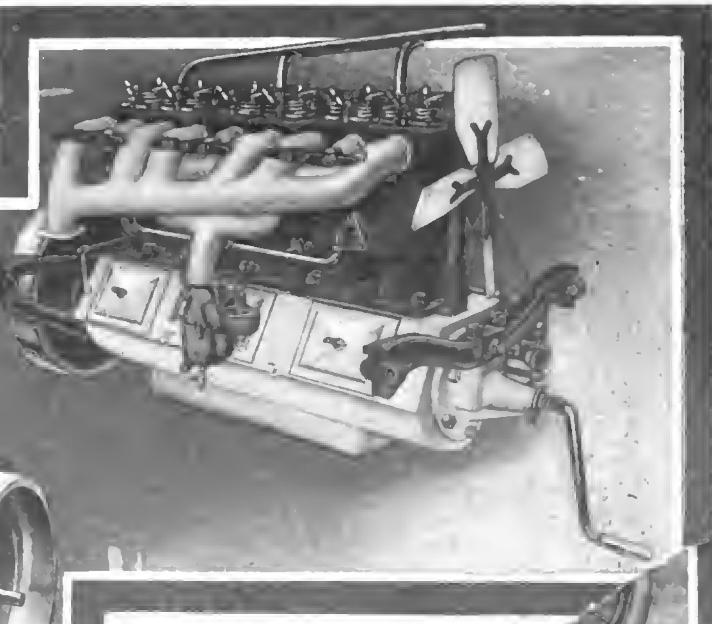
This will be made in but one chassis, which is, however, fitted with four body forms to suit the various needs. The chassis is powered within a six-cylinder engine of comparatively long stroke, although this is not made a feature, the power rating being fixed at 50 horsepower, which is well within the capacity of its size.

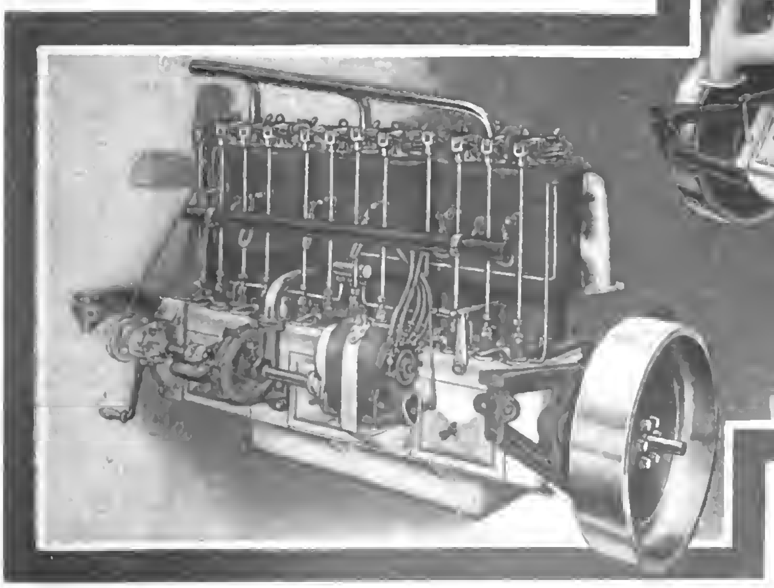
To take up in order the features of the car will be to begin with the most important part and finish with those parts of lesser value. Without a doubt, the motor is the most important part in the whole car and should receive the greatest amount of descriptive detail.

Distinctive Engine Features—First to be noticed are the overhead valves. This placing of the valves is said to be the source of considerable additional power, strictly aside from the more utilitarian one of accessibility. The latter is well worth the consideration of the buyer who is getting his first car, since the old hand will be sure to bear it in mind. The cylinders, of 4½-inch bore and 5-inch stroke, six in number, are cast in pairs. Differing from the usual overhead valve construction is the location of the pipes for both inlet and exhaust on the right side. These pipes are yoke-held, which allows of their ready and very quick removal, either one being removable without disturbing the other. Upon that side of the motor, then, there is nothing but the carbureter and the above-mentioned pipes. The result is again a maximum of accessibility.

Opposite to this are placed the rest of the accessories, that is, the magneto and pump, together with the driving means for both of these and for the fan.

The cylinders are water-jacketed for an unusual length, the whole stroke of the piston being covered. The water passages are unusually large, with easy bends, through which the water is driven by means of the centrifugal pump. The latter is of large diameter, driven at a high speed, which, in combination with an artistically designed radiator of large capacity and sufficient depth, insures reliability of cooling at all times.





Right- and Left-Hand Views of Standard Six Motor

These cylinders are mounted
case of barrel shape. Th
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arms, these being
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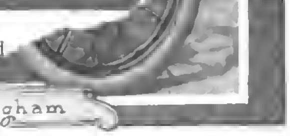
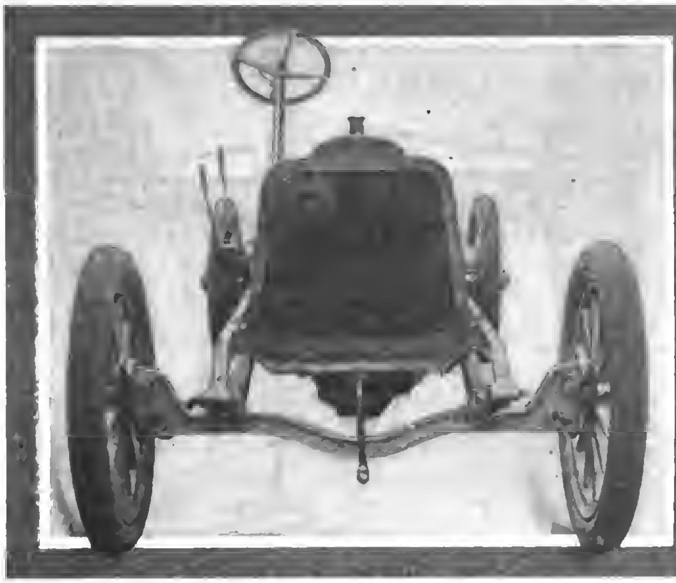


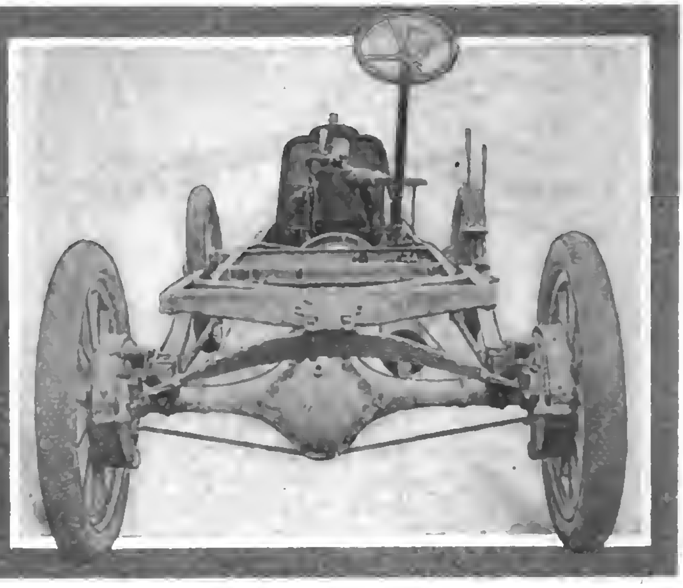
selected material. Being of circular section the ends are closed with circular plates, while the sides have each three large hand holes. With the two end plates and the six side plates removed the inside is as open as it is possible to get it. The lower part of the crankcase forms an oil well from which the lubricating oil is pumped around to the bearings by means of a positively driven pump. This draws its supply from the oil well and maintains a constant level in the bottom of the case. There the lubrication is by splash, the overflow passing through passages on the side of the case to the reservoir below.

Highest Grade Materials Employed Throughout—From one end of the car to the other the materials have been selected for the work they are to do, rather than the reverse. For instance, the crankshaft is of alloy steel. It is a one-piece drop forging, with the flywheel flange at the rear made integral. To prepare it, heat treating is resorted to after it has been finished, finally grinding to an exact size. So, too, with the camshaft. This is a one-piece drop forging, with the cams forged integrally. This form of construction eliminates all pins, keys, cotters, and set screws, with a consequent saving of time, temper and tools.

Inlet and exhaust valves are interchangeable, as are also the



Chassis of Standard Six, as Seen from Front



Rear View of Same, Showing Axle Construction

cages which they work in. Any one valve may be removed immediately by unscrewing a single nut. The valves are mechanically operated though tappet rods, placed on the left side of the motor, on which side the single camshaft is located.

How the Fuel Is Supplied to the Engine—Of course, the engine must be fed. This one eats gasoline and is fed through the medium of a patented, improved carbureter, known as the Carter. It is water-jacketed and has an automatic air control, which may, however, be adjusted from the dashboard. This vaporizer was selected after a prolonged series of tests to determine which one was best suited to the peculiar needs of the six-cylinder motor. It has proven reliable at both extremes of speed, the highest and lowest, as well as rendering good efficient service at any speed in between the two extremes.

Ignition is duplicate in so far as the source of current is concerned. A Remy magneto supplies the current ordinarily, but, if desired, dry cells may be used instead, as well as for quick starting. The single set of plugs are located on the left side of the
play cylinder castings, where they project into the combustion cham-
tures as This location just above the magneto makes the wiring
ment, in the compact and simple. Starting is effected through a
account the prope vided for that purpose and placed on the steer-
of the battery, and the ne truction works to retain the compression
as proper methods of wiring. d is always effective.

The electric vehicle lends itself engine and its accessories
many walks of life, that it would seem that, the transmission. In

the Standard Six the two are combined in a unit. The clutch is of the widely used cone type, the inverted cone being used. The face of the clutch is provided with cork inserts. The transmission affords three forward speeds and one reverse, sliding gears operated on the selective plan being the medium. All gears and shafts are of special steel, heat-treated, hardened and ground to size. The shafts are mounted throughout on annular ball bearings.

Control Is Standard—In so far as any control may be said to be standard, in that it follows the majority of the best cars, this one is standardized. Aside from the gear shifting lever, placed at the driver's right, as is also the emergency brake lever, there are the two usual foot pedals. These operate, respectively, the service brakes and the clutch. Then there are the spark and throttle levers, which are placed on top of the steering wheel, within the rim, so as to be convenient to the fingers.

Chrome-nickel steel is the material of the frame. It is made especially for this six-cylinder car by a reputable maker, and in the making, not only is this best of material used, but it is subjected to unusual care in heat treatment, so that the full benefit may be had of the quality which has made this material preeminent for withstanding shocks. The front end of the frame is narrowed to permit turning short, while the rear end is raised, or, as it is usually spoken of, dropped to lower the center of gravity without reducing the road clearance.

In combination with the upswept rear end, platform springing is resorted to. The front springs remain semi-elliptic in form. All springs are made from special crucible steel, scientifically designed and tempered. The fronts are 40 inches long, the rear side members 42 inches long, and the rear cross member 38 inches. All of them are of the same width, namely, 2 inches. The platform arrangement, it is needless to add, is one in which the frame is supported from three points, with a consequent relief from all twisting strains. All spring joints are lubricated.

Roller Bearings for Both Axles—Both the front and rear axles are mounted upon taper roller bearings. The front is of the I-section drop-forged in a single piece with the spring seats not only forged integral, but widened out as well, which results in a wider bearing for the spring at that point. The cross-connection is placed back of the axle and the knuckles turn on roller bearings, which are arranged to take the thrust coming at that point. The rear axle is of the full-floating type carrying the whole car weight upon a heavy pressed-steel tube, within which the driving axle turns on Timken roller bearings.

Mounted upon the ends of the axles are the wheels, which are of large diameter; 36 inches is the nominal size, while the number of spokes is 12 in each wheel.

Model 74. Waverley Stanhope

INDIANAPOLIS, IND., Oct. 25—A year and a few days have elapsed since October 10, 1908, when the present Waverley Company took over the plant and business of the Pope Motor Car Company in Indianapolis. The preceding year of depression in general business and of financial embarrassment to the then owning company had reduced the operating force of the plant to 150 men, which was soon found inadequate properly to conduct revived business.

The new company was made up of conservative business men, not disposed to spend money foolishly or to plunge into improvements without substantial grounds for the expenditure, and a policy of judicious and steady expansion was at once inaugurated.

To-day the company has on its pay-roll nearly 600 men, and is steadily adding to the force as fast as skilled and competent men can be obtained in its various departments. With upwards of 200,000 square feet of floor space devoted exclusively to the manufacture of electric carriages, delivery wagons, and trucks, it has already been found necessary to operate part of this great establishment night and day to fill orders. If the present rate of increase continues, the management will soon be obliged to put the entire plant on night and day shifts.

When it is remembered that this is a plant which manufactures electric automobiles from the crude raw materials, operating its own forge and machine shops, and making its own tools; building its own bodies from its own patented designs; forging its own axles and making its own wheels; building its own motors, its own patented controller, and its own exclusive chainless driving system; finishing its coach bodies with sixteen different coats of color and varnish in twenty-eight separate and distinct operations, upholstering them with the choicest and most expensive grades of broadcloth and leather, and turning out a completed carriage unexcelled in perfection of mechanical detail and in artistic design and finish, some idea will be gained of the great variety of engineering and manufacturing processes that are carried on in this gigantic establishment. While the new company is celebrating its first anniversary with satisfaction over the successful results of the year's business and with pleasing anticipations of a future of still greater accomplishment, the factory organization looks back upon nearly twenty years of continuous existence and practical achievement.

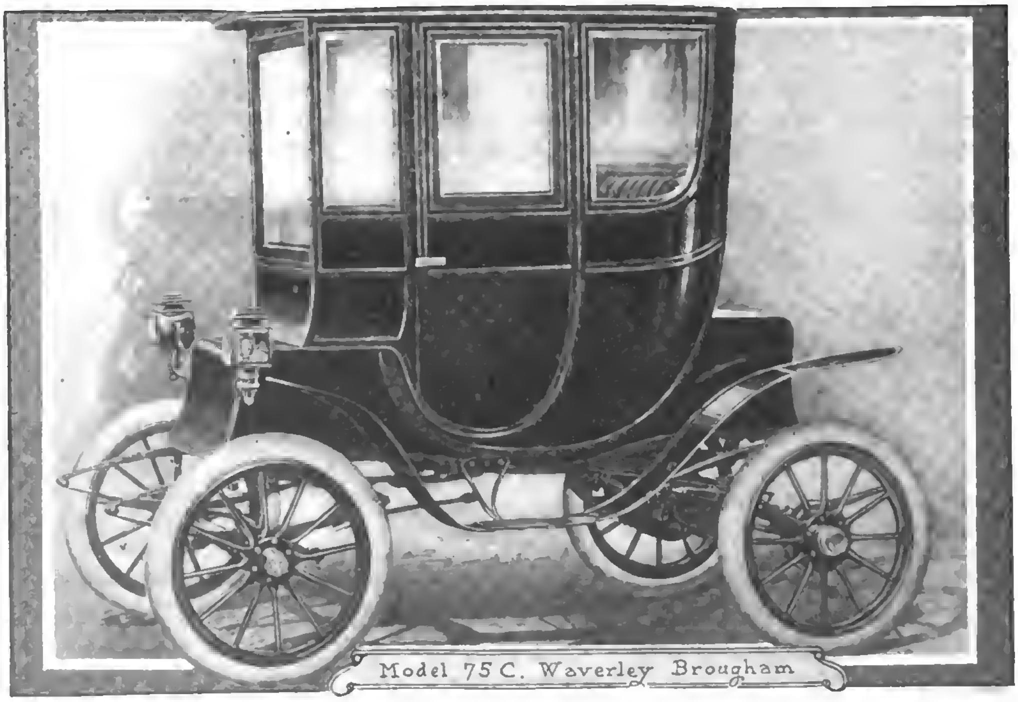
Originally engaged in the business of manufacturing the famous Waverley bicycles, this great factory was among the first to begin experiments with storage battery propulsion as applied to automobiles.

Many costly experiments were made before success was finally achieved, and, as in the beginnings of all new industries, there were not wanting people who were ready to predict that success was impossible. But the leading principles of storage battery propulsion were gradually established by many and frequent trials along different lines.

It soon became evident, for instance, that the electric vehicle and the gasoline touring car were utterly distinct machines, occupying separate fields and coming as little into competition as a family carriage and locomotive. As a matter of fact, the makers of Waverley Electrics saw in the province of the family carriage their especial field and opportunity. They aimed to produce an ideal carriage of high grade, enlarged range, great dependability, superior convenience and delightful freedom from the worries and annoyances that are inseparably connected with all complicated mechanism.

The ultimate success achieved in all these directions was not the result of a sudden inspiration of genius or the product of a single brain. Many minds contributed their share, and the electric carriage of to-day is an evolution of higher types from inferior forms.

With an electric car that has outgrown the experimental stage and has long ago solved all those mechanical problems involved in successful storage battery propulsion, and with a constantly growing demand for this carriage in all quarters of the country,



Model 75 C. Waverley Brougham

the present success of the company and its future prosperity as well are most certainly assured.

The names of the officers and stockholders are as follows: President, William B. Cooley; vice-president and manager, Herbert H. Rice; treasurer, Carl von Hake; secretary and assistant manager, Wilbur C. Johnson. Directors: William B. Cooley, Herbert H. Rice, Joseph C. Schaf, Carl von Hake, Hugh Dougherty, Burton E. Parrott, William F. Kuhn. Other stockholders: Aquilla Q. Kones, Hugh M. Love, Alexander C. Ayres, John R. Love, William Kothe.

Of the 1910 Waverley it may be said that it is an improvement upon all previous models of this company's manufacture. The new Waverley driving system makes the use of either solid or pneumatic tires perfectly practicable and satisfactory; the enlarged wheelbase, increased size of the wheel, and the use of full elliptical springs on all new models has added to the comfort of the rider and the serviceability of the machines under all conditions of roads; while the peculiar compactness of build and the beauty of the Waverley designs has not suffered in any particular from the changes made. The fact that Waverleys of this year's design are making distances of from eighty to ninety miles on a single charge without extra batteries and without being stripped for special test runs, has added greatly to the interest in and demand for this make of electrics.

Such results have been reported from many different parts of the country. Thus, M. C. Mathias, superintendent of fire alarms at Reading, Pa., who runs a Waverley runabout, writes: "I have run as far as 90 miles with this machine on one charge, and *never* have to go to the garage for a recharge until I have 70 miles out of it."

This experience is not confined to any one section of the country, or any one person, as is well shown by a parallel case in the East. Thus, the Dodge Motor Vehicle Company of Boston wrote to the factory under date of August 12, saying: "We sold this car (Model 75-C) to Mrs. Hyde, of Allston, Mass., after we had taken one running discharge. The writer then took Mrs. Hyde and her daughter for a ride of 81 miles, from Boston to Marblehead Neck and return to Allston. The car after running this distance, up hill and down, was practically as strong as at starting. We think that you need not hesitate to say that this model with a 32 cell battery will run 100 miles with three or four people."

Many instances of mileage are available and of significance chiefly to show that the days of the electric that will give but fifteen to twenty miles on a charge have gone by. It is now possible to equip any electric machine to give almost any required mileage. Waverleys, for instance, have given 142 miles on a charge when such distances were demanded; but a fifty-mile ride in an electric or any other form of private carriage is as much as most people care for, and it is well understood that there is economy in the standard instead of hy-cap batteries.

HOW WILLYS ENTERED AUTO INDUSTRY

Probably the American boy does not live who has not at one time or another been told that he may be president if he so wills it, states the Toledo *Times*. But how few actually realize that wish! On the other hand, perhaps as much honor attaches to the great captains of industry, which positions, like the other, go to the men with the ability. As a field for the latter, probably no one business offers more opportunity for the young man to rise than the automobile industry, yet most of the large automobile firms have been built up from a small beginning.

One that most assuredly has is that of the Toledo Motor Company, of Indianapolis, Ind., and Toledo, O., which is presided over by John N. Willys. The story of the rise of Willys from practically nothing to president of the largest single company within two years reads like a fairy tale.

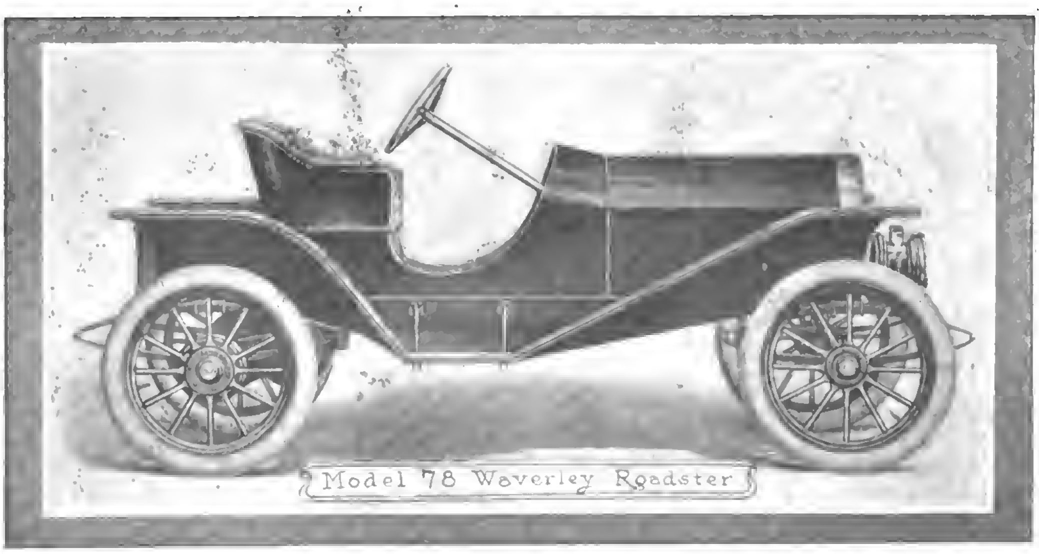
Like many another young man, mechanically inclined, Mr. Willys entered the bicycle business in Canandaigua, N. Y., where his family then lived. From the bicycle to the automobile business was as logical a step for him as it was for a number of the manufacturers whose product he handled. Removing to Elmira, N. Y., he had established the Elmira Sales Company, the object of which was to sell bicycles. Following that came the organization of the American Motor Car Sales Company with headquarters at Indianapolis, Ind.

The latter firm was organized by him for the sole purpose of promoting the sales of the Overland, American and Marion, all Indianapolis-built cars. After several months of thriving business Willys one day found himself in the anomalous position of having sold something that he could not deliver. That is, he had signed contracts for and received a deposit on some 500 Overland cars which were not forthcoming on the date set.

A flying visit to the factory showed the latter to be practically closed, and some questioning resulted in the information that the plant was to go into the hands of a receiver on the following day for want of $450 with which to pay back salaries of workmen.

With characteristic energy, Willys raised $500 practically on his good name, and on a Sunday at that, using this money the following day to straighten out the wages question. More than that, he devised a plan to satisfy the creditors temporarily, thus allowing the company to make enough cars to permit him to fulfill his contracts. Through the medium of this deal he obtained control of the Overland plant.

At that time, September, 1908, no one appreciated better than Willys himself that the company's manufacturing facilities were not adequate, the factory having but 30,000 feet of floor space. So he took over the Marion plant, in which circumstances favored him to the extent that it was far from being on a hopeful basis. Under his direction the two plants were able to exceed the estimated output of 1,500 cars, actually turning out some 4,075 during 1908. Once again confronted with a lack of factory facilities, he obtained an option on thirty acres of land near Indianapolis and planned a monster factory. Before, however, this deal had been closed, he heard of the Pope-Toledo plant, which was then on the market. Within 48 hours after hearing of it he closed a deal in New York City with Col. Albert Pope for the purchase of the plant. This property is now being renovated and put into shape to turn out 12,000 cars for 1910, while the output planned for Indianapolis is 8,000 cars, a total for Willys plants of 20,000.



Model 78 Waverley Roadster

Levi Fletcher, and His "Steam Road Engine" in 1894

PORTLAND, ME., Oct. 25—Stored away in the old Fletcher barn at Hollis is the first automobile ever built in the State of Maine, and possibly the first one ever run over the roads of the Pine Tree State. This is the famous "steam road engine," built by Levi Fletcher some ten or fifteen years ago. Levi Fletcher, who constructed the vehicle, is dead, and thereby passed away a genius, who died of a broken heart.

Mr. Fletcher conceived the idea of a carriage running along the roads without horses. He said that locomotives could make their way along tracks and steam rollers could go through the streets. Why not, then, a pleasure or commercial vehicle driven by the same mysterious force? He told his plans to no one, but quietly went to work on what he conceived would be a steam road engine. He had never seen an automobile nor heard of one, as there were only a very few in existence at that time, and they were in the experimental stage.

He gathered a bit of iron here, some brass there and piping in another place. When he had secured the requisite amount of material he assembled the parts, and the "steam road carriage" was the result. It was not a sightly looking contrivance, but the principle was right, and it ran.

Out upon the road the machine was pushed from the barn and the neighbors stood around in astonishment. With much snorting, and grinding and hissing, the steam vehicle went slowly ahead. It made excellent progress down a grade, but when it struck a hill there was absolutely "nothing doing." Levi saw there must be improvements, so the contrivance was hauled back to the barn.

Repairs and alterations were made and the carriage was so fixed up that he could spin along a country road at a fair rate of speed, but it always balked at hills. One day Levi was puttering about the machine in the barn when he was attracted by a shout, and what was his astonishment to see a real automobile go by. He gazed in open-mouthed wonder, dropped his tools and went into the house. He never again touched his steam carriage and seemed to lose all interest in life. It is said he died of a broken heart.

OHIO LAW DECLARED CONSTITUTIONAL

COLUMBUS, O., Oct. 25—By a decision of the Ohio Supreme Court handed down recently, the Ohio automobile law has been declared to be in accordance with the constitution. The decision is the outcome of an effort on the part of T. M. Drolesbaugh, of Crawford county, to avoid registering his car. When he was arrested he pleaded the unconstitutionality of the State law, on the ground that it was an arbitrary discrimination against automobiles in favor of horse-drawn vehicles, and that it violated Article I, section 2 of the Ohio constitution. The lower courts sustained the constitutionality and the decision was reaffirmed by the highest State tribunal.

HOW THE PNEUMATIC, FINALLY, WAS TESTED

The *Allgemeine Automobile Zeitung*, Berlin, recently published some chapters of incidents of days that are past, some of the anecdotes being of so delightful a character that they will certainly interest American readers as well as those of the Fatherland. In unfolding the tale of the early trials of the Michelin pneumatic, the writer says:

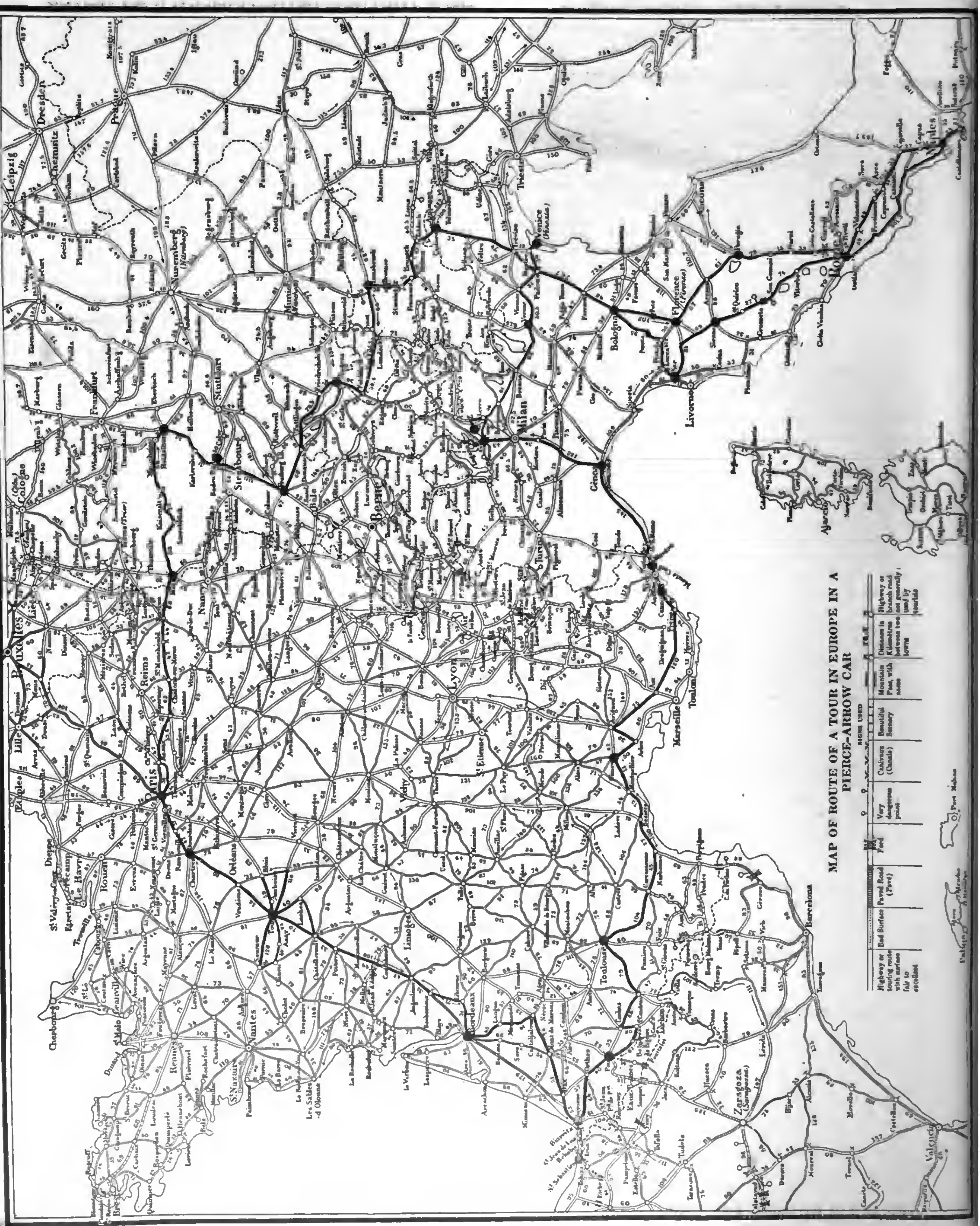
It was a Benz car of the very earliest kind that was destined to take part in the Paris-Bordeaux-Paris race of 1895, equipped with Michelin tires. It was proposed to go over the course with it about three months before the race, and André Michelin was to meet the vehicle at Poitiers. Of course, the whole factory turned out to watch the *Swallow's* arrival at Clermont, and in the very earliest hours of the morning a group of young men posted themselves on the stiffest part of the hill—and waited. When it turned 4 a. m., and nothing was to be seen, they grew impatient, and questioned an old farmer coming along with a herd of cows as to whether he had seen a "carriage without a horse." The old man, naturally thinking they were enjoying a joke at his expense, waxed wroth and shouted: "A carriage without a horse! You cheeky lads, how dare you try to fool an old man like me?"

But at the very minute of speaking a huge cloud of smoke in the distance heralded the approach of the Benz, clambering painfully up the hill, to the great astonishment of the old man, who was thrown into a state of veritable panic by the approaching monster. Unfortunately, the car had an inglorious end without participating in the race, as, shortly before the date, it was found that the cylinder had burst and the water had entered the compression chamber.

It had taken the Clermont people three whole months to find out why the machine of this flighty *Swallow* so often went on strike. Out of the parts of the *Swallow* a new car was built with the greatest speed and hurry, with the help of a 6-horsepower Daimler marine motor bought in Cannstatt. This vehicle was dubbed the *Spiderweb* on account of its light weight, which, it must be acknowledged, existed more in the minds of the constructors than in reality. Only, on building the chassis, which was concluded before the motor came to hand, it was forgotten to leave the necessary space for the engine, and afterwards it had to be put in as best it could. The car, which had no differential, could, however, attain a speed of 35 to 40 kilometers, with its back axle coupled direct with the engine.

Fate cruelly overtook this marvelous vehicle on its first trial, for shortly after its departure the following laconic telegram arrived: "Ran into tree on third speed near Moulins." This tree, unfortunately, did not bend, but sternly rejected the car, with the result that driver and mechanician were thrown into a field.

Undaunted, a third car, a 2 1-2-horsepower Peugeot, was purchased, and a 4-horsepower Daimler engine put into it, which also found its resting-place on the back axle. It was fearfully difficult to steer this vehicle; the car persisted in permanently zigzagging, and this remarkable quality made a great deal of skill imperative to get out of the way of approaching vehicles. Nevertheless, it was determined to take part in the race with it! It was equipped with a lot of spares, in a tool-box of such vast dimensions that it looked like a perambulating arsenal. Thus armed, the car, which weighed 1,400 kilogrammes, set out on its trial runs, during which time it twice ran amuck owing to its miserable steering. The first time all went well, but the second time the mishap occurred at night during a lamp test, in consequence of the forgetfulness of a workman who had carried out an alteration in the wheels, but had forgotten to readjust the brakes. As the back axle had no differential, a strong pull of the hand-brake sufficed to completely throw the car round, and, colliding with a telegraph pole, it threw the whole lot into the field. Of course, the car promptly caught fire, as it was fitted with slow-tube ignition, and burnt down to the metal parts. But it was repaired in time and started in the race, thereby enabling the tires to be tested at least, after this chapter of accidents.


MAP OF ROUTE OF A TOUR IN EUROPE IN A PIERCE-ARROW CAR
SIGNS USED
Highway or touring route with surface fair to excellent
Bad Surface
Paved Road (Pavé)
Ford
Very dangerous point
Caniveau (Canals)
Beautiful Scenery
Mountain Pass, with name
Distance in Kilometres between two towns
Highway or branch road not generally used by tourists

SOME CONCISE INFORMATION FOR EUROPEAN TOURING

WITH just enough detail to serve as a guide and enough illustrations to give the reader a good idea of what may be seen in a 4,000-mile tour of Europe, a book recently issued by the Pierce-Arrow Motor Car Company, of Buffalo, presents a rather unique total of information. In one way the book will prove a boon to those Americans who contemplate taking their cars across the Atlantic for touring. It presents the itinerary of an American with his American car and driver who went to Europe without any definite plans, just as many another citizen of the United States has done.

The American's time was limited and his ideas of where he wanted to go and what he wanted to see were vague and general. The car had been shipped direct from the factory at Buffalo, consigned to the company's hranch in Paris and so, naturally,

A Medieval Street in Picturesque Loches

The Garden of the Fountains at Nimes

that was the first objective point of the tourist. The manager of the Paris branch of the Pierce-Arrow Company had been informed of the coming and had also been given the greatest latitude in making arrangements.

The advantage of this plan was apparent when the tourist came to make his arrangements. His crated car had been met at the dock by a representative of the branch and driven overland to Paris, there to await him. A courier-valet who spoke English, French, Spanish, Italian, Austrian and German, maps and a store of information concerning road conditions were ready for his inspection, and membership in the Touring Club of France had been arranged. A deposit was made with the Touring Club to cover duties in the countries to be visited, as follows: France, 1,290 francs; Italy, 600 francs; Austria, 2,258 francs; Germany, 539 francs: total $4,687 francs. When this deposit was made a triptyque was given to the tourist and this enabled him to cross the various frontiers without the usual customs formalities other than the signing of the triptyque. When the return to Paris was made and the triptyque, properly signed, given over to the Touring Club of France, the deposit was returned, only a small fee being charged for the accommodations and courtesies the club had furnished.

From the maps provided by the Pierce-Arrow agency and the information furnished by the Touring Club a route was selected

Peasant Women of the Pyrenees Mountains

that led through a beautiful chateau district of France to the east cost of that country and then to the border of Spain long enough for a one-day trip across its boundaries. The route chosen then led along the southern coast of France into Italy and north to Lake Como, then down through that part of Italy which is more familiar to the historian. From there the trip north was made by easy stages through southeastern Austria and the eastern part of Germany, until the tourist again entered France and turned the car over to the Paris branch of the company for shipment home. In the book the complete route is marked by night stops and a more detailed idea of the country traversed is shown by the list of these.

The first four nights were spent at Tours while the chateau country was being seen, and from then on the night stops were Bordeaux, Biarritz, Pau, Toulouse, Nimes, Cannes, Monte Carlo, Genoa, Como, Bellagio, Verona, Venice, Bologna, Florence Perugia, Rome, Naples, Siena, Pisa, Pierre di Cadore, Inusbruck, Bregenz, Freiburg, Metz and Paris. Luncheon stops are also mentioned in the book and only once was it necessary to carry luncheon in the car owing to the absence of a good inn or café on the day's run, this being between Naples and Rome, when the old Appian way is used for a part of the distance.

A new use for picture postcards is told of in the book. As soon as the tourist reached the city of any considerable size he could buy a number of these

Arcaded Street and Principal Square, Genoa

Bologna's Leaning Towers

Arcaded Street to Cathedral

cards, showing the principal places of interest in the city and from them would be enabled to select the places he wished to visit. A courier would then be engaged, at the leading hotel generally, and with his assistance the places selected could be seen to their best advantage.

In the back of the book is a map, 16 x 19 inches in size, showing the principal roads through the countries visited, the cities and towns, boundary lines, distances and road conditions. The route used by the tourist who furnished the material for the book is shown and his night stopping places are indicated by black circles. In addition to the map the book is well illustrated by views of buildings, cities and mountain scenes encountered on the trip.

It is not the intention of the company in issuing this book to prescribe a route that should be followed by motor car tourists in Europe, but merely to show what can be done by an American owner of an American car who, with his time limited, goes to Europe to see as much of the instructive, beautiful and entertaining as he can. Whether he wishes, in a general way, to follow the route shown or not, the book contains a store of information in the most concise form.

Altogether, the mileage of the car was 5,170. Of this, 1,268 miles were taken up by the trip from Havre to Paris and the return and the side trips made during the tour. No accurate record of the mileage of the side trips was kept, and for this reason the only distances recorded are those between the night stops. These are:

	Kilometers	Miles
Paris to Tours	232	144
Tours to side trip	147	92
Tours to side trip	160	99
Tours to side trip	193	120
Tours to Bordeaux	313	194
Bordeaux to Biarritz	264	164
Biarritz to side trip	108	67
Biarritz to Pau	104	65
Pau to Toulouse	229	142
Toulouse to Nimes	310	193
Nimes to Cannes	299	186
Cannes to Monte Carlo	54	34
Monte Carlo to Genoa	170	106
Genoa to Como	171	106
Como to Bellagio	85	53
Bellagio to Verona	213	132
Verona to Venice	120	75
Venice to Bologna	161	100
Bologna to Florence	102	63
Florence to Perugia	168	104
Perugia to Rome	178	111
Rome to Naples	229	142
Naples to side trip	90	56
Naples to Rome	191	119
Rome to Siena	219	136
Siena to Pisa	114	71
Pisa to Bologna	160	99
Bologna to Pierre di Cadore	274	170
Cadore to Innsbruck	183	114
Innsbruck to Bregenz	156	97
Bregenz to Freiburg	178	111
Freiburg to Heidelberg	198	123
Heidelberg to Metz	215	134
Metz to Paris	290	180
Total	6,279	3,902

HOW THE AUTOMOBILE WASHED THE CLOTHES

By R. J. GRISWOLD

EXTREMES touch when an automobile figures in the Monday washing, but that is what certain residents of a Michigan town saw not so long ago. Seeing is believing, and although I had to turn out at 5 o'clock in the morning to witness the demonstration, it was worth the effort.

This is how it happened. A friend of mine who lives in the country had a guest from the city staying with him for a couple of weeks. A neighbor who was a temporary member of the Merry Widowers' Club, owing to the absence of his wife and family, was also sharing his hospitality. When the end of the week rolled around there was naturally an extra large washing. This did not cause the housewife any worry until, late Saturday afternoon she received a note from the lady of the tubs stating that the latter was going on a short vacation and would be unable to be present as usual Monday morning. Madam must needs make other arrangements. The C. Q. D. signal was displayed; they scoured the neighborhood, but not a washwoman was to be found. Finally in utter distress the lady of the house went to her husband and said: "George, what *shall* we do?"

George simply smiled. "Don't worry, my dear," said he. "Keep cool and take it easy. A plan has occurred to me which I think will take care of the situation. Just have the washing ready Monday morning, bright and early, and leave the rest to me."

The evening and the following day were spent in a round of pleasure, with George always the leader, undisturbed by the burden of responsibility which he had assumed.

Sunday afternoon George slipped out to the garage, and patting his car on the hood, said: "Old fellow, it's you for the washing to-morrow."

Donning his overalls, he jacked up the rear axle and placed a broomstick through the right rear wheel to hold it stationary. After taking off the tire of the other rear wheel he brought in the washing machine, fastening it with cleats to keep it from moving. With two trunk straps buckled together he made an endless belt which he placed over the left rear wheel and the wheel of the washing machine.

The rest was easy. I was tipped off to appear on the scene at five in the morning. When I entered the garage, rubbing my eyes, George was comfortably seated in the front seat, smoking a cigar. The car was chugging along on middle gear, and the washing machine was running as it had never run before. The hired girl and the man of all work were kept on the jump putting in and taking out the clothes. I couldn't help thinking of the feelings of that poor old washing machine. It certainly must have thought that it had struck some one with an arm of iron.

AUTOS COMPETE WITH ELECTRIC LINES

Increased fares on the electric interurban lines running out of Tacoma, Wash., caused the establishment of an automobile service between that city, Brookville, Fife and Milton. The increase made the fare to Milton 26 cents, instead of the old rate of 15 cents, which the automobile line will endeavor to maintain.

EXPENSES OF AN AMERICAN'S TRIP IN EUROPE

An IDEAL trip of 6,700 miles through England, France and Algeria, which was made last Summer by A. Lowes Dickinson, of the Automobile Club of America, in a 40-horsepower Locomobile, offers to prospective imitators a complete table of the expenses which may be looked for. Mr. Dickinson kept a log-book of the tour, showing in detail all expenditures, and averaged these for mileage. Automobilists who contemplate taking their cars abroad and adopting the most delightful way of seeing a foreign country, may obtain many useful pointers from his figures.

Five weeks were spent on British soil. From the landing at Southampton the route lay across the English downs, through masses of heather, to Castle Malwood, the seat of Lady Harcourt, and the Rufus Stone, where William Rufus was killed in the year 1100. Thence through the Great Forest to the Avon Valley, stopping for luncheon at the quaint White Hart Inn, at Salisbury, the party went on through Amesbury and past the big military camp at Bulford, concluding the first day's run at Winchester. The remainder of the first week was spent in leisurely touring to London via Brighton, visiting on the way St. Leonnards, Hythe, Charing, with its picturesque old half-timbered house, Yew Tree Farm, beautiful Leeds Castle and steep Ryegate Hill, the route made famous by coaching parties.

While at the English metropolis a number of days were spent in making various short and long trips about the city, among them being jaunts to Windsor Castle, Baldock, Richmond Park, Gad's Hill, the home of Charles Dickens, and other places of note.

After completing 2,000 miles in England the car was shipped to Boulogne, France. At the latter place it was necessary to wait four hours for driving licenses, the usual test drive being required. Striking out over the Route Nationale and into the valley of the Somme, the first night stop was made at Amiens, 76 miles from Boulogne. After spending a morning in exploring the Cathedral the party threaded its way over the undulating roads and chalk table land through Breteuil, Beauvais, Allone and Meru, where the beauty of the country became greater. At Conflans, the Seine was crossed for the first time, the route then lying through the Forêt de St. Germain country. At first the roads were bad, but upon reaching Suresnes and passing into the Bois de Boulogne (where duty has to be paid on gasoline) and on to Paris, the road is all that is to be desired.

From the French capital jaunts were made through the Chateau country, St. Cyr, Rambouillet, Voisins and Chartres. After an exploration of the ancient Chateau de Blois and nearby spots the party bore over to Tours, then down the Loire Valley to Liginières, lunching at inns, and thence driving into the Indre Valley and southward to historic Poitiers.

Leaving bright and early, a strenuous run of 200 miles was made toward the Pyrenees, ending in Agen at 8:30 in the evening. Several days were then spent journeying a few hundred miles through Coarraze, Lourdes, Pau, the Tournay country, before the Mediterranean was sighted. A visit was made to the Maison Carrée, the almost perfect specimen of an old Roman temple, with the old Roman baths nearby, and thence down to Avignon.

The road from here through Aix, Cannes and Nice was uninteresting, being much cut up with wine traffic. Pushing onward the following day on the wonderful Corniche d'Or road, along the beautiful country of the Gulf of St. Tropez, and through the winding mountains with their gorgeous scenery, the ride into Marseilles (1,725 miles from Boulogne) was a delight.

After some annoying trouble occupying several hours the car was loaded onto a steamer and run through a terribly rough sea to Algiers in about 30 hours. The freight rate is 227 francs for a car weighing 3,910 pounds, and the transportation company charges 100 francs additional for insurance, but as there is great doubt as to what this insurance actually covers, it is better to insure through Lloyds, which can be done for one-quarter of one per cent. There are several lines by which a car can be carried to Algiers.

The party spent five weeks in Algeria, visiting both known and remote parts, upon which notes in the log-book of the Loco are quite lengthy and would fill a small-sized book. The return trip was made via Marseilles and then direct to Havre in six days.

The following statement of running cost, kept very accurately, gives a fair idea of what an automobilist has to spend to take his family abroad on a 6,700 mile trip, with a car of ample power:

Cost per mile run.	In England 30 running days, 2,000 miles	In France & Algeria 47 running days, 4,700 miles
Gasoline	$0.031	$0.0496
Oil	.0092	.0063
Repairs and spare parts	.0069	.0065
Supplies and sundries	.0045	.0039
Garage, cleaning, etc	.0176	.0142
Tire expenses	.0786	.0729
Licenses	.0076	.0049
Chauffeur's board and expenses	.0446	.0294
	.20	.1877
Freight, England to France and France to Algiers and back		.0381
Total cost per mile	.20	.2258

Number of gallons used, 215
Miles per gallon on gasoline used, 9.3

Hotel expenses, leaving out of account Paris and Nice, where any price may be paid, averaged throughout France and Algeria $4 per day each. This included wine, tips and all expenses, and in every case rooms containing two beds, which are more expensive. The chauffeur's expenses averaged $1.75 a day.

Mr. Dickinson's 40-H.P. Locomobile at Gavarnie, France

THE AUTOMOBILE

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UNIFORM REGULATIONS ABROAD

Common sense triumphed again over medieval provincialism when France, Germany, Belgium, Italy, Bulgaria, Roumania, Montenegro, Servia and Monaco signed the international automobile regulations. These nations may henceforth be regarded as the promised lands of the automobilist. Although few Americans may expect to visit the countries which form the latter half of the list—indeed we suspect that few could locate them on the map, except the very last one—it will readily be admitted that they have proved themselves worthy to be enrolled among the progressive nations of the world, and deserve a share of the benefits of intercourse by automobile.

The regulations thus adopted are few and simple, but important. They embody the very points which every automobilist hopes to find soon in the laws of our several States. The examination of drivers and cars and the issuance of an international license, the regulation of lights and signals, and the adoption of uniform road signs; finally, the elimination of customs annoyances—all these are calculated to make touring in the favored countries an unalloyed pleasure.

Great Britain alone, of the commonly traveled European countries, proved recalcitrant. England resemble the United States in many ways. Both apparently regard the extortion of a few dollars revenue as of more importance than the safety of the general public; thus they issue driving licenses to anyone who can pay the necessary fee and are unwilling to go to the bother and expense of an examination. In both countries, too, the political powers in supremacy appear to be afraid to entrust their representatives with any degree of responsibility. We may talk of the dilatoriness and inefficiency of the Latin races, but in this instance they acted with remarkable promptness and certainty. Great Britain, however, still has a chance to redeem herself.

Nor is the United States entirely without hope of being able to join the ranks of progress. The American Automobile Association has in preparation a bill to be presented to the next Congress, which embodies most of the features of the international regulations, as well as others more adapted to the particular needs of the country. That phase of the bill which is of the greatest importance, however, does not lie in its individual features, but in the assumption by the Federal Government of the right to control automobile traffic as being interstate.

FACTORS INFLUENCING PRODUCTION

Hardly a week passes without the addition of several new concerns to the already long list of automobile manufacturers, or, more correctly, makers. This is a matter causing some apprehension, for those inclined to worry figure that the output of the newcomers will be large, and this, added to the already swollen estimates of 1910 productions, brings the grand total for the year up to figures which are alarming to contemplate. Certainly, if every firm produces the full number of cars now credited to it, there will be overproduction of the worst kind.

But few of the hurriedly launched companies weather the first season; a smaller number produce cars at all, and a scant percentage approach quantity estimates.

This is a statement which is borne out by facts and figures relative to companies in the past and may readily be verified. The starting of a new concern of this sort, to manufacture or even assemble automobiles, requires a number of points to produce ultimate success, and the lack of any one of them spells failure.

Thus there must be sufficient capital, there must be the ability to use it wisely, there must be an able design, and there must, above all, be mechanical ability and shop equipment to produce the design in actuality. From the lack of any one of these the new concern will go under. Lack of capital hampers many firms, and, according to statistics, produces about one-fourth of all failures. In the present day and time, with a parts famine imminent, this would have great bearing. The ability to use the capital wisely and well probably goes with the first, or amount of capital, since in the end it amounts to the same thing. The man or men unable to use their capital to the best advantage would practically never have enough.

The design is of paramount importance, too, for if the designer fall down on a very small point, perhaps so small as to be thought insignificant, and the first cars do not take well, the result is the same as if the design had been worthless. More than this, without a shop equipped properly to work out the designer's ideas his plans may become worthless.

So it may be said that there are many components which enter into the makeup of a successful automobile, of which few of the mushroom companies now springing up over night possess all, and many of whom possess not even a majority of them.

E.-M.-F. TO HAVE CANADIAN PLANT

Detroit, Oct. 25—Not content with controlling a big slice of the automobile business on this side of the border the E.-M.-F. Company is going after foreign trade in earnest.

The first step in the consummation of this plan is the establishment of a $400,000 automobile plant at Walkerville, Canada, just across the river from Detroit, and the organization of the "E.-M.-F. Company of Canada." The concern will be merely a subsidiary company of the Detroit firm, although new capital has been interested in the undertaking. Foremost among the incorporators are Frederick H. and J. Harrington Walker, of the Hiram Walker & Sons Company, leading distillers in the dominion, and it is understood that they, together with Dr. J. B. Book, Charles L. Palms and Walter E. Flanders, of the Detroit E.-M.-F. Company, will furnish all the money needed. Mr. Flanders is president and general manager of the new concern, and Robert M. Brownson, secretary and treasurer. A factory building has been secured in Walkerville and machinery will be installed sufficient to ultimately give a daily capacity of 100 E.-M.-F. "30" and Studebaker-Flanders "20" cars.

The E.-M.-F. Company of Canada will not, it is announced, content itself with the trade of the dominion. It has enjoyed an excellent demand for cars from Canadian points, but there was always a heavy duty to contend with. This difficulty will now be obviated. Furthermore, an inviting field is found in the other portions of the British Empire, particularly India, New Zealand and Australia. By shipping its cars from a Canadian instead of an American port the company will be entitled to a 99 per cent. rebate in duties, an item well worth considering and which will give it a decided advantage over manufacturers on this side of the border. The present plan has been under consideration for some time.

DETROIT DEALERS' SHOW TO BE BIG

Detroit, Oct. 25—January 24-29, inclusive, are the dates selected by the Detroit Auto Dealers' Association for its third annual automobile show, which will be held in the Wayne Hotel Gardens. This is not Detroit's third automobile show, but the third one under the auspices of the dealers' association. To deal in figures, it is the eighth annual exhibit that has been held in the City of the Straits, and each year has seen something better than its predecessor.

For the 1910 show there is 35,000 square feet of space available, and, inasmuch as it falls at the interval between the New York and Chicago exhibitions, there is every reason to believe that the exhibits will be more varied than ever. The dealers' association has voted $10,000 to be utilized in decorations for the gardens, which is $2,000 more than was voted for last year's show, and exhibitors will not be required to decorate, that expense being included in the price of space.

John Gillispie, who so successfully handled the arrangements for the ceremonies in connection with the start of the Glidden Tour from Detroit last summer, has been chosen manager.

DETROIT ADDS THE ANHUT CAR

Detroit, Oct. 25—If this city fails to produce its full proportion of the automobiles manufactured the coming season it will be no fault of sundry ambitious and optimistic Detroiters. The organization of a new automobile company is of weekly occurrence.

The latest to be added to a long string is the Anhut Motor Car Company, capitalized at $150,000, which has been organized by State Senator John N. Anhut. Others in the company are H. H. Lonsby, Thomas F. Ahern and John B. Chaddock, Detroit, and Charles Lonsby, of Mt. Clemens.

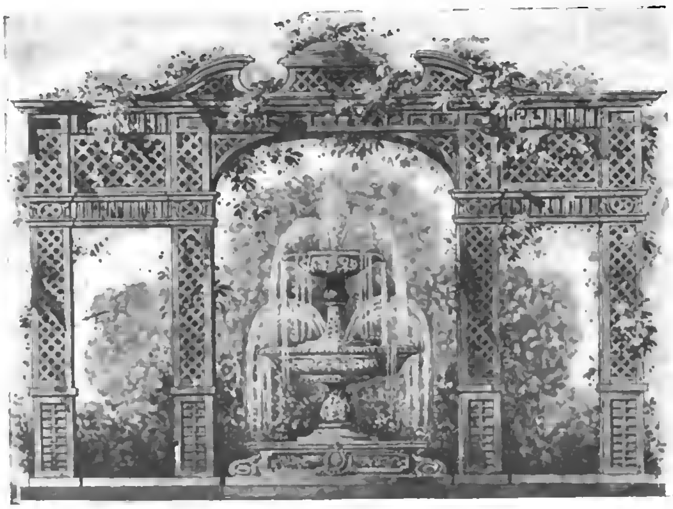
The company expects to begin manufacturing cars about the first of the year, and hopes to build 1,000 36-horsepower machines the first year.

This makes no less than seven automobile manufacturing companies that have been organized here in the last two months.

PALACE ELECTRICAL AND WATER EFFECTS

When the tenth annual show of the A. M. C. M. A. opens in Grand Central Palace, New Year's eve, the public and exhibitors will be treated to a combination of electrical and water effects such as has never been seen before. The decorators of the Palace, Unitt & Wickcs, the Hudson-Fulton decorators for the city of New York, have evolved a decorative scheme this time, which including as it does some wonderful scenic features involving the liberal use of electricity and water, is said to surpass anything ever produced in this line.

Stationed at the end of the main hall, where last year was placed the figures of "Age Instructing Youth," will be a marble fountain. The base of this, in which real water will be used in great quantities, supplied by a rotary pump, will measure 16 feet across by 14 feet high. Back of the fountain, so placed as to enhance the water and electrical effect, will be a hugh mirror of plate glass. Surrounding the two will be a peristyle, 40 by 25 feet in extent, and coverd with green trellis work. At the base of the fountain and around the peristyle, trees, shrubbery and potted plants will be placed. The effect will be spectacular in every sense of the word, and at the same time a suitable blending of harmonious colors will lend an Arabian Nights glamour to the decorative scheme as a whole.



Electrical Fountain for Grand Central Palace Show

PLANS FOR BOSTON'S BIG SHOW

Boston, Oct. 25—Application blanks for space in the eighth annual Boston Automobile Show, to be held March 5 to 12, 1910, in Mechanics Building under the auspices of the Boston Automobile Dealers' Association, have been sent out by General Manager Chester I. Campbell. For the show there will be available 105,000 square feet of show space, but the applications that already have been filed cover approximately eighty per cent. of the space. The preliminary allotment to members of the Dealers' Association has been made, and also the allotment to the members of the Motor and Accessories Manufacturers.

The show will be upon similar lines to those in the past, but the great increase in the number of pleasure cars has made it necessary for Manager Campbell to arrange for another division of this part of the show. Heretofore the pleasure cars have been exhibited on the street floors of the two main halls with overflow exhibits in the balcony and basement. In order to keep the cars out of the balcony Manager Campbell plans to have a special pleasure car department in one end of exhibition hall basement. This department will have special decorations.

The motor cycle department that has been in the basement will be moved to Talbot hall, a large hall off the balcony of exhibition hall, and the café will be in the basement. The decorative scheme for the show is being worked out, but has not yet been fully decided.

DEATH OF GEO. T. BARNSLEY

Pittsburgh, Oct. 25—Geo. Thos. Barnsley, road engineer of Allegheny county, died Saturday of heart failure. Mr. Barnsley was an officer of the Automobile Club of Pittsburgh, and it was chiefly under his direction that the County Roads contest now being brought to a close, was started last February. He had one great ambition, namely, to get 600 miles of macadamized roadway in Allegheny county. Already he had accomplished more than one-half of this task, and his plans were well laid for completing the remaining 300 miles, which would make more than one-third of the county roads macadamized.

During the past ten years Mr. Barnsley has been a steadfast advocate for the kind of roads which automobilists like to see, and every effort which he could put forth to secure better facilities for the automobilsts of Pittsburgh was cheerfully given. He rendered splendid service in the sign campaign, and also in securing effective city and state legislation of benefit to automobile owners and users. His death has taken from Pennsylvania its most noted road engineer, and a man who will be greatly missed by automobilists.

Mr. Barnsley was forty-five years of age, and had always been a resident of Pennsylvania. He was a graduate of the Rensselaer Polytechnic Institute of Troy, N. Y. He served successfully as engineer with the Norfolk & Western Railway Co.; the Pennsylvania Lines, and as chief engineer of the Wabash-Pittsburgh Terminal System. He was elected road engineer of Allegheny county in 1906.

CONVERSE NOW MASSACHUSETTS LEADER

Boston, Oct. 25—The annual meeting of the Massachusetts State Automobile Association was held last Thursday evening in the rooms of the Bay State Automobile Association, with a fair representation of delegates of the different clubs. A. E. Bliss, president, was in the chair.

At the election of officers A. D. Converse, of Winchendon, the past year chairman of the legislative committee of the association, was chosen president for the coming year. John P. Coughlin, president of the Worcester Automobile Club, was elected vice-president, and James Fortescue, secretary of the Bay State Automobile Association, was elected secretary and treasurer. He succeeds H. M. Sawyer, of Worcester, in the secretary's position, and J. C. Kerrison, of Boston, as treasurer.

The association passed a vote of thanks to Mr. Kerrison for his work as treasurer the past four years and elected him a permanent member of the association. The headquarters of the association will be at 24 Milk street, Boston, the secretary's office.

Mr. Converse presented an exhaustive report of the Committee on Legislation, telling in detail of its work in connection with the new automobile law that was passed by the Legislature last session. The committee considers the new law exceedingly fair to motorists and advocates giving it a fair trial. W. H. Chase, for the Good Roads Committee, presented a report showing that his committee had not been idle. The report urged upon the constituent clubs more energetic action in the cause of good roads. It was reported that several new clubs have been formed in the State and will be admitted to the State association. The new officers also are planning a campaign to secure a large number of new individual members.

MOORE OF MILWAUKEE, WISCONSIN HEAD

Milwaukee, Wis., Oct. 25—M. C. Moore, of Milwuakee, is the new president of the Wisconsin State Automobile Association, and he states that he will work with the spark advanced and the throttle wide open. James T. Drought continues as secretary, and George A. West remains in the treasurer's place. F. P. Hixon, of La Crosse, is first vice-president, and H. L. Halverson, of Whitewater, is second vice-president. The executive committee ocnsists of: A. R. Barker, Portage; C. W. Norris, Milwaukee; A. J. Horlick, Racine; George A. West, Milwaukee; James T. Drought, Milwaukee.

THE AUTOMOBILE CALENDAR

AMERICAN

Shows, Meetings, Etc.

Nov. 6-13.........Atlanta, Ga., Auditorium-Armory, National Automobile Show, auspices of National Association of Automobile Manufacturers. Samuel A. Miles and Alfred Reeves, General Managers, 7 East 42d Street, New York City.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Jan. 17-22........Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows Building.

Jan. 21-29........Detroit, Wayne Hotel Gardens, Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19........Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dai H. Lewis, Manager, 760 Main Street.

Feb. 19-26........Newark, N. J., Essex Troop Armory, Automobile Show, New Jersey Exhibition Company.

Feb. 21-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 22-26........Kansas City, Mo., Convention Hall, Fourth Annual Automobile Show.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

March 19-26......Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show. D. H. Lewis, Manager.

FOREIGN

Nov. 12-20.......London, Olympia, Eighth Annual International Automobile Show, Society of Motor Manufacturers and Traders.

AMERICAN

Races, Hill Climbs, Etc.

Oct. 28-30........Dallas, Texas, Three-Day Track Meet, Dallas Automobile Club.

Oct. 30...........Vanderbilt Cup Race, Long Island Motor Parkway, Motor Cup Holding Company.

Nov. 6-8.........Phoenix, Arizona, Road Race, Maricopa Automobile Club.

Nov. 8-9.........Savannah, Ga., Georgia Highway Reliability Contest to Atlanta, Savannah Automobile Club.

Nov. 9...........Atlanta, Ga., Track Races, Atlanta Automobile Association.

Nov. 20-21.......New Orleans, Annual Fall Meet, New Orleans Automobile Club. Homer C. George, Secretary.

Nov. 22..........Denver, Col., Start of "Flag to Flag" Reliability Run. G. A. Wahlgreen, Manager.

Dec. 29-30........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

Feb. 4-6..........New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.

CARL FISHER BECOMES A BENEDICT

Indianapolis, Oct. 23—Carl G. Fisher, one of the best known automobile men in the West, was married to-day to Miss Jane Watts at the home of the bride's parents in North Capitol avenue. Following the ceremony, Mr. and Mrs. Fisher left for Chicago, and will go from there to California and Mexico for an extensive motor trip. Mr. Fisher has taken a house at 500 North Capitol avenue which they will occupy on returning to the city.

Mr. Fisher is president of the Indianapolis Motor Speedway Company; president of the Presto-O-Lite Company, and treasurer of the Fisher Automobile Company, as well as an officer and large stockholder in the Empire Motor Car Company.

What the Clubs Are Doing These Days

BOTH PHILADELPHIA CLUBS WANT HOMES

PHILADELPHIA, Oct. 23—One result of the success of the Quaker City Motor Club's efforts in connection with the Fairmount Park race is the revival of the agitation for a clubhouse. The thousands of out-of-town visitors were astonished to find that the club was housed in a three-room suite in the Hotel Walton, and even though all the comforts of a modern hotel were within call, the guests could not be welcomed with the freedom and lack of restraint possible in private quarters. E. H. Fitch, George M. Graham and Allen Shelden have been appointed a committee on ways and means, and are now considering the question.

The Automobile Club of Philadelphia, which has an even smaller suite across the street from the Hotel Walton, also has the clubhouse bee in its bonnet. With 955 members on the rolls, it looks as if this organization is in even better shape than the Quakers to undertake the responsibilities of a householder. Dr. D. Braden Kyle is chairman of the committee having the matter in charge. The club is continuing its efforts in the sign-boarding line, and its display of signs, maps and road books at the Cleveland Good Roads Convention drew much favorable comment.

CANADIAN AUTO CLUB MAY TAKE UP AVIATION

MONTREAL, Oct. 23—"The Automobile and Aerial Club of Canada" will be the future title of what is now the Automobile Club of Canada, if the directors' resolution to take up aviation as a joint sport is adopted by the members at the annual meeting. The directors met yesterday afternoon and enthusiastically endorsed a proposition to extend the club's sphere of activity in this manner; they see a big future ahead for the aeroplane, and are anxious that theirs shall be the first club to take up the sport in Canada.

George Husson, manager of the Franco-American Automobile Company, of this city, has for some time been in communication with Louis Blériot, and has been assured that he could easily learn to operate one of the Frenchman's famous monoplanes. He expects to sail for France in November, and will spend three months looking over the machines turned out by the big companies. Curiously enough, much of the wood used by Blériot and other aeroplane constructions comes from Canada. The spruce of this country is found to suit admirably for many parts of the machines. Mr. Husson expects to bring back an aeroplane with him and begin flights.

PENNSYLVANIA CLUB'S THIRD ANNIVERSARY

LANSDOWNE, PA., Oct. 23—Two hundred members and guests gathered to celebrate the third anniversary of the Automobile Club of Delaware County, Pa., last Wednesday. The election was perfunctory, last year's officers being again chosen, as follows: J. H. Weeks, president; W. P. Anthony, vice-president; Dr. F. Marshall Harvey, secretary, and J. E. Mitchell, treasurer. The reports of the secretary and treasurer showed a membership of 410, and a balance of $710.02.

PITTSBURGERS WILL REWARD ROAD SUPERVISORS

PITTSBURG, PA., Oct. 25—At a banquet to be given by the Automobile Club of Pittsburg on Saturday evening, October 30, prizes will be awarded to more than 20 township supervisors who entered its good roads competition last February. More than $300 will be given in cash prizes and each supervisor will receive an additional gift of $5. The competition was for the purpose of seeing which supervisor could make the most improvement in his district during the season.

WASHINGTON CLUB HAS TWO HUNDRED

WASHINGTON, D. C., Oct. 23—The spacious country home of the Automobile Club of Washington was the scene of a merry gathering of motorists to-night, the occasion being the first of a series of stag smokers that will be held during the season. The clubhouse was thronged and a very entertaining bill was provided by the house committee. Six applications for membership were received. The club now has 200 members, and President W. D. West is determined to swell the number to 300 by the time of the annual meeting.

NEW YORK STATE CLUBS UNITE TO REPAIR BRIDGE

AUBURN, N. Y.—Oct. 23—The opening to the public of the free bridge across the Seneca River is directly due to the enterprise of the Auomobile Clubs of Auburn, Geneva and Syracuse. The State refused to appropriate the money for the repairs necessary to make the bridge safe and Cayuga and Seneca counties would only furnish between them $400 of the $1,500 required. At this juncture the Auburn club stepped in, and aided by the clubs of the two neighboring cities, made up the remainder. The club itself gave $150, the Geneva and Syracuse clubs gave $100 each, and the rest was from private individuals. President S. C. Tallman, of the Auburn Club, was in charge of the work.

Free Bridge Over the Seneca River, Near Auburn, N. Y., Repaired by the Local Automobile Clubs

THE LATEST NEWS FROM TIRETOWN

Akron, O., Oct. 23—The increase in the capital stock of the Diamond Rubber Company, from $5,000,000 to $10,000,000, marks another step in the remarkable and rapid growth in the business of the company. The increase was made in the form of a stock dividend, and announcement was made that the company expects to pay 10 per cent annually on the doubled capitalization. In anticipation of the increase in capitalization, the stock climbed as high as 350, while in the panic several years ago it was as low as 95. The increase in capitalization was made at the annual meeting, when the old officers of the company were re-elected. The company increased its stock from $3,500,000 to $5,000,000 in 1907, when it took over the Bryant Steel Wheel & Rim Company.

A. H. Marks, vice-president of the Diamond company, last week accomplished the largest purchase of suburban land ever made here. He bought 30 acres just west of the city, for which he paid $91,000. The Diamond Rubber Company has decided to further increase its plant by adding two buildings, one to be six stories high and 371 feet long, with a width of 103 feet. The size of the smaller building has not been decided upon. The proposed larger building will add six acres to the company's floor space, and the building now under construction, which will be completed by January 1, will add another six acres.

The Goodyear Tire & Rubber Company began this week planning to more than double its tire output by January 1 next. The beginning of next month a night shift will be put on, and from that time on the plant will be run night and day. Vice-President C. W. Seiberling announced that by the end of this year the output will be increased from 600 tires to 1,400 and 1,500 a day.

The Diamond and Goodyear Tire & Rubber Companies have landed two of the largest individual tire contracts of the 1910 season. The former has secured a contract to furnish 28,000 tires to the Maxwell-Briscoe Company, and the latter an order for 10,000 sets, or 40,000 tires for the Buick Motor Company.

The annual meeting of the Northwestern Rubber Company, of Liverpool, England, was held in the offices of the Diamond Rubber Company here this week, resulting in the election of A. H. Marks as president; William Alex Smith, of Glasgow, as vice-president and treasurer. E. E. Buckelton, Liverpool, secretary and managing director. These, with O. C. Barber, of Akron, and Joseph Torrey, of Liverpool, are the directors.

WASHINGTON DEALERS ENLARGE

Washington, D. C., Oct. 25—In anticipation of the largest volume of business in the history of the industry in this city, the automobile dealers of the National Capital are enlarging their salesrooms and making additions to their lines.

The L. P. Dorsett Company is doubling the capacity of its salesroom and garage at Seventeenth and U streets, giving it storage space for 100 additional cars. This company, which has handled the Stoddard-Dayton and Babcock electric for several years, has taken on the Mitchell and the Empire.

Chas. E. Miller & Brother, Ford agents, are remodelling their salesroom on Fourteenth street.

The Overland Automobile Company has secured a permit for the doubling of its garage at 1215 V street.

The Dupont Garage Company, which handles the Lozier, Columbia and Detroit electric, has opened a salesroom at Thirteenth and G streets, in the downtown business section.

The Motor Sales Company has relinquished the agency of the Herreshoff, and has taken the Moon and Rauch & Lang electric.

The Newbold-Speedwell Company has been formed to handle the Speedwell and has secured quarters with the Warner Motor Company, at 1206 New Hampshire avenue. G. H. Covert has been made manager of the Warner Company, succeeding A. Parker Warner.

The Roman Automobile Company, of Philadelphia, has opened a branch store on H street, and will feature second-hand cars.

The Wilson Company has moved into its new salesroom and garage at 1333 Fourteenth street, and taken on the Hupmobile.

$1,000,000 ROAD—JERSEY CITY TO NEWARK

Newark, N. J., Oct. 25—When the date of November 9 was set for the reception of bids to complete the gigantic Plank road project the friends of the movement for a real highway between Newark and Jersey City felt one big step had been made.

This road project has been under way for years, the object being the replacement of the present apology for a road with an up-to-date highway worthy of the name. While the original plans called for planks as a surfacing material, similar to the present surface of the road, the latest idea is to build a road with one of these materials: Medina sandstone, wood blocks, or granite blocks. The one to be used will be determined by the joint committee from Hudson and Essex counties, which committee is in charge of the whole work.

Among the features of the road which are worthy of mention are the following: The road surface will be widened to 100 feet, of which width some space on each side will be given over to the Public Service Company for trolley cars, those on one side of the road running to New York and the others to Newark. There will be 28 feet of roadway running east and west, and two sidewalks each 21 feet wide.

Important in the list of changes which this will necessitate is the bridge which will have to be built across the Passaic river. Proceedings to condemn the necessary land along each side of the present roadway have already begun and in one very important stretch this additional width of land has been donated. This is between the Passaic and Hackensack rivers, and was given outright by the Hackensack Meadows Company.

Expenses of the road improvements have been agreed upon, the two counties affected bearing the burden in proportion to the benefit derived from it. Thus, Essex county, to which the highway will be the more important, will pay for five-eighths, while Hudson county will pay the other three-eighths. This is with the exception of the big bridge, of which the trolley company will pay 25 per cent., after which the remaining expense will be shared by the counties in the same ratio.

NEWS PICKED UP IN FACTORY CALLS

The Simplex Motor Car Company, Mishawaka, Ind., with facilities to build the entire car, tires and ignition excepted, is rushing the work on this year's model and adding to the plant for future increased output.

The General Manufacturing Company, Elkhart, Ind., with added facilities, has contracted to build transmissions, clutches and motors in a large way for several of the Detroit makers who were caught in the material famine now on. The company is just finishing five hundred motors for the International Harvester Company.

The Elkhart Motor Car Company, Elkhart, Ind., makers of the Sterling, with a large new plant, reports material slowly coming in, but from appearances the company will put out three thousand cars this year. President Sterling just closed with the California agent to deliver two hundred cars.

AUTO SCHOOLS OPEN FOR SIXTH YEAR

What is probably the largest automobile school in the United States, and certainly is the biggest in New York City, opens to-night. This is the automobile school of the West Side Y. M. C. A. located on West Fifty-ninth street. The sixth year of work will be formally ushered in at a meeting in the auditorium at which several addresses will be made. Among the speeches and speakers are: "The Automobile and Aeronautics," Augustus Post, secretary of the Aero Club of America; "An Illustrated Look into the Rural Future of the Automobile," J. George Frederick, editor *Printer's Ink;* "The Outlook of the Automobile Industry," Hon. C. Andrade, Jr., attorney for New York Automobile Trade Association; "The Auto Driver and the Policeman," William McAdoo, former Police Commissioner. New York City.

GEMMER STEERING GEAR IS MUCH IN EVIDENCE

VARIETY seems to prevail in styles and types of steering gear used in automobiles, and it is a liberal education to visit the plant of the Gemmer Manufacturing Company, at Detroit, and take time enough examining into the process to learn how the gears are made. This plant was originally fitted out to make the Gemmer steering gear, but as demands increased and different designers of cars expressed preferences for other types of gears for reasons that seemed good to them, the maker of the Gemmer bowed to the will of the purchaser, fitted out more completely, and to-day in this plant it is possible to procure in quantity any of the several types of gear for which there is a material demand.

In the meantime, according to President Hammond, of the company, the variety of demands on the part of automobile designers is a source of extra cost, complicates the situation unduly and deliveries are rendered much more uncertain, so that uniformity would be a boon to the industry and standardization is a crying need.

The plant, which has been considerably more than doubled in recent times, is substantially fireproof, the idea being to reduce the chances of defaulting on contracts from this cause, and the shop system is so contrived that good work, reliability and freedom from labor trouble are regarded as of the greatest importance.

Foundry Products Are Stored Up—Most of the gear housings are made of malleable iron and any one familiar with this situation will readily understand that there is great uncertainty attending the procuring of the same. To guard against a famine of malleable iron it is necessary to carry a year's supply ahead and much room is taken up in storing this class of material. In the same way, drawn-steel tubing is stored, practically on a basis of a year's supply, and, according to the experience of the company, it is not enough to place orders and fix the time of delivery. The material must actually be delivered, stored, and the actual cash outlay is therefore very considerable, none of which can be recovered until the steering gears are delivered to makers of cars from time to time agreeable to contract conditions.

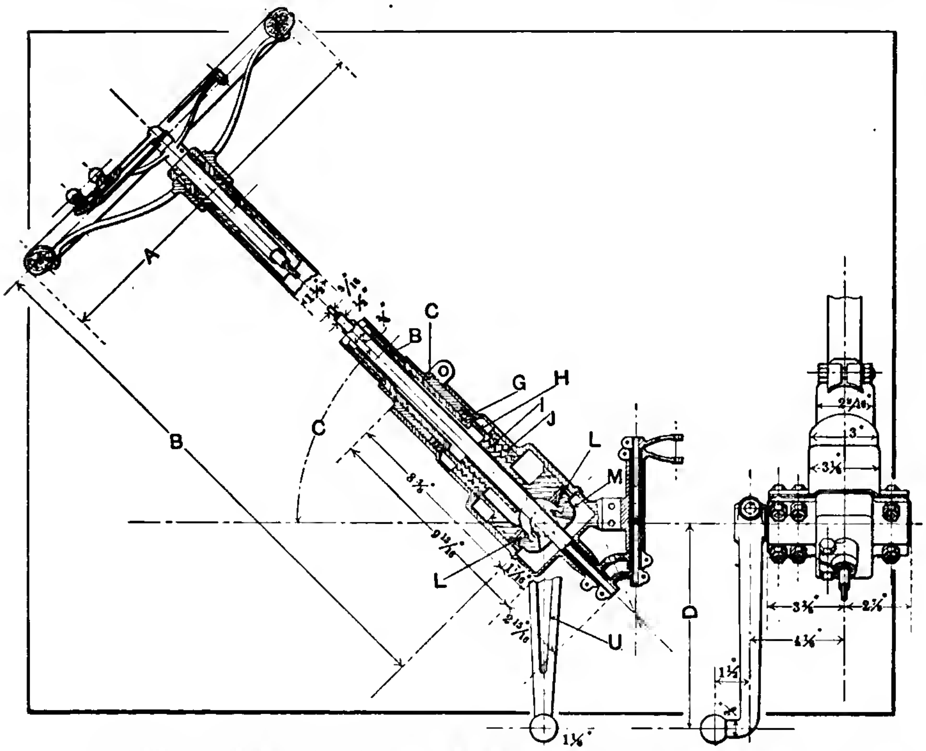


Fig. 1—Model C regular Gemmer Gear, showing bevel type of spark and throttle connections, mode of control, and well-designed steering arm

Shop Equipment Extensive and Complete—The several types of worms, sectors and other designs of gears are made of a free-cutting "cementing" steel, capable of being fashioned in automatic machine tools to the greatest possible extent, and special hobbing machines are employed in hobbing the worm threads. The parts are forged in dies, and in order to relieve strains they are annealed and otherwise prepared for the hobbing process. The above process applied to all of the types of worms and gears made, and after the hobbing is done and threads are cut, the worms and sectors are cemented and with a suitable depth of the carbon penetration as a result of cementing, they are water quenched to render the surfaces of the threads glass hard.

The class of material used is of such a high grade that water quenching is practicable, and the kinetic properties of the steel are assured by an intermediate oil-quenching process. In this way the worms and gears, without respect to type and price, are all of the same finish hardness and so uniform in structure as to leave nothing to be desired.

Regular Gemmer Gear Ranks as Standard—Fig. 1 depicts the regular Gemmer type of gear, the particular one being the Model C, and since the figure is in cross-section it will scarcely be necessary to discuss the working of the gear at great length. The first point to be readily disposed of is that of the concentric disposition of the spark and throttle rods; they pass up through the column to levers on the wheel and motion is imparted to the rest of the system by means of a bevel-gear system attached to the housing at the bottom end of the column.

The steering wheel may be of any desired diameter, the usual range being about 16 inches. The wood may be mahogany, black walnut or other selection and the manner of fastening the wood may be selected by the buyer with the understanding that the price will change accordingly.

Where the column is brazed to the gear a key is used as a safety measure so that, should the brazing fail, the key will have to be sheared off before the wheel will fail. That the key would shear off is not at all likely and the only thing that can happen is that lost motion might be developed, which lost motion would serve as a warning to the motorist that the brazing has failed and should be attended to.

This question of brazing, according to Mr. Hammond, is one that is in need of backing up by an independent safety measure on the ground that even a man of skill cannot be dead sure that the brazed joint is perfect and a separate key, in addition to brazing, affords a due measure of safety.

Principle of the Gemmer Gear—Referring to Fig. 1, the nut H has a right-hand thread outside engaging with nut J and left-hand thread inside engaging with nut I. When the wheel is rotated in one direction, thus rotating the nut H through the column B by the action of the right and left-hand threads, one nut is forced down against one of the pivot blocks L, depressing that side of the rocker shaft M and at the same time the other nut is raised. This action rotates the shaft giving the lever U its movement. Rotating the steering wheel in the opposite direction, the action on the shaft M moves the lever U in the opposite direction.

In view of the importance of adjustment of steering gear,

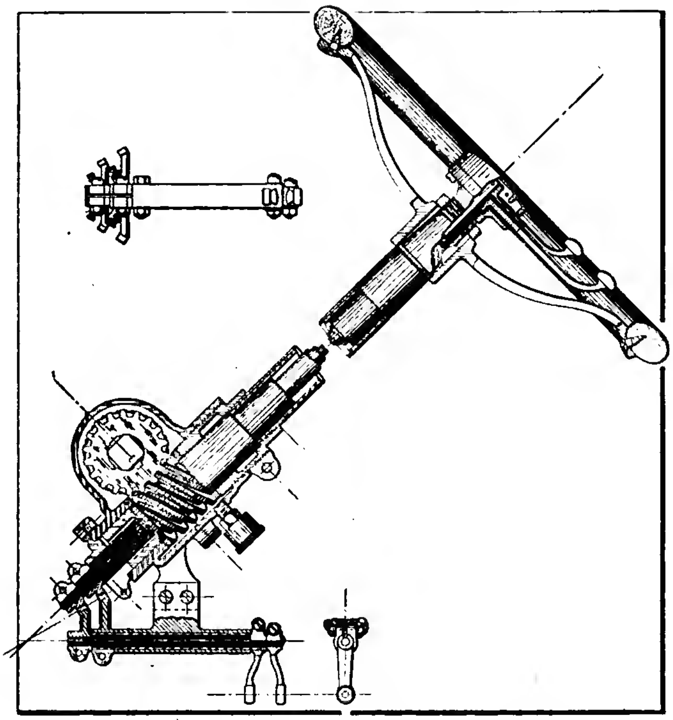


Fig. 2—A low-priced form of worm and sector gear with plain thrust bearings, but with means for adjusting

considering how very desirable it is to eliminate lost motion, it will be of advantage to notice that all the work done in imparting motion to the rocker shaft M is in compression. The nut J presses on one side, giving a movement in one direction and I presses on the other side, imparting the reverse movement. Under the circumstances the wear on the thread comes on one side only and if the adjusting nut C is screwed down to take up any lost motion there may be in ball thrust G, and continuing, presses on the nut H, which in turn pushes down against the nuts I and J, brings the bearing surface of the threads in contact and I and J in turn are pressed down against pivot blocks L and they against their bearings on the shaft M, thus eliminating lost motion at all points.

Shoulders will not form, as is bound to be the case in worm and sector types of gear, because in this type of gear any movement from the neutral point causes the wearing surfaces to overrun, hence shoulders are prevented from forming, so that after adjusting the mechanism will not bind.

Worm and Sector Types Are Much Used—From the Gemmer to worm and sector types is a considerable deviation, yet even so, a considerable part of the business of the company is that of building worm and sector types of gear, and Fig. 2 depicts the type C gear, which is the lowest priced product the company turns out. The work is keyed onto the spindle and a taper pin is fitted to a taper hole through the shell of the gear and the tube to prevent the worm from floating off. Bearings are of phosphor bronze, long and nicely fitted, and means are provided for adjusting the thrust surfaces up against the ends of the worm as the occasion requires.

In this class of worm and gear the quality of the material used is up to the customary standard of the company and the reduction in price is brought about merely by adapting the parts composing the gear to automatic machine tools, the use of plain but adjustable thrust bearings, instead of ball types, and in such other little economies as quantity production naturally falls heir to. The spark and throttle levers on this wheel as shown are different from those depicted in Fig. 1, but this is a matter which may be adjusted to suit the purchaser, who may choose any one of a number of systems available, paying the difference if there is any.

Fig. 3 shows the type K worm and sector gear, which is a more costly product than the gear shown in Fig. 2, primarily due to the use of a ball-thrust bearing and to such other little refinements as a difference in price will naturally support. This gear is used on cars weighing up to 4,000 pounds, is provided with a quadruple thread, 2-inch lead, six pitch, 5 1-2 to 1 ratio of worm to sector and the throw of the lever is 65 degrees per turn of the wheel. Special designs necessarily interfere with delivery, and are at extra cost. As a rule, quality is more dependable if regular designs are used.

Steering Wheels in Divers Forms—In some examples the spiders of the wheels are of bronze, but aluminum is the favored material. The spokes in each case are dished, internal strains are eliminated, and "wasters" are reduced to a minimum. The wheels shown in the figures are of the class with the wood work fastened on by means of screws, but in the finer examples of work in the Gemmer plant the wood is laminated, using mahogany for the purpose, and the lamanæ, after being built up and glued on to the flange of the spider, are finished.

The finish may be in natural mahogany, rosewood or any other style, and the character of the finish depends upon the amount of money the purchaser wants to pay. The strength of the wheels is not dependent upon the finish, and it is the claim of the maker that the wheels on the lowest priced gears are quite as safe and secure as the products with the highest finish.

RELATION OF GASOLINE VAPOR TO AIR

In any discussion of the relation of gasoline to atmospheric air, it becomes necessary to carefully distinguish as between vaporized and liquid gasoline. With air at 60 degrees Fahrenheit, about 15 per cent. of true gasoline vapor will produce a state of saturation. Such a mixture would be non-explosive, and in practice the following holds:

Volumes of gasoline vapor in per cent of air volumes	*Volumes of atmospheric air at 60° F. corresponding	
15.0		Saturation point of air at 60° F.
5.5	3,400	Too rich to serve for the purpose
4.0	4,000	Uncertain in its action
	5,000	
	6,000	
	7,000	
1.9	8,000	Suitable for the best results
	9,000	
2.4	10,000	Too uncertain to be of value

*In the above table the volumes of air relate to one volume of liquid gasoline, whereas the vapor volumes are in percentage of the air volumes used in each case. Absolutely accurate determinations will depend upon the mixture being of a definite character.

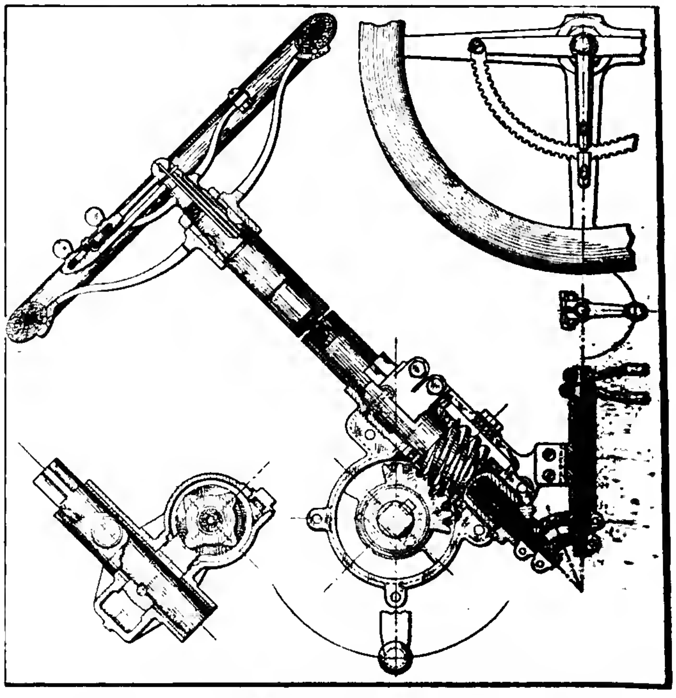


Fig. 3—Model K worm and sector gear with bevel spark and throttle, and ball-bearing thrust

IN AND ABOUT THE GARAGES

Pittsburgh—The Standard Automobile Company has let the contract for a four-story garage, 215 by 70 feet, at Grant Boulevard and Bellefield avenue. It will be finished in gray pressed brick and terra cotta, and the cost is estimated at $125,000. Plans are being prepared for a garage to be used by a new taxicab company at Grant Boulevard and Craig street. This will be four stories high and 135 feet square, and is to have one of the most complete repair shops in the city. At Butler, Pa., 30 miles north of Pittsburgh, the Atwell Automobile Company has broken ground for a $25,000 garage, two stories high, in which the Oldsmobile and Cadillac will be sold.

Philadelphia—The Regent garage, 4525 Springfield avenue, has recently doubled its storage capacity by the erection of another building, giving the largest unobstructed floor space of its character in the city. Its depth is now 227 feet and width 50 feet, and it is also remarkable from the fact that it has two six-foot skylights each 76 feet in length. There are now two entrances to the garage, the former one on Springfield avenue, and a new one from Baltimore avenue, so that cars may enter or leave from either street. Frederick K. Mears is the proprietor.

Gouverneur, N. Y.—F. N. Freeman, representing the Gouverneur Maxwell-Briscoe Motor Company, has just completed one of the finest garages in the State. It has been built to accommodate the great number of tourists, en route from southern and western points to the St. Lawrence, Montreal, and Plattsburgh. The floor space is 75 by 110 feet in size, giving space not only for the storage of many cars, but also for the repair shop, and a stock room with all kinds of general parts and accessories. A finely appointed women's waiting room is a feature.

Baltimore—A garage is being erected at Charles and Twentieth streets by the Dixon S. Walker Auto Company, agent for the Studebaker. The company's business has outgrown its garage at 1917 North Charles street, which was new only a year ago. The new garage will front 175 feet on Charles street, with a depth of 80 feet. Charles H. Evans has opened the Northeastern Garage, at Regester and Federal streets. The building has a capacity of 30 machines.

St. Augustine, Fla.—The St. Augustine Machine Company has arranged to build a large addition to its garage on Granada street. At present the quarters are 40 by 46 feet in size, and with the new part will be increased to 40 by 120. This will greatly enlarge the storage capacity and will also give space for a well equipped repair shop. The proprietors have also decided to increase the gasoline storage capacity to 500 gallons.

Pittsburgh—The E. J. Thompson Company has purchased a site on New Louisa street, near the world's biggest baseball grounds, on which to erect a garage. The property is 75 by 110 feet. A concrete garage to cost $50,000 will be erected.

New Fireproof Garage of Easton Auto Co., Easton, Pa.

Newark, N. J.—The Newark Auto and Engineering Company is building a salesroom and garage at 318-320 Broad street, north of Belleville avenue. The building will be 50 by 100 feet, of brick and steel construction with stucco front and one story high. The company holds the agency for the Rambler. Temporary offices are located at 151 North Sixth street.

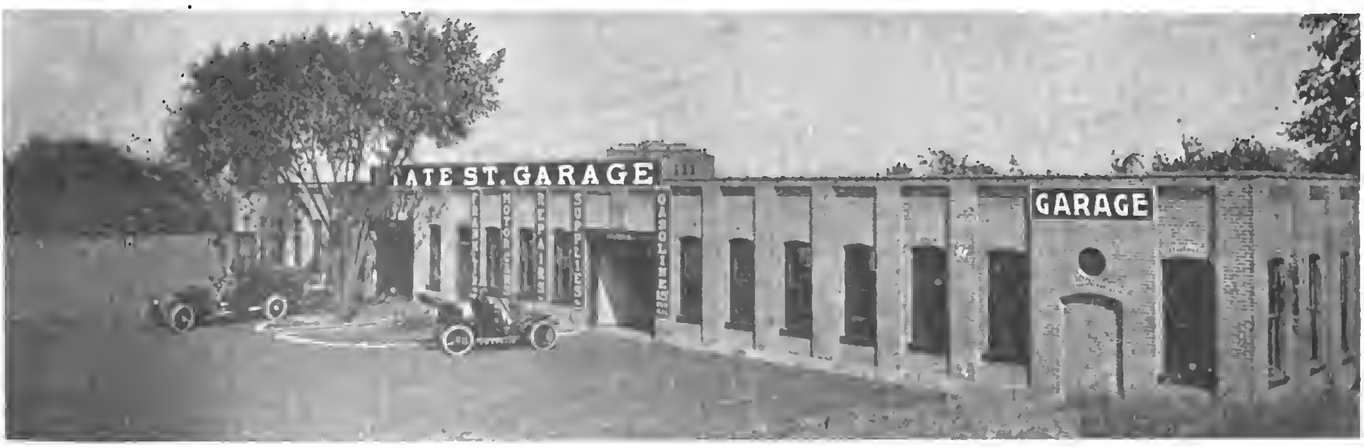
Augusta, Ga.—The communistic garage, proposed by President C. B. Garrett of the automobile club, is finding favor among local autoists. It is probable that no difficulty will be found in getting 30 men to subscribe $500 each for stock, and then the building will be erected. It is planned to have it centrally located.

Baltimore—The Ford Automobile Company has arranged to build a modern garage on West North avenue. The site is 40 by 110 feet in size and the building will be two stories high, with the lower for show purposes and the garage, while the upper will contain the offices and repair shop.

Valdosta, Ga.—Ground has been broken for a new garage by A. A. Parish. The location is at 116 and 118 West Central avenue, and the building will be 60 by 90 feet in size. It will be fully equipped with repair shop and features for caring for the cars on storage.

Cincinnati—The Evanston Automobile & Garage Company has been recently formed in Cincinnati, with headquarters at 3705 Main avenue. Charles Schiear, C. Roy Clough and F. T. Larson are the organizers, and the agency for the Velie and Hupmobile has been taken.

Columbus, Ga.—The Georgia Automobile Exchange has purchased a lot on Second avenue, and will start the erection of a $10,000 garage for its own use.



Garage and Salesrooms of C. W. Gray, Watertown, N. Y., Which Has Just Been Completed

This garage is one of the most complete establishments of its character in the northern part of New York State, and is the home of the Franklin agency for Watertown and vicinity. The ample floor space and interior arrangements make it particularly available for the expeditious handling of cars

A. G. Vanderbilt on Coaching Trip Uses White Steamer as Tender

On the recent trip of the New York Coaching Club from New York to Newport in Mr. Vanderbilt's coach "Pioneer," a White Steamer accompanied the party as "tender" and general utility and emergency wagon. The White was used to carry extra parts for the coach, for running ahead and making arrangements at the ferries, and for bringing news of the approach of the coach to the stations where the horses were to be changed. Occasionally, when it was necessary to lighten the load of the coach on a steep hill, four or five of the passengers would transfer themselves to the automobile

Pierce-Arrow Auto School.—As in former years, the Pierce-Arrow Company will conduct a free school of instruction, divided into three sections, for owners of Pierce-Arrow cars, drivers, and dealers and repairmen. Each class will last two weeks, beginning soon after the first of the year and continuing through the Spring. Two classes will probably be set apart for colored men. The classes for owners will contain more of driving instruction than the others, while those for drivers will be taken up largely with a thorough foundation in the care and maintenance of the cars. Dealers and repair men will be well grounded in the principles of construction and in the making of adjustments. Driving of the cars does not predominate in any of the courses, although it has a part in each. A six-cylinder 48-horsepower car will be used in the instruction school. No fee is charged, the only requisite being that the entrant be an owner, driver of or dealer in Pierce-Arrow cars, bearing a letter of identification from the dealer in his district.

Firestone Says 135,000 Cars—The published claims of automobile makers as to their productions during the coming seasons may occasionally need to be taken with a grain of salt, but the purchasing departments of those makers are not likely to order more tires than they can actually build cars. H. S. Firestone, who naturally has opportunities to obtain inside knowledge of the plans of the purchasing departments, conservatively estimates that the production for 1910 will be about 135,000 cars. Mr. Firestone also expresses a belief that one-third of the cars will leave the factories with demountable rim equipment.

Prospects at Peru, Ind.—The Peru Auto Parts Mfg. Co., recently organized at Peru, Ind., with a capital of $200,000, has purchased a $60,000 plant on the lines of the Wabash and L. E. & W. railroads and will begin immediately the manufacture of automobile wheels, axles and other parts. The officers of the company are S. H. Penfield, president; John Tomey, vice-president and treasurer, and Frederick Brown, Jr., secretary. It is reported that this company is distinct and separate from the Salisbury Wheel & Mfg. Co., of Jamestown, N. Y.

For More Breeze Carbureters—The Breeze Carbureter Company, of Newark, N. J., is building a reinforced concrete factory on South street, Newark, which will afford about ten times the floor space of the company's present quarters. The equipment will be the most modern throughout, including fireproofing and sprinkler systems. Pressure of business has necessitated moving the company's offices from the present factory at 276 Halsey street to 14 William street, the space vacated by the office being devoted to manufacturing.

Grout in Suburban Service—George H. Prouty, of Barre, Mass., has put in service a nine-passenger Grout between Petersham and Barre, carrying passengers and mail. The car has three seats, seating three passengers on each, and is finished with unusual elegance, considering the service in which it is used. Its maximum speed is about 30 miles an hour. Mr. Prouty expects to put a 12-passenger car in operation soon.

New Maxwell Branch at Albany, N. Y.

Ohio Electrics at Toledo—The stock of the Ohio Electric Car Company has all been subscribed in Toledo by twenty capitalists of that city, each taking the maximum of $5,000. The office and works of the new company are located at the Milburn Wagon Company's plant and a large force of men is already at work there on the bodies. One type of electric chassis will be built.

Big Ball Bearing Order Placed—From the J. S. Bretz Company, with offices in the Times Building, New York City, the E-M-F Company has ordered 20,000 F. & S. ball bearings for 1910 cars. These are to be used on the main driving pinion for live rear axles, and are arranged for both thrust and radial loads.

NEW YORK TRADESMEN ENERGETIC

For some time past, members of the New York Automobile Trade Association have not been entirely satisfied with the work of the organization, and the subject received considerable attention at a recent midday luncheon, held at the Hotel Cumberland, on Broadway, and presided over by Gen. John T. Cutting, twice-elected president. A committee was appointed to revise the present constitution and by-laws, which have not enabled the association to enlarge its scope to meet changing conditions. President Cutting advocated greater interest in metropolitan automobiling.

Among the other association members who spoke were: C. Andrade, Jr., of the R. M. Owen Company; J. F. Plummer, of the Locomobile Company; Robert Slusser, of the Harrolds Motor Car Company; W. W. Burke, of the Mora Motor Car Company, and C. W. Wurster, of Wyckoff, Church & Partridge.

NEW MAXWELL BRANCH AT ALBANY

The Maxwell-Brisco Motor Company has opened a branch at 72-74 Central avenue, Albany, N. Y., where it has one of the finest show rooms in that portion of the Empire State. W. K. Hadley, a veteran in the automobile field, has been appointed manager. He has been connected with the sales department of the home company for the past three years in a traveling capacity.

IN AND ABOUT THE AGENCIES

Pennsylvania Agencies—The following agencies are announced by the Pennsylvania Auto Motor Company, Bryn Mawr, Pa.: Middleton Motor Car Company, 548 Golden Gate avenue, San Francisco; Vail Motor Car Company, Los Angeles, Cal.; Lemly-Mills Auto Company, San Antonio, Tex.; Pennsylvania Sales Agency, Atlanta. Ga.; D. A. Kendall Motor Company, Kansas City, Mo.; H. Weston, Jacksonville, Fla.; Pensacola Buggy Works, Pensacola, Fla.; Pennsylvania Selling Agency, Providence, R. I.; Murray O'Neill, New Bedford, Mass.; Haynes Automobile Company Minneapolis, Minn.; Oliver De Charme, Troy, N. Y.; Philip A. Lowe, Pittsfield, Mass.; C. W. Fulkerson, Carbondale, Pa.; Pennsylvania Selling Agency, 609 Neville street, Pittsburgh; Walter Slack, Trenton, N. J.

Winton, Philadelphia—Manager A. E. Maltby, of the Winton branch at Philadelphia, has decided to rebuild on the site of the present building at 246 North Broad street, the specifications calling for a two-story structure with a floor space of 25,000 square feet. The first floor will be occupied by showrooms and offices and the second by shops, stock rooms and storage. Pending completion, which cannot be before March 1 next, the Winton agency will be in temporary quarters at Broad and Race streets.

Packard, Philadelphia—After November 1 the Packard, for many years represented by the Keystone Motor Car Company, will be handled direct from the factory through a branch house. Just who will be the head of the branch has not been announced. It is understood, however, that the establishment of the Keystone Company, on North Broad street, will be bought outright.

Bosch Magnetos, San Francisco—The Bosch Magneto Company has established a branch at 537 Van Ness avenue which is to be its headquarters for the West and the Pacific Coast. A stock will be kept of the various types of Bosch magnetos and their fittings and parts, and the new branch will be conducted in the same manner as the New York main office and the Chicago branch.

Continental Tire Agencies—Additional distributing agencies of the Continental Caoutchouc Company are the Gibson Automobile Company, 238 Massachusetts avenue, Indianapolis, for a part of Indiana; the Jas. S. Bailey Company, Portland, Me., and the Auto Supply Company, Baltimore, for the entire State of Maryland.

National and Standard, Omaha, Neb.—The Standard Automobile Company, composed of H. E. Wilcox and Charles Merz, who is to drive a National in the Vanderbilt, is building a garage on Farnam street, west of Twenty-fourth, where it will sell National and Standard Six.

Jackson, Philadelphia—S. R. Blockson has been awarded the agency for the Jackson, which he formerly handled with much success at Pedricktown, N. J. He will be with the Stoyle-Vogel Company, Broad and Race streets, until he secures permanent quarters.

Royal Tourist, Minneapolis, Minn.—I. A. Thorson and E. G. Johnson have organized the Royal Automobile Company to represent the Royal Tourist, with an office at 717 Hennepin avenue.

Assembly Floor of the Chalmers-Detroit Motor Company, Detroit

The entire second floor of the new building of the Chalmers-Detroit factory is used for assembling finished cars. The above picture shows one section of the floor containing chassis waiting for bodies to be fitted thereto, and the final touches applied before testing and shipment

American and Moon, Omaha, Neb.—The recently incorporated Sweey-Edwards Automobile Company will handle the American and Moon and expects to be installed in a new garage on Farnam street by December 1.

American Simplex, New York City—S. J. Wise has been appointed metropolitan agent for the American Simplex and has established headquarters at Broadway and 54th street.

Acme, Pittsburgh—L. Glesenkamp, Sons & Company have secured the Acme agency, and will also handle the Glesenkamp-Martin commercial car, a local production.

Baker, Wilmington, Del.—Col. G. P. Postles, who is the agent in this city for the Chalmers-Detroit and Hudson, has taken the representation of the Baker electric.

Kline-Kar, San Francisco—The Frank O. Renstrom Company, of 424 Stanyan street, opposite Golden Gate Park, has taken the agency for the new Kline-Kar.

PERSONAL TRADE MENTION

A. D. Frost, formerly sales manager of the Harry S. Houpt Company, New York City, in which capacity he had charge of the distribution of the 1909 Herreshoff, has been appointed sales manager of the Herreshoff Motor Company, of Detroit. The 1910 Herreshoffs will be marketed direct from the factory.

William F. Horner, resigning from the automobile editorship of the New York *Press*, has taken a similar position with the Brooklyn *Eagle*. William Newton, formerly of the *Eagle*, succeeds Mr. Horner on the *Press*.

H. W. Doherty, sales manager for the Cameron Car Company, Beverly, Mass., for the past two years, resigns his position with that company November 1. Mr. Doherty has not announced plans.

William J. Urquhart has been promoted to be general manager of the Western sales department of the White at Chicago. C. A. Hawkins will devote attention to Pacific Coast sales.

Rapidly Developing Plant of the Chalmers-Detroit Motor Company at Detroit

The photograph shows some of the additions now under way. To the extreme right is shown the old factory building, while in the center is the recently completed addition. To the far left is the first floor of a contemplated four-story duplicate of the other two main buildings. Additional floors are now being added to the original building as well as the completed new building

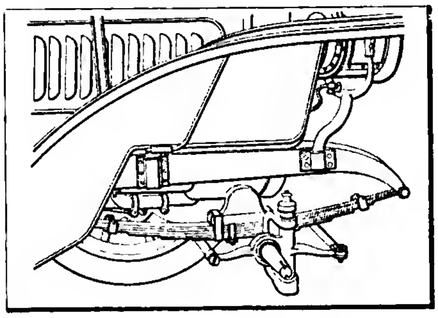
Information for Auto Users

High Compression Spark Plug—In the construction of the Champion spark plug, the makers, the Champion Company, 36 Whittier street, Boston, use great care and the best of materials, so that the resulting plug is particularly suitable for cases where the duty is severe, as for use with high compression, with excess of oil in the cylinders, with magneto, etc. In fact, as to magneto, the makers say that this plug is particularly suited for that use, since the nickel-alloy points used are imperforable to spark of any intensity. Under the severe use demanded from a magneto plug, they will not burn off. One point

CHAMPION PORCELAIN SPARK PLUG

of sterling worth is that the center wire is firmly cemented and baked into the porcelain forming the central portion of the plug. This also prevents any possible leak of cylinder compression through that opening. Both shell and bushing are cut from solid stock, so that the porcelain does not contact with either.

Trailing Axle Spindle Makes for Safety—Since the public is always interested in any device which makes for increased safety without complicating the machine or materially increasing the cost, a short description of the principles and action of the B. & L. Front Axle Trailing Spindle will be of interest. This device is made by the Queen Mfg. Co., Webster City, Ia., and is intended primarily to be a safety device—a sort of life insurance. The axle spindle is set back of the center of the front axle by a predetermined amount, this setting back or offsetting resulting in the spindle, and with it the wheel, following a straight-ahead line, whether the cross-connection be severed or not. Thus, in case of an accident which breaks or loosens the cross rod, the car will continue straight ahead, regardless of that fact. It is claimed that, strictly aside from this safety feature, the car equipped with this trailing spindle, steers so much easier as to eliminate all fatigue from that cause. As proof of their claims, the manufacturers, who now have shop rights for sale, claim to have driven a machine thus equipped through eight loads of



B. & L. TRAILING FRONT AXLE

sand so distributed as to strike only the wheels on one side, this being done at a speed of 25 miles an hour, and without the hands touching the steering wheel. On this test the car did not vary 6 inches from a straight line.

Self-Adjusting Tire Tread—For the season of 1910, the Leather Tire Goods Company, now located at Niagara Falls, N. Y., have brought out a new style tire which will be welcomed by tourists who who have known and appreciated the Woodworth Adjustable Tread. The newer form differs from the old in the method of fastening the tread on the tire. The tread itself consists of a number of galvanized steel plates riveted along each side of the tread a short distance apart and connected by short, stiff

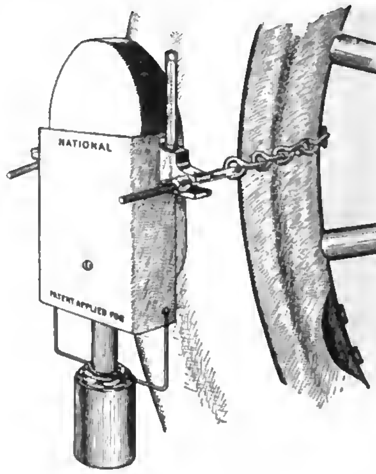
WOODWORTH SELF-ADJUSTING TREAD

springs. Each spring is linked to one end of a plate and has a hook at the other end. The tread is applied by slipping it sideways over the deflated tire with the springs unhooked. When in place, the springs are hooked into the plates, forming a ring around each side. As the tire fills out, the springs are stretched, holding the cover tight on the tire and ready to take up any slack.

More than this, the leather used in the new treads is treated by a new process, which the makers state doubles the life of the leather, preventing the action of dirt and water from affecting it. The new leather is of a dark green color.

The rivets used in this tread have thicker heads, thus adding greatly to the mileage obtainable. The corners of each rivet are rounded off so that they cannot be caught in such a way as to be forced out of the leather. More, the leather on each side of the heavy rivet is studded with smaller, flat-headed rivets, which, while adding little to the total weight, protect the leather in ruts, or on rocky roads.

New Small Vulcanizer of Simple Form—With the usefulness of a vulcanizer admitted and fast becoming well-known for its economical effect upon tire upkeep, there is a wide demand for a small and portable machine as opposed to the very expensive large ones, which are heavy and bulky to handle. The newest to appear is that of the National Motor Supply Company, Cleveland, which is called the National steam vulcanizer. This is a small device consisting of a brass shell, which is filled with water.



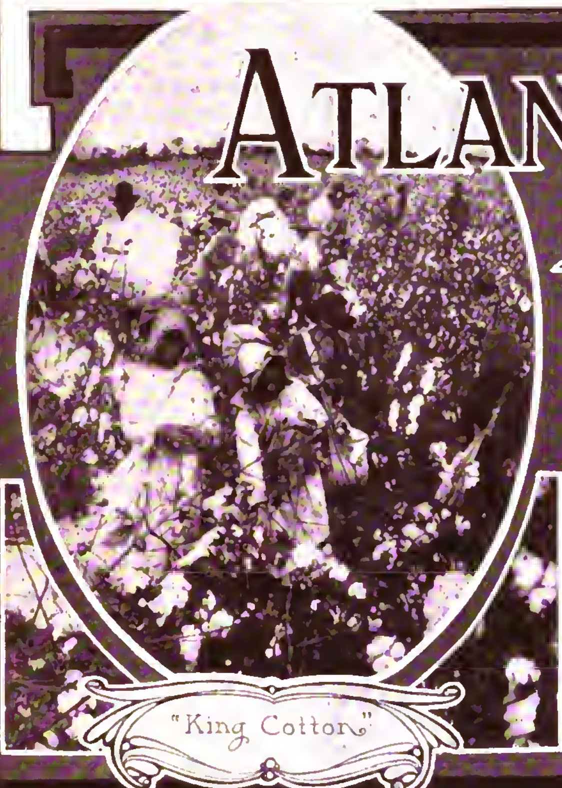
NATIONAL VULCANIZER IN PLACE

This shell may be held to the tire by means of small chains and screws with wing nuts to regulate the tension. In this way, the vulcanizing may be done right on the tire, allowing the use of the device out on the road if so desired. In addition, there is a small alcohol lamp or torch attached to the base of the brass shell, which is utilized to heat the water. This water is heated to such an extent as to turn it into steam, when the action of the vulcanizer proceeds just the same as any steam device. The size of the torch is such as to turn the water into steam in about 7 minutes, and a complete job in less than 15 minutes.

Aside from this, the National is very simple to operate, as there is nothing to get out of order. The flame guard is interchangeable from one side of the vulcanizer to the other, so that the flat side can be used for tubes and the concave side for shoes. A complete outfit is furnished, and since there is no danger of burning or otherwise injuring the tire, it makes a very efficient outfit for the private owner.

THE AUTOMOBILE

ATLANTA THE AUTO MECCA OF THE SOUTH


"King Cotton"

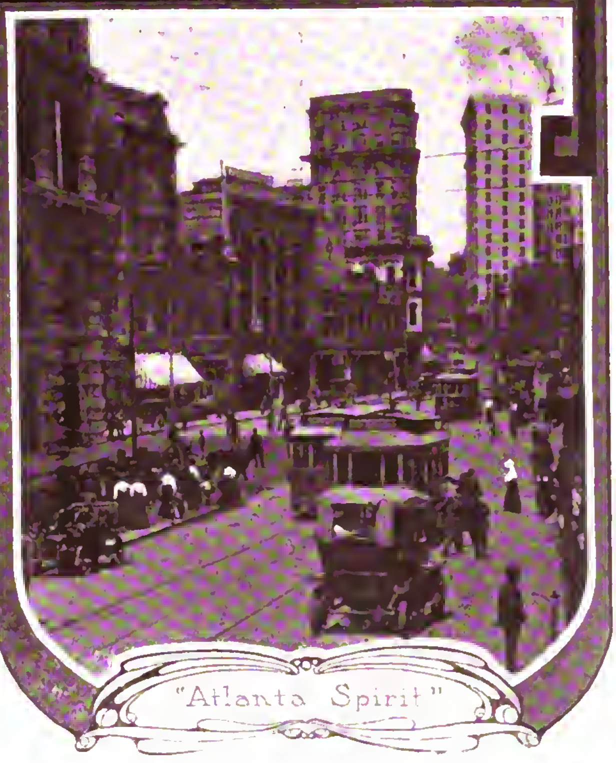
ATLANTA, GA., Nov. 3—This "Gateway of the South" in another day will have become the "Autoists' Mecca," with a plenteous vanguard already in possession of the liveliest city of the New Southland, which values to the greatest extent the boon of the motor-driven vehicle that abridges distance and spells economy and cements the bonds that unite all sections of the country.

The big Auditorium-Armory is crowded with the 1910 products of the American automobile manufacturers, and the display tells a story that will be concluded as the salesmen write down the orders which must be the inevitable result of such a choice auto menu. Managers Miles and Reeves, two past masters in the show line, have done their work thoroughly and artistically, aided, of course, by a capable committee from Atlanta's progressive citizenship. The mammoth building lends itself to exhibition purposes, and this will be apparent to the thousands when on Saturday they are allowed to feast themselves upon the inviting up-to-date demonstration of the greatest and most beneficial industry of modern times.

Over the roads the visitors are coming Atlantawards, the New York-to-Atlanta good roads tourists being the earliest arrivals, after having created excitement and enthusiasm all the way from the Big Town of the country. When men get together they are certain to talk and discuss, and the result invariably is action of some kind. To realize how greatly the South is interested in good roads, one has only to broach the subject these days, and then he will discover that the building of real highways is something that finds pronounced favor with a section of the country which is only awakening to its possibilities.

All Atlanta autodom and most of the South is patiently engaged in holding its breath in expectation of the very, extremely large, doings during "Auto Week," the greatest motor celebration ever held in the South and one which in many ways is unique in all motor car history.

The New York-to-Atlanta tourists to-day found awaiting them a reception that is a wonder, in a quiet, artistic way. Some weeks ago


"Atlanta Spirit"

PHOTOS FROM STEREOGRAPH COPYRIGHT, BY UNDERWOOD & UNDERWOOD, NEW YORK the Atlanta Chamber of Commerce met and appointed committees to have the welcoming celebration in charge. Committees were named from the Capital City club, the Piedmont Driving club, and a committee to arrange escorts, and when these bodies got through their work it was certain that the tourists would be met in proper manner and entertained well upon their arrival.

Saturday afternoon the South's long-expected "Auto Week" actually begins—a "week" that stretches over some eight days, into which will be packed more automobile excitement than was ever before seen in this section of the country, and which, for variety of program, number of participants, and enthusiasm has seldom been equalled in America. 'Tis a full program.

Saturday night the show will open and run until November 13. Monday, from four Georgia cities, endurance runs will start, with Atlanta as the destination; and the following day a fifth one will get under way. Each run will consume two days. The Georgia Good Roads Automobile Association is engineering these: From Savannah, by the "Capital route"; from Fitzgerald and Albany, a run with two starting points, the contestants to meet at Macon and go to Atlanta in a body; from Augusta; and from Birmingham, in Alabama.

The Savannah run naturally promises to be the most important, for Savannah has a wholesale way of doing things that makes for success. Fifty starters from Savannah are regarded as probable. The list of entries heads off with Mayor George W. Tiedeman; F. C. Battey, president of the Savannah Automobile Club; Harvey Granger, and A. W. Solomon, names familiar in the arrangements for the Savannah race, and T. A. Bryson, who drove the scout car from Savannah to Atlanta and back.

The Albany-Fitzgerald run should be numerically strong, for Albany talks of fifty cars and Fitzgerald of thirty. Both cities have good entry lists already, headed in each case, as was Savannah's list, with the mayors of the cities. The first day that the entry blanks were out in Augusta a dozen entries were made for that run, so there will be a goodly number on hand before the entry lists close.

While the show preparations were going on the last finishing touches were put on the new automobile tracks, on which a meet will be held, November 9 to 13. The street car company has finished its extensions to the course, the railroads which reach the track have planned special schedules, and every inch of the main highway from Atlanta to the track has been oiled, in order to insure dustless running to the new course, as well as on it.

The day the first quartette of runs ends, November 9, will open the races. These will run for five days, giving the Southern city the longest track meeting ever known in America.

Representatives of the Atlanta Automobile Association were at the Vanderbilt Cup race, and straightway signed Hugh Grant, with his Alco; Joe Matson, with his Chalmers-Detroit; and Harroun, with his Marmon, which guarantees three recent winners on the Atlanta track. Strang had previously been landed, with a Fiat; as had Robertson with his Fairmount Park car. Louis Bergdoll will bring his Benz racer, and Kilpatrick will be on hand with his Hotchkiss. It is reported that Christie will be in Atlanta. Chevrolet, with his Buick, and the National team are certain starters. Other entries are: Hearne, Fiat; Basle, Renault; Cliquot, Pope-Toledo; Behr, Renault; the full Chalmers-Detroit teams; Grant, Marion; three Maxwells, two Mathesons, three Pullmans and one Moon.

N. A. A. M. Atlanta Show Committee

Of course, there will be a good many local entries from Southern branches and agencies located in Atlanta and the amateurs are likely to have some good races. As there are to be five full days of racing, each day's events to begin at 11 o'clock and to last until well into the afternoon, it will take a pretty good bunch of entries to make a go of the affair, but it is probable that plenty of cars have been secured.

Reports from the local committee are that there is an unprecedented demand for hotel accommodations, and to meet this demand requests for rooms will be referred to the Committee on Information and Public Comfort. Secretary George H. Chapin has issued application blanks for hotel accommodations and all such matters should be referred to him for attention. A circular issued by the committee says:

"The Committee on Information and Public Comfort undertakes to find comfortable rooms and board for prospective visitors to Atlanta during automobile week. It will, if possible, secure quarters in some of the hotels. If this is impossible, it will assign rooms in some of the best boarding houses or private homes, notifying the visitor immediately of the place selected, rates, and all other information. This will give the visitor opportunity to write to the hotel, boarding house, or householder and make what further arrangements may be necessary. The committee urges that all arrangements shall be made at once, as there will be many thousand visitors in Atlanta during automobile week and those who apply first will get the best accommodations."

Secretary Chapin also states that for parties touring to Atlanta it may be possible to secure a stopping place where automobiles may be stored.

HOW ATLANTA GOT A NATIONAL SHOW

By CLARK HOWELL, Editor of the Atlanta Constitution.

YOU ask me to tell you "How Atlanta come to get the first national automobile show of 1910 models?"

I will give you the facts in the case, and your readers may judge for themselves how it was done.

Somehow or other Atlanta has always been impressed with the fact that it was the center, or at least of this part, of the universe, and the "Atlanta Spirit" is proverbial.

It was created out of the ashes of the burned town left by General Sherman in 1864—then a place of about eight or nine thousand inhabitants. It had been the storm center of the Civil War, and was the last stronghold and gateway of supplies of the Confederacy. When Sherman took it and established it as his Southern base, the war was practically over. It did not take Appomattox to write the finale. The Confederacy fell with Atlanta.

Thousands of exhausted and impoverished Confederate veterans, moving backward and forward through the South to their depleted homes, passed through the town, which had been burned less than a year before, and observed on every side remarkable evidences of thrift and enterprise in the rebuilding of the place which had been only a few months before completely annihilated. It was with difficulty that enough workmen could be engaged in sufficient quantities to meet the demand. Supplies could not be obtained fast enough.

Many families in the county surrounding who had lived in opulence and ease as slaveholders before the war, and who, with the exception of their land, were left penniless at the end of the war, soon found new avenues of wealth in supplying brick and lumber and building material generally at unprecedented prices. Hundreds of the returning Confederate veterans from other States took advantage of the opportunity to get work and enter business anew.

Many of those who thus took up citizenship in the rebuilding town afterward became the most prominent and successful of the business men of the city, some of them laying the foundation of large fortunes afterward accumulated.

Other Southern cities did not recuperate from the devastating results of the war as rapidly as did Atlanta, and it was the remarkable energy exhibited by the city at that time that gave birth to the "Atlanta Spirit."

The Atlanta Show Committee

From that day to this Atlanta has been growing by leaps and bounds, stopping at nothing, aspiring to anything and accomplishing results which would often have staggered a city of ten times the population.

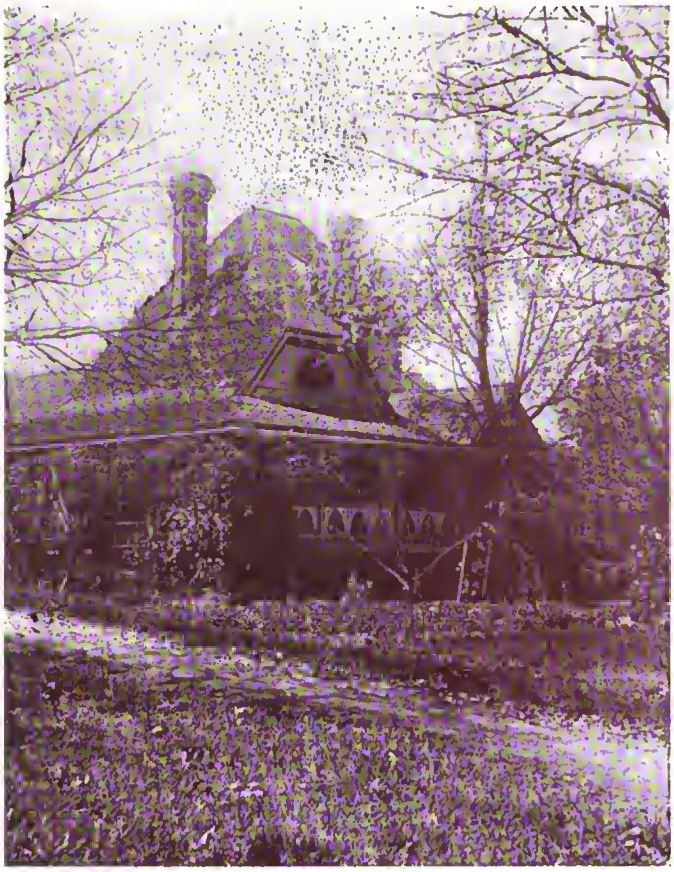
And that is why Atlanta went out after the first National automobile show of 1910 models.

We were aware of the fact that only two National shows were authorized by the National Association of Automobile Manufacturers—one at New York and the other at Chicago—and that numerous applications had been made by other large cities the country over for the authorization that would put them on the same basis as New York and Chicago.

Why not Atlanta, therefore, even though all the other aspiring cities had been turned down and had been told that it would be impossible for them to get anything more than a "dealers' show," which had been successfully conducted in Boston, Pittsburg, Cincinnati, St. Louis, Denver, San Francisco, and a host of other cities, without in any wise involving the National association, or committing it to a responsibility which it was unwilling to assume beyond New York and Chicago.

So we were told to go right ahead and arrange for a "dealers' show"—that we would have the best wishes of the National association, but that none of the manufacturers could exhibit unless their local dealers saw fit to do so, which, it was suggested, could very easily be arranged by the co-operation of the local dealers themselves.

The first suggestion of a National automobile show for Atlanta had been made through the columns of the Atlanta *Constitution*, which editorially took the position that as Atlanta was the commercial center of the great section represented in the South Atlantic and Gulf States, and as the natural crossing point of travel to and from all this section, it should stand for the South just where New York stood for the States in the East and Chicago for the West, and that if the automobile industry could be impressed with the wonderful possibilities of Southern development and the advantage of Atlanta as the distributing center of the Entire South, the National association could be induced to make an exception in Atlanta's favor and put it upon the same basis as the other National shows.



FROM STEREOGRAPH, COPYRIGHT, BY UNDERWOOD & UNDERWOOD, NEW YORK

Once the Home of Joel Chandler Harris

So it became a question of a National show or nothing'

A committee of seven was appointed to take the matter up with the executive committee of the National association, and I happen to know of the spirit that actuated that meeting and of the result obtained, for I was one of the seven, and my colleagues did me the honor to make me their spokesman.

We had an engagement to meet the executive committee at the association's headquarters at 7 East Forty-second Street, in New York City, and before the meeting almost every member of the committee in casual conversation had endeavored to pave the way for a soft place to receive our fall, preparing us in advance to meet the disappointment which they felt was coming.

But Benjamin Briscoe, the Maxwell king, a member of the committee, had chanced to be in Atlanta only a few weeks before and had seen the magnificent Auditorium-Armory Building, which had just been constructed by the city, and had had an opportunity to observe some of the "Atlanta Spirit."

"Boys," said he to the Atlanta committee, "those fellows are perfectly honest in their belief that it would be an unwise thing to authorize a National show for Atlanta, and they think they are not going to do it. But if you make the showing to them that you have made to me, and if they can be made to understand the situation as I have seen it, you will get the show."

The meeting occurred during the first week in May of the present year, and to make a long story short Atlanta got the first National show for 1910—to be followed by the National shows in Chicago and New York—these three cities being the only three whose shows are conducted under the auspices of the National association and at which exhibits are made direct by the national manufacturers of cars and accessories.

Incident to and built around the Automobile Show are various automobile attractions, such as the Speedway contest to take place at the $250,000 autodrome on the suburbs of the city; the State Good Roads Automobile contests from Augusta, Savannah, Albany, Fitz-Gerald, Dublin, and Birmingham, all centering in Atlanta, and the New York-to-Atlanta highway contest, all of these taking place during Automobile Week, which will begin November 6 and end November 13.

These varied automobile attractions have literally centered the interest of the automobile world on Atlanta, and every indication points to the fact that from the standpoint of the automobilist and the automobile industry, the week will be one of unprecedented interest in the annals of the trade in this country.

And just now the South, being at the top notch of prosperity with 13 1-2-cent cotton, will meet the trade more than half way.

The farmers of the State of Georgia alone will realize in cash this year $100,000,000 from their cotton, not to speak of the many more millions that will come from the manufactured goods and the by-productts.

It seems that the South has entered upon an era of unprecedented prosperity, and that the problem of the country people moving to the cities is being solved by automobiles, telephones, and good roads, bringing the schools within convenient reach of the farm house, and opening up facilities which have heretofore been denied the country home.

And the day is coming when every successful farmer will own his automobile—for he needs it even more than his city neighbors. What's more, he is able to pay for what he wants.

AUTOMOBILE SITUATION "DOWN MOBILE"

MOBILE, ALA., Oct. 30—The motor car situation in Mobile is one which holds out the greatest of promise. A city of upward of 70,000 people, having attained this growth mostly during the past six years, with large office buildings growing, it has paid little heed to motoring until recently. At the present time the number of cars taxed and recorded in the office of the city tax collector is 153. The majority of this number was bought during the past two years.

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A Picturesque Corner of Atlanta City Park

The List of Exhibitors

Apperson Bros. Auto Company	Kokomo, Ind.
Austin Automobile Company	Grand Rapids, Mich.
Autocar Company	Ardmore, Pa.
Babcock Electric Carriage Company	Buffalo, N. Y.
Baker Motor Vehicle Company	Cleveland, Ohio.
Bartholomew Company	Peoria, Ill.
Black Mfg. Company	Chicago, Ill.
Brush Runabout Company	Detroit, Mich.
Buckeye Manufacturing Company	Anderson, Ind.
Cadillac Motor Car Company	Detroit, Mich.
Cartercar Company	Pontiac, Mich.
Chalmers-Detroit Motor Company	Detroit, Mich.
Columbus Buggy Company	Columbus, Ohio.
Dayton Motor Car Company	Dayton, Ohio.
Elmore Manufacturing Company	Clyde, Ohio.
Ford Motor Company	Detroit, Mich.
H. H. Franklin Manufacturing Company	Syracuse, N. Y.
Great Western Automobile Company	Peru, Ind.
Hudson Motor Car Company	Detroit, Mich.
Hupp Motor Car Company	Detroit, Mich.
Jackson Automobile Company	Jackson, Mich.
Jewel Carriage Company	Cincinnati, Ohio.
Thomas B. Jeffery & Company	Kenosha, Wis.
Knox Automobile Company	Springfield, Mass.
Locomobile Company of America	Bridgeport, Conn.
Marion Motor Car Company	Indianapolis, Ind.
Maxwell-Briscoe Motor Company	Tarrytown, N. Y.
W. H. McIntyre Company	Auburn, Ind.
Metz Company	Waltham, Mass.
Mitchell Motor Car Company	Racine, Wis.
Moline Automobile Company	East Moline, Ill.
Moon Motor Car Company	St. Louis, Mo.
Mora Automobile Company	Newark, N. Y.
National Motor Vehicle Company	Indianapolis, Ind.
Nordyke & Marmon Company	Indianapolis, Ind.
Olds Motor Works	Lansing, Mich.
Overland Automobile Company	Indianapolis, Ind.
Packard Motor Car Company	Detroit, Mich.
Peerless Motor Car Company	Cleveland, Ohio.
Pennsylvania Auto-Motor Company	Bryn Mawr, Pa.
Pierce-Arrow Motor Car Company	Buffalo, N. Y.
Pope Manufacturing Company	Hartford, Conn.
Premier Motor Manufacturing Company	Indianapolis, Ind.
Rapid Motor Vehicle Company	Pontiac, Mich.
Rauch & Lang Carriage Company	Cleveland, Ohio.
Renault Frères Selling Agency	New York City.
Reo Motor Car Company	Lansing, Mich.
St. Louis Car Company	St. Louis, Mo.
Selden Motor Vehicle Company	Rochester, N. Y.
Speedwell Motor Car Company	Dayton, Ohio.
F. B. Stearns Company	Cleveland, Ohio.
Stevens-Duryea Company	Chicopee Falls, Mass.
Streator Motor Car Company	Streator, Ill.
Studebaker Automobile Company	Cleveland, Ohio.
Sultan Motor Company	New York City
White Company	Cleveland, Ohio.
Winton Motor Carriage Company	Cleveland, Ohio.
Woods Motor Vehicle Company	Chicago, Ill.
York Motor Car Company	York, Pa.

ACCESSORY EXHIBITORS

CARBURETERS

Byrne, Kingston & Company	Kokomo, Ind.	M
Stromberg Motor Devices Co.	Chicago, Ill.	2

HORNS, LAMPS, SPEEDOMETERS

Badger Brass Mfg. Company	Kenosha, Wis.	1
Gabriel Horn Manufacturing Company	Cleveland, Ohio	M
Jones Speedometer Company	United Mfrs. N. Y.	1
Veeder Mfg. Company	Hartford, Conn.	1

IGNITION

Connecticut Tel. & Electric Company	United Mfrs. N. Y.	1
Electric Storage Battery Company	Philadelphia, Pa.	1
Herz & Company	New York City	2
Kokomo Electric Company	Kokomo, Ind.	M
C. A. Mezger	United Mfrs. N. Y.	1
National Carbon Company	Cleveland, Ohio	M
Never-Miss Spark Plug Company	Lansing, Mich.	2
C. H. Splitdorf	New York City	M
Lavalette & Company	New York City	2

JOBBERS

Emil Grossman Company	New York City	2
Post & Lester	Hartford, Conn.	2
Charles E. Miller	New York City	2

LUBRICANTS

Adam Cook's Sons	New York City	2
Jos. Dixon Crucible Company	Jersey City, N. J.	M
A. W. Harris Oil Company	Providence, R. I.	1
N. Y. & N. J. Lubricant Company	United Mfrs. N. Y.	1

MOTORCYCLES

Milton W. Arrowood Company	Atlanta, Ga.	2
Aurora Automatic Machine Company	Chicago, Ill	2
Consolidated Manufacturing Company	Toledo, Ohio	2
Excelsior Supply Company	Chicago, Ill	2
Greyhound Motor Works	Buffalo, N. Y.	2
Hendee Manufacturing Company	Springfield, Mass.	2
N. S. U. Motor Company	New York City	2

PAPERS

Auto Era Publishing Company	Atlanta, Ga.	2
Chilton Printing Company	Philadelphia, Pa.	2
Class Journal Company	New York City	2
"Motor"	New York City	2

TIRES

Ajax-Grieb Rubber Company	Trenton, N. J.	M
Dayton Rubber Mfg. Company	Dayton, Ohio	2
Diamond Rubber Company	Akron, Ohio	M
Dow Tire Company	New York City	2
Empire Tire Company	Trenton, N. J.	M
Federal Rubber Company	Milwaukee, Wis.	M
Firestone Tire & Ruber Company	Akron, Ohio	M
Fisk Rubber Company	Chicopee Falls, Mass.	1
G & J Tire Company	Indianapolis, Ind.	M
B. F. Goodrich Company	Akron, Ohio	1
Goodyear Tire & Rubber Company	Akron, Ohio	M
Hartford Rubber Works Company	Hartford, Conn.	M
Leather Tire Goods Company	Niagara Falls, N. Y.	2
Michelin Tire Company	Milltown, N. J.	M
Morgan & Wright	Detroit, Mich.	M
Republic Rubber Company	Youngstown, Ohio	M
Rutherford Rubber Company	Rutherford, N. J.	2
C. A. Shaler Company	Waupun, Wis.	2
Weed Chain Tire Grip Company	United Mfrs. N. Y.	1

TOPS AND WIND-SHIELDS

Ajax Trunk & Sample Case Company	New York City	2
Chicago Wind Shield Company	Chicago, Ill	2
Sprague Umbrella Company	Norwalk, Ohio	2
Vehicle Apron & Hood Company	Columbus, Ohio	2

MISCELLANEOUS

S. F. Bowser & Company	Ft. Wayne, Ind.	2
Cloud-Stanford Company	Atlanta, Ga.	2
Hartford Suspension Company	Jersey City, N. J.	M
High Wheel Auto Parts Company	Muncie, Ind.	2
Oliver Manufacturing Company	Chicago, Ill.	M
W. F. Polson	Buffalo, N. Y.	2
Randall-Faichney Company	Boston, Mass.	2
Shipman Instrument Company	Sunbury, Pa.	2

Cars of the Show and their Prices

Under $1,000

$378	Metz (unassembled)	Runabout
$485	Brush	Runabout
$500	Billy 4-20	Runabout
$500	Reo	Runabout
$550	Maxwell AA	Runabout
$600	Metz	Runabout
$600	McIntyre A-1	Runabout
$750	Hupmobile	Runabout
$750	Studebaker-Flanders	Surrey
$800	Lambert	Runabout
$850	Maxwell Q	Runabout
$900	Hudson 20	Roadster
$900	Ford	Roadster
$950	Ford	Touring

$1,000 to $1,499

$1,000	Maxwell Q	Touring
$1,000	Overland "38"	Runabout
$1,000	Reo	Touring
$1,050	Black-Crow D	
$1,050	Ford	Coupe
$1,100	Cartercar H	Roadster
$1,100	Ford	Landaulet
$1,100	Mitchell R	Roadster
$1,125	Cartercar H	Surrey
$1,125	Cartercar H	Baby Tonneau
$1,200	Ford	Town Car
$1,250	Ford	Limousine
$1,250	Jackson 30	Touring
$1,250	Lambert 30	Touring
$1,250	McIntyre M-4	Touring
$1,250	Overland "40"	Roadster
$1,250	Reo 80-35	Touring
$1,250	Studebaker E. M. F.	Touring
$1,350	Mitchell T	Touring
$1,350	Petrel	Runabout
$1,400	Overland "41"	Touring

$1,500 to $1,999

$1,500	Chalmers-Detroit 30	Touring
$1,500	Maxwell E	Touring
$1,500	Moline M	Touring
$1,500	Moon 30	Touring
$1,500	Overland "42"	Touring
$1,500	Petrel	Touring
$1,500	Stoddard-Dayton 10-H	Runabout
$1,600	Cadillac 30	Touring
$1,600	Cartercar L	Touring
$1,600	Great Western	Touring
$1,600	Pullman O	Baby Tonneau
$1,600	Stoddard-Dayton 10-B	Touring
$1,700	Jackson 40	Touring
$1,750	Autocar XX	Touring
$1,750	Elmore 36	Touring
$1,750	Franklin	Runabout
$1,750	McIntyre M-20	Touring
$1,800	Rambler "53"	Touring
$1,850	Franklin	Touring

$2,000 to $2,499

$2,000	Apperson 4-30	
$2,000	Lambert	Touring
$2,000	Pennsylvania D	Runabout
$2,000	Pullman K-10	Touring
$2,000	Selden	Touring
$2,000	White Gasoline	Touring
$2,000	White Steam	Touring
$2,100	Pennsylvania D	Touring
$2,250	Rambler "54"	Touring
$2,350	Jackson 50	Touring
$2,400	Glide	Roadster

$2,500 to $2,999

$2,500	Elmore 46	Touring
$2,500	National 40	Touring
$2,500	Glide	Touring
$2,500	Moline K	Touring
$2,500	Mora	Touring
$2,500	Premier 40	Touring
$2,500	Rambler "55"	Touring
$2,500	Selden	Touring 7
$2,500	Speedwell	Touring
$2,500	White Gasoline	Touring 7
$2,650	Marmon 32	Touring
$2,650	Stoddard-Dayton 10-K	Roadster
$2,700	Franklin D	Surrey
$2,750	Chalmers-Detroit 40	Touring
$2,750	Pope-Hartford T	Touring
$2,750	Stoddard-Dayton 10-K	Baby Tonneau
$2,800	Franklin D	Touring
$2,800	Stoddard-Dayton 10-F	Touring 7
$2,800	Stoddard-Dayton 10-T	Town Car
$2,850	Stevens-Duryea XXX	Roadster
$2,850	Stevens-Duryea XXX	Baby-Tonneau

$3,000 to $3,499

$3,000	Apperson 4-40	Touring
$3,000	Moon 45	Touring
$3,000	Oldsmobilé	Touring
$3,000	Pennsylvania C	Touring
$3,000	Pennsylvania D	Landaulet
$3,000	Pope-Hartford T	Touring 7
$3,000	Pullman M	Touring
$3,000	Selden	Limousine
$3,000	Standard Six	Touring
$3,100	Knox R	Runabout
$3,200	Franklin K	Town Car
$3,200	Packard 18	Roadster
$3,200	Packard 18	Touring
$3,250	Knox R	Touring
$3,250	Stoddard-Dayton 10-S	Runabout

$3,500 to $3,999

$3,500	Locomobile 80	Touring
$3,500	Premier 60	Touring
$3,500	Pullman M	Touring 7
$3,600	Franklin H	Surrey
$3,750	Franklin H	Touring
$3,750	Pope-Hartford T	Limousine
$3,800	Pennsylvania D	Touring 7
$3,800	Stoddard-Dayton 10-F	Limousine
$3,850	Franklin K	Limousine
$3,850	Pierce-Arrow 36	Roadster
$3,850	Speedwell	Limousine

$4,000 to $4,499

$4,000	Franklin D	Limousine
$4,000	Pierce-Arrow 36	Touring
$4,000	Studebaker-Garford	Touring
$4,000	White Seam 40	Touring
$4,200	Apperson 4-50	Jack-Rabbit
$4,200	Apperson 4-50	Touring
$4,200	Apperson 6-40	Touring
$4,200	National 50	Touring
$4,200	Packard 30	Roadster
$4,200	Packard 30	Touring
$4,300	Packard 18	Limousine
$4,300	Peerless 30	Touring
$4,400	Packard 18	Landaulet

$4,500 to $4,999

$4,500	Locomobile 40	Touring
$4,500	Peerless 20	Limousine
$4,500	Winton 60	Touring
$4,600	Oldsmobile	Runabout
$4,600	Oldsmobile	Baby Tonneau
$4,600	Oldsmobile	Touring
$4,850	Pierce-Arrow 48	Roadster

$5,000 and over

$5,000	Franklin H	Limousine
$5,000	Knox M	Touring
$5,000	National 60	Touring
$5,000	Pierce-Arrow 48	Touring
$5,500	Peerless 30	Limousine
$5,800	Peerless 30	Landaulet
$5,850	Pierce-Arrow 66	Roadster
$5,900	Locomobile 40	Limousine
$6,000	Locomobile 40	Landaulet
$6,000	Peerless 50	Touring
$6,000	Pierce-Arrow 66	Touring
$7,000	Peerless 50	Limousine
$7,300	Peerless 50	Landaulet

GASOLINE

Apperson
Austin
Autocar
Brush
Black
Cadillac
Cartercar
Chalmers-Detroit
Elmore
Ford
Franklin
Great Western
Glide
Hudson
Locomobile
Lambert
Marion
Maxwell
McIntyre
Metz
Mitchell
Moline
Moon
Mora
Marmon
National
Oldsmobile
Overland
Pope-Hartford
Premier
Pullman
Rambler
Renault
Reo
Standard
Selden
Speedwell
Stearns
Stevens-Duryea
Studebaker-Flanders
Studebaker-E-M-F
Studebaker-Garford
Hupmobile
Halladay
Jackson
Jewel
Knox
Packard
Peerless
Pennsylvania
Petrel
Pierce-Arrow
Stoddard-Dayton
Winton
White

ELECTRIC

Babcock
Baker
Columbus
Rauch & Lang
Studebaker
Woods

STEAM

White

COMMERCIAL

Packard
Rapid
Studebaker

STRUCTURAL TENDENCIES IN ATLANTA EXHIBITS

DETAILS now form the field of the investigator in automobile design, and points which a few years ago would have been passed over unnoticed are now subjects for scare-heads. But there are two marked tendencies at present which are worthy of far more attention than they have hitherto received; namely, the abolition of the water pump and the similar fate of the spark-advance lever.

Thermo-syphon circulation, more familiarly known as natural circulation, has had a limited adherence from the earliest days of the industry. Renault and Brasier, of France, have employed it with the greatest success, even on their racing cars which won the Gordon Bennett and the Grand Prix. In this country Maxwell has always been a firm believer in this simpler method. Until quite recently, however, its spread has been slow. Now Brush, Elmore, Ford, Hupmobile, Jackson and Moline, as well as the pioneers, Maxwell and Renault, and the happily named "Billy" of local production, all appear with pumpless motors.

Although there has been no such unanimous movement against the spark-advance lever, yet the handwriting has appeared on the wall. This reform, too, was inaugurated by the French pair, Brasier and Renault, and by the Italian Fiat. Its principal American exponent has been the Franklin. Magneto ignition has made the fixed spark capable of universal adaptation, and its use offers many advantages in simplicity and economy.

DETAILS OF THE 1910 CARS, EXHIBITED AT THE FIRST ANNUAL SOUTHERN NATIONAL SHOW, ATLANTA, GA., NOVEMBER 6-13, 1909

MAKE AND MODEL	Price	H.P.	BODY Type	BODY Seats	MOTOR Cylinders	MOTOR Bore	MOTOR Stroke	COOLING Radiator	COOLING Pump	IGNITION Magneto	IGNITION Battery	Lubrication	Clutch	TRANSMISSION Type	TRANSMISSION Speeds	TRANSMISSION Drive	WHEEL Base	WHEEL Track	Frame	BEARINGS Motor	BEARINGS Transmission	BEARINGS Axle	Weight	TIRE Front	TIRE Rear
Apperson 4-30	$2000		Touring		4										3	Shaft	112		P. steel					34x4	34x4
Apperson 0	2450		Touring		4																				
Apperson 4-40	3000		Touring		4										3	Draft	122		P. steel					36	36
Apperson 4-50	4200		Runabout	2	4										3	2-chain	116		P. steel						
Apperson 4-50	4200		Touring		4										4	Shaft	128		P. steel					36	36
Apperson 6-40	4200		Touring		6																				
Autocar XX	1750	25.6	Touring	5	4	4	4½			Bosch					3	Shaft			P. steel	Plain	Roller	Roller		34	34
Billy 4-20	500	18.2	Runabout	2	4	3⅜	4½	V. tubes	None	None	Storage	Pump	Cone	Sel.	2	Shaft	88		P. steel			Roller	1,000	32x3	32x3
Black-Crow D	1050		Surrey	4	4																				
Brush	485	6.4	Runabout	2	1	4	5		None					Plan	2	2-chain	80	*56	Wood	2 plain	Ball	Ball		28x3½	28x3½
Cadillac 30	1600	28.9	Touring	5	4	4¼	4½	V. tubes	Gear	Splitd'f	Dry	Pump	Cone	Sel.	3	Shaft	110	*56½	P. steel	5 plain	Roller	Roller		34x4	34x4
Cartercar H	1100	25.6	Roadster	3	4	4	4		None	Splitd'f	Storage	Pump	None	Frict'n		1-chain	100	56	P. steel	3 plain				32x3	32x3
Cartercar L	1600	28.9	Touring	5	4	4¼	4½		Centrif'l	Splitd'f	Storage	Pump	None	Frict'n		1-chain	110	56	P. steel	3 plain				32x3½	32x3½
Chalmers-Detroit 30	1500	25.6	Touring	5	4	4	4½	V. tubes	Centrif'l	Extra	Storage	Pump	Disc	Sel.	3	Shaft	115	*56	P. steel	2 ball	Ball	Roller		34x3½	34x3½
Chalmers-Detroit 40	2750	40.0	Touring	5	4	5	4¾	H'comb.	Centrif'l	Bosch	Storage	Pump	Cone	Sel.	3	Shaft	120	56	P. steel	3 plain	Ball	Roller		36x4	36x4
Elmore 36	1750		Touring	5	4	4½	4	V. tubes	None	None	Dry	6 mech.	Con. b'd	Sel.	3	Shaft	110	56	P. steel	5 plain	Ball	Roller	2,400	34x4	34x4
Elmore 46	2500		Touring	5	4	4½	4	V. tubes	None	None	Dry	6 mech.	Con. b'd	Sel.	3	Shaft	120	56	P. steel	5 plain	Ball	Roller	2,800	36x4	36x4
Ford	950	22.5	Touring	5	4	3¾	4	V. tubes	None	Ford	None	Splash	Disc	Plan	2	Shaft	100	*56	P. steel	3 plain	Plain	Roller	1,200	30x3	30x3½
Franklin G	1850	18.2	Touring	4	4	3⅜	4	Air c'l'd	Air c'l'd	Bosch	None	Mech'l	Disc	Sel.	3	Shaft	91½		Wood	5 plain				32x3½	32x4
Franklin K-4	3200	18.2	Town car	5	4	3⅜	4	Air c'l'd	Air c'l'd	Bosch	None		Disc	Sel.	3	Shaft	100		Wood	5 plain				30x3½	30x4
Franklin D	2800	28.9	Touring	5	4	4¼	4	Air c'l'd	Air c'l'd	Bosch	None		Disc	Sel.	3	Shaft	106		Wood	5 plain				36x4	36x4½
Franklin D	4000	28.9	Limousine	5	4	4¼	4	Air c'l'd	Air c'l'd	Bosch	None		Disc	Sel.	3	Shaft	111½		Wood	5 plain				34x4½	35x5
Franklin H	3750	43.8	Touring	7	6	4¼	4	Air c'l'd	Air c'l'd	Bosch	None		Disc	Sel.	3	Shaft	127		Wood	7 plain				36x4½	37x5
Glide 45	2500	36.1	Touring	5	4	4¾	5			Eise'n	Storage	Pump	Disc	Sel.	3	Shaft	120	56½	P. steel	Plain	Roller	Roller		36x4½	36x4½
Great Western 30	1600	28.9	Touring	5	4	4¼	5		Centrif'l			Pump	Cone	Sel.	3	Shaft	112	*56½	P. steel	Plain				34x3½	34x3½
Halladay																									
Hudson 20	900	22.5	Roadster	3	4	3¾	4½	V. tubes	Centrif'l	Extra	Dry	Pump	Cone	Sel.	3	Shaft	100	56	P. steel	3 plain	Plain	Roller	1,700	32x3	32x3½
Hupmobile	750	16.9	Runabout	2	4	3¼	3⅜		None	Bosch		Splash	Disc	Sel.	2	Shaft	86	56	P. steel	3 plain	Plain		1,100	30x3	30x3
Jackson 30	1250	25.6	Touring	5	4	4	4	H'comb.	None	Splitd'f	Dry	Splash	Cone	Sel.	3	Shaft	105	56½	P. steel	5 plain	Ball	Roller		32x3½	32x3½
Jackson 40	1700	32.4	Touring	5	4	4½	4½	H'comb.	None	Splitd'f	Dry	Splash	Disc	Sel.	3	Shaft	110	56½	P. steel	5 plain	Ball	Roller		34x4	34x4
Jackson 50	2350	36.1	Touring	5	4	4¾	4¾	H'comb.	None	Splitd'f	Dry	Splash	Disc	Sel.	3	Shaft	120	56½	P. steel	5 plain	Ball	Roller		36x4	36x4
Jewel		28.9	Touring		4	4¼	4¾	Cellular	None	Splitd'f	Dry	Splash	Plate	Sel.	3	Shaft	115	56	P. steel	3 plain	Ball	Ball	2,300	34x4	34x4
Knox R	3100	40.0	Runabout	1	4	5	4¾		Centrif'l	Bosch	Storage	Pump	Plate	Sel.	3	Shaft	102		P. steel	5 plain	Ball	Ball		36x4	36x4
Knox R	3250	40.0	Touring	5	4	5	4¾		Centrif'l	Bosch	Storage	Pump	Plate	Sel.	3	Shaft	117		P. steel	5 plain	Ball	Ball	3,000	36x4	36x4
Knox M	5000	48.4	Touring	5	4	5½	5½		Centrif'l	Bosch	Storage	Pump	Plate	Sel.	3	Shaft			P. steel	5 plain	Ball	Ball			
Knox S		57.0	Touring		6	4⅞			Centrif'l	Bosch	Storage	Pump	Plate	Sel.	3	Shaft			P. steel	7 plain	Ball	Ball			
Locomobile 30	3500	32.4	Touring	5	4	4½	4½	H'comb.	Centrif'l	Make & break	None	3 mech.	Cone	Sel.	4	Shaft	120		P. steel	3 plain	Ball	Ball		34x4	34x4½
Locomobile 40	4500	40.0	Touring	7	4	5	6	H'comb.	Centrif'l		None	3 mech.	Cone	Sel.	4	2-chain	123		P. steel	3 plain	Ball	Ball		36x4	36x5
Lambert	800												None	Frict'n											
Lambert 30	1250												None	Frict'n											
Lambert	2000												None	Frict'n											
Marion		28.9	Roadster	3	4	4¼	4½	H'comb.	Centrif'l	Splitd'f	Dry	Pump	Disc	Sel.	3	Shaft	112	56½	P. steel	3 plain	Roller	Roller	2,150	34x4	34x4
Marmon 32	2650	32.4	Touring	5	4	4½	5							Sel.	3	Shaft	116		P. steel	3 plain					
Maxwell AA	550	12.8	Runabout	2	2	4	4	Cellular	None	Splitd'f	Dry	Splash	Disc	Plan	2	Shaft	82	*56½	P. steel	2 plain	Plain	Roller	1,150	28x3	28x3
Maxwell O	850	22.5	Runabout	2	4	3¾	4	Cellular	None	Splitd'f	Dry	5 mech.	Disc	Prog	3	Shaft	93	*56½	P. steel	3 plain	Roller	Roller	1,500	30x3½	30x3½
Maxwell E	1500	28.9	Touring	5	4	4¼	4¼	Cellular	None	Splitd'f		5 mech.	Disc	Prog	3	Shaft	108	*56½	P. steel	5 plain	Roller	Roller	2,500	34x4	34x4

DETAILS OF THE 1910 CARS, EXHIBITED AT THE FIRST ANNUAL SOUTHERN NATIONAL SHOW, ATLANTA, GA., NOVEMBER 6-13, 1909 (Continued)

MAKE AND MODEL	Price	H.P.	BODY Type	BODY Seats	MOTOR Cylinders	MOTOR Bore	MOTOR Stroke	COOLING Radiator	COOLING Pump	IGNITION Magneto	IGNITION Battery	Lubrication	Clutch	TRANSMISSION Type	TRANSMISSION Speeds	TRANSMISSION Drive	WHEEL Base	WHEEL Track	Frame	BEARINGS Motor	BEARINGS Transmission	BEARINGS Axle	Weight	TIRES Front	TIRES Rear
McIntyre A-1	$600	13.6	Runabout	2	2	4⅛	3¾		None	Extra	Dry		Plate	Plan	2	2-chain	90	*56		2 plain				30x3	30x3
McIntyre M-4	1250	27.2	Touring	5	4	4⅛	3¾			Splitd'f	Dry	Pump	Cone	Sel	3	Shaft	112	*56	P. steel	Plain				36x3½	36x3½
Metz	600	9.8	Runabout	2	2	3½	3½	Air c'l'd	Air c'l'd	Bosch	None	Splash	None	Frict'n		2-chain	81	56½	P. steel	2 ball	Ball	Ball	550	28x2½	28x2½
Mitchell R	1100	28.9	Roadster	3	4	4¼	5		Centrif'l	Splitd'f	Dry	6 mech	Cone	Sel	3	Shaft	100		P. steel	3 plain	Roller	Roller		34x3½	34x3½
Mitchell T	1350	28.9	Touring	5	4	4¼	5		Centrif'l	Splitd'f	Dry	6 mech	Cone	Sel	3	Shaft	112	*56½	P. steel	3 plain	Roller	Ball		34x3½	34x3½
Mitchell S	2000	43.8	Touring	7	6	4¼	5		Centrif'l	Splitd'f	Dry	8 mech	Cone	Sel	3	Shaft	130		P. steel	4 plain	Roller	Ball		36x4	36x4
Moline M	1500	25.6	Touring	5	4	4	4½			Bosch			Cone	Sel	3	Shaft	110		P. steel	3 plain	Roller	Roller		34x3½	34x3½
Moline K	2500		Touring	5	4								Cone	Sel	3	Shaft			P. steel	3 plain	Roller	Roller			
Moon 30	1500	28.9	Touring	5	4	4¼	5							Sel	3	Shaft			P. steel	3 plain				34x4	34x4
Moon 45	3000	36.1	Touring	5	4	4¾	5							Sel		Shaft	120		P. steel	3 plain				36x4	36x4½
Mora	2500	32.4	Touring	5	4	4½	5½		Centrif'l			Pump	Cone	Sel	3	Shaft	112		P. steel	3 plain	Ball	Roller		34x4	34x4
National 40	2500	40.0	Touring	5	4	5	5½	H'comb	Centrif'l	Bosch	Storage	Pump	Cone	Sel	3	Shaft	124	56½	P. steel	5 ball	Ball	Ball	3,000	36x4	36x4
National 50	4200	48.6	Touring	5	6	4½	4½	H'comb	Centrif'l	Bosch	Storage	Pump	Cone	Sel	3	Shaft	130	56½	P. steel	7 ball	Ball	Ball	3,350	36x4½	36x4½
National 60	5000	60.0	Touring	5	6	5	5	H'comb	Centrif'l	Bosch	Storage	Pump	Cone	Sel	3	Shaft	137	56½	P. steel	7 ball	Ball	Ball	3,500		
Oldsmobile	3000	36.1	Touring	5	4	4¾	4¾	H'comb	Centrif'l	Bosch	Dry	Pump	Cone	Sel	4	Shaft	118	56	P. steel	3 plain	Ball	Roller		36x4	36x4
Oldsmobile	4600	54.1	Runabout	2	6	4¾	4¾	H'comb	Centrif'l	Bosch	Dry	Pump	Cone	Sel	4	Shaft	118	56	P. steel	4 plain	Ball	Roller		42x4½	42x4½
Oldsmobile	4600	54.1	Touring	7	6	4¾	4¾	H'comb	Centrif'l	Bosch	Dry	Pump	Cone	Sel	4	Shaft	130	56	P. steel	4 plain	Ball	Ball		42x4½	42x4½
Overland "38"	1000	22.5	Runabout	2	4	3¾	4½	Cellular	None	Remy	Dry		Plate	Plan	2	Shaft	102	56	P. steel	5 plain	Plain	Roller	1,850	32x3½	32x3½
Overland "41"	1400	28.9	Touring	5	4	4¼	4½	Cellular	None	Remy	Dry		Plate	Plan	2	Shaft	112	56	P. steel	5 plain	Plain	Roller	2,200	34x4	34x4
Overland "42"	1500	28.9	Touring	5	4	4¼	4½	Cellular	None	Remy	Dry		Cone	Sel	3	Shaft	112	56	P. steel	5 plain	Ball	Roller	2,200	34x4	34x4
Packard 18		26.4	Roadster	3	4	4 1/16	5½	H'comb	Centrif'l	Eiseman	Storage	Pump	Plate	Prog	3	Shaft			P. steel	3 plain	Ball	Roller			
Packard 18		26.4	Touring	5	4	4 1/16	5½	H'comb	Centrif'l	Eiseman	Storage	Pump	Plate	Prog	3	Shaft			P. steel	3 plain	Ball	Roller	2,750	34x4	34x4
Packard 30	4200	40.0	Roadster	3	4	5	5½	H'comb	Centrif'l	Eiseman	Storage	Pump	Plate	Prog	3	Shaft			P. steel	3 plain	Ball	Roller			
Packard 30	4200	40.0	Touring	7	4	5	5½	H'comb	Centrif'l	Eiseman	Storage	Pump	Plate	Prog	3	Shaft			P. steel	3 plain	Ball	Roller	3,300	36x4	36x4½
Peerless 20		25.6			4	4	4½		Gear	Bosch	Storage	3 mech	Ex. band	Sel	4	Shaft	113	56	P. steel	3 plain	Ball	Ball		32x3½	
Peerless 30	4300	38.0	Roadster	3	4	4⅞	5½		Gear	Bosch	Storage	3 mech	Ex. band	Sel	4	Shaft	118½	56	P. steel	3 plain	Ball	Ball		36x4	36x5
Peerless 30	4300	38.0	Touring	7	4	4⅞	5½		Gear	Bosch	Storage	3 mech	Ex. band	Sel	4	Shaft	122	56	P. steel	3 plain	Ball	Ball		36x4	36x5
Peerless 50	6000	57.0	Roadster	3	6	4⅞	5½		Gear	Bosch	Storage	4 mech	Ex. band	Sel	4	Shaft	132½	56	P. steel	4 plain	Ball	Ball		36x4	36x5
Peerless 50	6000	57.0	Touring	7	6	4⅞	5½		Gear	Bosch	Storage	4 mech	Ex. band	Sel	4	Shaft	136	56	P. steel	4 plain	Ball	Ball		36x4	36x5
Pennsylvania D	2100	28.9	Touring	5	4	4¼	4½		Gear		Dry	3 mech	Cone	Sel	3	Shaft	110		P. steel	3 plain	Ball	Ball	2,300	32x4	32x4
Pennsylvania C	3000	36.1	Touring	5	4	4¾	5¼		Gear	Bosch	Dry	6 mech	Cone	Sel	3	Shaft	114		P. steel	3 plain	Ball	Ball	2,900	34x4	34x4½
Pennsylvania E	3800	38.0	Touring	7	4	4⅞	5¼		Gear	Bosch	Dry	6 mech	Cone	Sel	3	Shaft	122		P. steel	3 plain	Ball	Ball	3,300	36x4	36x4½
Petrel	1350	30.6	Runabout	2	4	4⅜	4½	Cellular				Pump	None	Friction		2-chain	108	56	P. steel				2,000	32x3½	32x3½
Petrel	1500	30.6	Touring	5	4	4⅜	4½	Cellular				Pump	None	Friction		2-chain	115	56	P. steel				2,400	34x3½	34x3½
Pierce-Arrow 36	3850	38.4	Roadster	3	6	4	4¾		Centrif'l	Bosch	Storage	Pump	Cone	Sel	4	Shaft	119		P. steel	4 plain	Ball	Roller		36x4	36x4
Pierce-Arrow 36	4000	38.4	Touring	5	6	4	4¾		Centrif'l	Bosch	Storage	Pump	Cone	Sel	4	Shaft	125		P. steel	4 plain	Ball	Roller		36x4	36x4½
Pierce-Arrow 48	4050	48.6	Roadster	3	6	4½	4¾		Centrif'l	Bosch	Storage	Pump	Cone	Sel	4	Shaft	128		P. steel	4 plain	Ball	Roller		36x4½	36x4½
Pierce-Arrow 48	5000	48.6	Touring	5	6	4½	4¾		Centrif'l	Bosch	Storage	Pump	Cone	Sel	4	Shaft	134½		P. steel	4 plain	Ball	Roller		36x4½	37x5
Pierce-Arrow 66	5850	66.2	Roadster	3	6	5¼	5½		Centrif'l	Bosch	Storage	Pump	Cone	Sel	4	Shaft	133½		P. steel	4 plain	Ball	Roller		37x5	37x5
Pierce-Arrow 66	6000	66.2	Touring	7	6	5¼	5½		Centrif'l	Bosch	Storage	Pump	Cone	Sel	4	Shaft	140		P. steel	4 plain	Ball	Roller		37x5	38x5½
Pope-Hartford T	2750	29.7	Touring	5	4	4 5/16	5½	Cellular	Centrif'l	Extra	Storage	4 mech	Cone	Sel	3	Shaft	118	56	Armored	3 plain		Roller		36x4	36x4
Premier 4-40	2500		Touring	5	4			Cellular	Centrif'l	Make & break	Extra	5 mech	Disc	Sel	3	Shaft	120	56½	P. steel	3 plain	Ball	Ball		34x4	34x4
Premier 6-60	3500		Touring	7	6						Storage	7 mech	Disc	Sel	3	Shaft	136	56½	P. steel	4 plain	Ball	Ball		36x4	36x5
Pullman 0	1600	25.6	Surrey	4	4	4	5	Cellular		Bosch	Dry	Pump	Cone	Sel	3								2,000	34x3½	34x3½
Pullman K-10	2000	32.4	Touring	5	4	4½	4¾	Cellular	Centrif'l	Bosch		Pump	Cone	Sel	3	Shaft	112	56½	P. steel	5 plain	Ball	Roller			
Pullman 4-40	3000		Roadster		4			Cellular																	
Pullman M	3500		Touring	7				Cellular																	
Rambler "53"	1800	32.4	Touring	5	4	4½	4½	V. tubes	Centrif'l	Splitd'f	Storage	4 mech	Cone	Sel	3	Shaft	108	*56	P. steel	3 plain	Roller	Roller		36x3½	36x3½
Rambler "54"	2250	40.0	Touring	5	4	5	5½	V. tubes	Centrif'l	Eisem'n	Storage	4 mech	Ex. band	Sel	3	Shaft	117	*56	P. steel	3 plain	Roller	Roller		36x4	36x4
Rambler "55"	2500	40.0	Touring	7	4	5	5½	V. tubes	Centrif'l	or Bosch	Storage	4 mech	Ex. band	Sel	3	Shaft	123	*56	P. steel	3 plain	Roller	Roller		36x4½	36x4½
Renault 8-10		7.2			2	3	4¾	V. tubes	None	Bosch	None		Cone	Prog	4	Shaft	77	50					1,100	28x3½	28x3½
Renault 10-14		14.3			4	3	4¾	V. tubes	None	Bosch	None		Cone	Prog	4	Shaft	107	54					1,600	32x3½	32x3½
Renault 14-20		19.6			4	3½	4¾	V. tubes	None	Bosch	None		Cone	Prog	4	Shaft	120	55					1,900	34x4	34x4
Renault 20-30		24.2			4	4	5½	V. tubes	None	Bosch	None		Cone	Prog	4	Shaft	120	55					2,500	36x4½	36x4½
Renault 35-45		42.0			4	5⅛	5½	V. tubes	None	Bosch	None		Cone	Prog	4	Shaft	132	55					2,800	36x4½	36x4
Renault 50-60		54.0			6	4¾	5½	V. tubes	None	Bosch	None		Cone	Prog	4	Shaft	138	56					3,200	37x5	37x5½

MAKE AND MODEL	Price	H.P.	BODY		MOTOR			COOLING		IGNITION		Lubrication	Clutch	TRANSMISSION			WHEEL		Frame	BEARINGS			Weight	TIRES	
			Type	Seats	Cylinders	Bore	Stroke	Radiator	Pump	Magneto	Battery			Type	Speeds	Drive	Base	Track		Motor	Transmission	Axle		Front	Rear
Reo	$500	9.0	Runabout	2	1	4½	6	V. tubes		None	Dry	Splash	Plate	Plan	2	1-chain	78	55	P. steel	2 plain	Plain	Roller		28x3	28x3
Reo	1000	18.0	Touring	5	2	4½	6			None	Dry	Splash	Plate	Plan	2	1-chain	96	55	P. steel	2 plain	Plain	Roller		32x3½	32x3½
Reo 30-35	1250	25.6	Touring	5	4	4	4½	V. tubes	Centrif'l	Splitd'f	Dry	Pump	Disc	Sel	3	Shaft	108	55	P. steel	3 plain	Ball	Roller		34x3½	34x3½
Standard Six	3000	48.6	Touring	5	6	4½	5		Centrif'l	Remy	Dry	Pump	Cone	Sel	3	Shaft	124	56	P. steel	Plain	Ball	Roller	3,200	36x4	36x4
Selden **35**	2000	36.1	Touring	5	4	4¾	5	H'comb	Centif'l	Extra	Storage	Pump	Cone	Sel	3	Shaft	116	55	P. steel	3 plain	Roller	Roller	2,650	34x3½	34x4
Selden **40**	2500	40.0	Touring	7	4	5	5	H'comb	Centif'l	Bosch	Storage	Pump	Cone	Sel	3	Shaft	122	55	P. steel	3 plain	Roller	Roller	2,800	36x4	36x4½
Speedwell 10-D	2500	46.0	Touring	5	4	5	5	Cellular	Centrif'l	Bosch	Storage	Pump	Cone	Sel	3	Shaft	121	56½	P. steel	3 plain	Roller	Roller	2.600	36x4½	36x4½
Stearns **15-30**	3200	32.4	Touring	5	4	4½	4¾	H'comb	Centrif'l	Bosch	Storage	Pump	Disc	Sel	3	Shaft	116	56½	P. steel	3 ball	Ball	Ball	2,650	34x4	34x4
Stearns **30-60**	4600	46.0	Touring	5	4	5⅜	5¾	H'comb	Centrif'l	Bosch	Storage	Pump	Disc	Sel	4	Shaft	120	56½	P. steel	3 ball	Ball	Ball	3.450	36x4	36x5
Stevens-Duryea W	2850	36.1	Roadster	3	4	4¾	4½		Centrif'l		Storage	4 mech	Disc	Prog	3	Shaft	109	56	P. steel	3 plain	Ball	Ball		36x3½	36x4
Stevens-Duryea X	2900	36.1	Touring		4	4¾	4½		Centrif'l		Storage	4 mech	Disc	Prog	3	Shaft	124	56	P. steel	3 plain	Ball	Ball		34x4	34x4
Stevens-Duryea Y	4000	54.1	Touring		6	4¾	4½		Centrif'l		Storage	6 mech	Disc	Prog	3	Shaft	142	56	P. steel	4 plain	Ball	Ball		36x4	36x5
Stoddard-Dayton 10-B	1600	24.0	Touring	5	4	3⅞	4½	V. tubes	Centrif'l	Splitd'f	Storage		Cone	Sel	3	Shaft	108		P. steel	3 plain	Roller	Roller		32x4	32x4
Stoddard-Dayton 10-A	2100	28.0	Touring	5	4	4 3/16	5	V. tubes	Centrif'l	Splitd'f	Storage		Cone	Sel	3	Shaft	116		P. steel	3 plain	Roller	Roller		34x4	34x4
Stoddard-Dayton 10-F	2800	36.1	Touring	7	4	4¾	5	V. tubes	Centrif'l	Bosch	Dry		Cone	Sel	3	Shaft	128		P. steel	3 plain	Roller	Roller		36x4½	36x4½
Stoddard-Dayton 10-S	3250	44.1	Runabout	2	4	5¼	5¾	V. tubes	Centrif'l	Bosch	Dry		Cone	Sel	3	Shaft	106		P. steel	3 plain	Roller	Roller		34x4½	34x4½
Studebaker-Flanders	750	20.2	Surrey	4	4	3⅝	3¾	V. tubea	Centrif'l	Splitd'f	Dry	Splash	Cone	Prog	2	Shaft	100	56½	P. steel	Plain	Ball	Ball	1.200	32x3	32x3
Studebaker-E. M. F.	1250	25.6	Touring	5	4	4	4½	V. tubes	Centrif'l	Splitd'f	Storage	Splash	Ex band	Sel	3	Shaft	106	56½	P. steel	3 plain	Ball	Ball	1,800	32x3½	32x3½
Studebaker-Garford	4000	36.1	Touring	7	4	4¾	5¼	V. tubea	Centrif'l	Bosch	None	3 meeh	Cone	Sel	4	Shaft	117½	56½	P. steel	3 plain	Ball	Ball	3.000	36x4	36x4½
White Gasoline	2000	22 5	Touring	5	4	3¾	5⅛	H'comb	Centrif'l	Bosch	None	Pump	Cone	Sel	4	Shaft	110	56½	P. steel	2 ball	Ball	Ball		32x4	32x4
White Gasoline	2500	22.5	Touring		4	3¾	5⅛	H'comb	Centrif'l	Bosch	None	Pump	Cone	Sel	4	Shaft	120	56½	P. steel	2 ball	Ball	Ball		34x4	34x4
Winton **48**	3000	48.6	Touring	5	6	4½	5	V. tubes	Centrif'l	Eisem'n	Storage	Pump	Disc	Sel	4	Shaft	124		P. steel	4 plain	Ball	Roller			
Winton **60**	4250	60.0	Touring	7	6	5	5	V. tubes	Centrif'l	Eisem'n	Storage	Pump	Disc	Sel	4	Shaft			P. steel	4 plain	Ball	Roller			
White Steam 0-0	2000	20.0	Touring	5	2	2½ & 4½	3							Sel	2	Shaft	110		P. steel	2 ball				32x4	32x4
White Steam M-M	4000	40 0	Touring		2	3 & 5	4½							Sel	2	Shaft	122		P. steel	2 ball				36x4	36x5

TABLE OF SPECIFICATIONS FOR 1910

Structural details and dimensions of the gasoline and steam pleasure cars exhibited at the Atlanta Show are listed in the preceding tables. Owing to the earliness of the season, the information about some of these cars remains scanty, and consequently in many items the tables are incomplete. They will, however, suffice to give an idea of the number and quality of the exhibits at this first National show of the South.

Many of the manufacturers have given special attention to Southern peculiarities in respect to wheel tread. The wagons and carriages which use Southern roads almost invariably track 60 or 61 inches, and consequently the ruts are spread too far apart to suit a car with standard tread. For this reason a large percentage of automobile manufacturers make their cars with an optional width of tread of 60 inches. Such cars are indicated in the tables with an asterisk (*) placed against the regular figure for tread or wheel track. Many other makers whose cars are not so marked will supply the Southern standard for a slight extra charge.

A. L. A. M. Formula Rating Employed—The horsepower ratings are in all cases according to the A. L. A. M. formula, disregarding the makers' figures whenever these differ from the standard. It will be obvious that this is the only fair method of comparison. Some makers rate four five-inch cylinders at 30 horsepower, others at 50; the difference is not in the motors, but in the fact that the former rating is at a speed of 600 revolutions per minute, and the latter at 1000 revolutions. Much better give the standard rating of 40.0 and avoid confusing the reader with the additional figures.

Radiators are another source of confusion. In the tables these are divided into three classes, according to their construction: verticle tube, cellular and honeycomb. The vertical tube designation is self-explanatory, with the addition that the component tubes are provided with radiating fins, or pass through closely-spaced metal sheets which answer the same purpose. Cellular radiators are those made up of flat, zigzag tubes, without radiating fins, and the honeycomb type is that originated by the Mercedes, in which the tubes are horizontal and serve for the passage of the air, while the water passes through the interstices between the tubes.

Table Signs and Abbreviations—Pumps, in all cases appearing in the tables, are either of the centrifugal or the gear types, both too well known to need description. A remarkably large number of cars, however, dispense with the pump, circulation being on the thermo-syphon principle, effected simply by the different degrees of heat of the two bodies of water, one in the cylinder jackets and the other in the radiator.

So uniform is the use of high-tension ignition by magneto that it has become superfluous merely to state its presence; and to give the most possible information, the magnetos have been designated by the names of their makers, whenever possible.

The lubrication of the motor cylinders and bearings is another field for standardization. The system of lubrication by a continuous circulation of oil, used over and over, is designated in the tables by the word "Pump." The system in which each cylinder or bearing is fed a definite quantity by an individual pump is indicated by the abbreviation "mech," accompanied by a figure showing the number of such feeds. Splash lubrication is that in which the lubricant is simply injected into the crankcase at stated times.

Clutches are divided into cone, disk, plate, and expanding or contracting band types. Change-gears are either selective, progressive, planetary or friction, all familiar terms, for which the abbreviations will be self-explanatory. The aim throughout the tables has been to avoid confusion by classifying the designs for each part into the smallest possible number of definite types, rather than to attempt to describe each part individually. With each type indicated by a given and uniform sign, reference to the tables is made easy, and yields at once a definite idea of the construction of the car in question. A glance down the columns of the table will also give an idea of present structural tendencies.

THE AUTOMOBILE

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AUTOMOBILE WEEK AT ATLANTA

Leader of the rejuvenated South, Atlanta this week welcomes the industry which is expected to play no unimportant part in its development. Atlanta recognizes the importance of transportation, for the railroads first brought her prosperity; and she sees that the farm lands on which her prosperity depends will best be served by the more modern agent of transportation, the automobile.

In the modern scheme of development the railroad seems to have exhausted its possibilities. It has created great distributing centers—Atlanta stands as an example; but its scope is limited. It cannot reach every hamlet and farmhouse. The electric interurban lines come nearer to the individual producer, but still not quite close enough. Here lies the field of the automobile.

Each farmhouse can have its road linking it with the railroad station, and its automobile to use that road; and the combination of a good road and a good automobile gives the most economical form of short-haul transportation known. With good roads, every farmhouse is on the railroad.

This form of transportation is the South's keenest need, and its lack the greatest hindrance to further development. The steel rails and the locomotive have done their allotted part; the macadam road and the automobile must end the work.

Atlanta's public-spirited citizens saw this want and with characteristic energy set about supplying it. They found it necessary to work in two directions: for the country-folk had not realized that they needed automobiles, and the automobile makers had not realized that they needed the country-folk. These two bodies had to be brought together and made to see their mutual dependence.

Here Atlanta spirit came into play. Most cities would have been content with a single show or tour; not Atlanta. The program made out by her enterprising citizens included a show—a National show at that; not one but half a dozen tours, and a race meet on the fastest track in the country. Truly no small undertaking!

How the National show was secured, Clark Howell, the editor of the Atlanta *Constitution*, has related elsewhere. Ninety-nine men out of a hundred would have given up the attempt in despair, but the Atlanta delegation persisted—and won. They obtained the greatest honor that could be given any city by the united automobile manufacturers, the first exhibition of the new models: that honor which formerly had been reserved for the nation's metropolis. It was a fitting recognition of their enterprise.

Meanwhile another group of citizens were busied with the race-track. Here, too, was displayed persistence and faith of the kind which makes for success. First the necessary capital had to be raised. This did not prove as difficult as might have been expected, in view of the amount called for. But the committee found that contractors were reluctant to undertake the construction within the specified time. Persistence won another victory when a reliable firm was found to assume the contract, and when that firm fulfilled its obligation with time to spare. The track, with new records already established on its surface, awaits its opening meet.

So much for the spectacular side. The show was assured, with its splendid decorations, its polished chassis and beautifully finished cars, appealing to the esthetic sense. The races would bring world-famous drivers and speedy machines to rouse the sporting instinct. There remained the familiar, intimate side, the proximity of the dust-stained cars and their goggled drivers, traveling well-known roads and stopping at well-known inns, to wake the personal interest.

For this purpose the tours were instituted. From every point of the compass automobiles were to rendezvous at Atlanta, demonstrating at once their ability and usefulness and the failings of the local roads. Augusta, Savannah, Albany, Fitz-Gerald, Dublin, and Birmingham all send their quotas, and from New York the greatest tour of all takes its way southward. Each will pass through virgin country and will awake many thousands of country dwellers to the advantages of good roads and the automobile.

No labor could have been more unselfish, or wider reaching in its influence for good, than that of Atlanta's citizens; and, like most unselfish efforts, it will redound in no small degree to their own benefit.

Future years, we hope, will find Atlanta the center of hundreds of miles of plantation and farm land, broad hills and valleys snow-flecked with cotton and golden with corn; and each plantation and farm will be linked to its town and its railroad with bands of white macadam. Friends will be neighbors, though ten counties distant, and all will be united in fellowship and prosperity.

GOOD ROADS ACTIVITY AT FEVER HEAT IN THE SOUTH

THE good roads movement in the South is both an old and a new proposition. The desire for good roads has long been felt, and movements looking to their accomplishment have been often started. It is the method that has obtained that deserves the title of "something new."

This method was first adopted by the Atlanta *Journal*, and came in the shape of offers of cash prizes for the best road in various counties in the South. It was this offer, or rather this series of offers, that set nearly every section of the South at work, laboring for the better keep of the highways and the construction of perfect roads.

The *Journal* tour from New York to Atlanta started the real activity in this direction, and credit is due Major John S. Cohen, managing editor of this paper, for the energy that has made the movement a success. When he decided upon his plan of action, there was no time lost. He went out on the roads personally and inspected them. His title of major was well earned by active service during the Spanish-American war, and while not a man of strong physique, he has endured much hardship in the field. He was called upon to muster his courage and strength when he started on the first "scout tour."

This tour was for the purpose of locating the best possible route from Atlanta to New York. To make the trip did not mean a joy ride by any means. There were creeks and rivers to ford, bad bridges to cross, rough roads to travel, and many hardships to endure. There was one bright spot to these inconveniences, however, one saving grace for the bad things, and that was the universal courtesy, liberality, and enthusiasm of the people along the routes traveled. From the hour that the first car left Atlanta to the hour that its journey was ended in New York, the trip was one continuous ovation from every city, town, and hamlet visited. But while this is true, there was work to do, and real work. Observations had to be taken, maps had to be made, bridges tested, mountains climbed, swollen streams crossed, and a hundred and one inconveniences overcome every day. It was here that the experience and energy of Major Cohen was seen at its best.

The news of the movement and the new plan that was being put into operation spread into the most remote places, far from railroads and telegraph lines. As the car went speeding down a country road one afternoon in North Carolina it passed near a small farmhouse. The owner was seated on his porch reading when he heard a blast from the horn of the machine. He sprang to his feet and waving a paper high above his head exclaimed: "Three cheers for the *Journal* and good roads." He then gave the cheers he had just called for.

After the initial trip from Atlanta to New York, the return journey was made. But the pathfinders did not return as they had come. Instead they made their way back by a different route, and went through many hardships for the second time.

Again the generous entertainment and hearty greetings given by the citizens through whose territory the car passed made up for all the sacrifices. It had been decided before the first trip was made to give prizes to the counties having the best roads by a certain date. After this had been determined upon it became necessary to decide upon the route along which the improvements were to be made. That was really the hardest part of the task. Physical discomforts were as nothing compared to the task of disappointing hundreds of kind friends who were anxious to have their municipalities on the road. But at last the work was finished and the line selected without regard to personal feelings. By doing this the best possible results were obtained.

Then began the work of citizens, boards of trade, county officials, city governments and individuals. Roads that a few days before had been almost impassable were graded, cherted, and rolled as quickly as possible, and then more permanent improvements were begun. Bridges were constructed, drains were built, and yet the work continued. This, however, was not confined to the Atlanta-to-New York highway. Sections not on this route were not to be outdone by their neighbors, and they, too, got busy.

Movements to improve roads farther South were soon active and in a short time were general. The efforts first began in Georgia, extended to Mississippi and Louisiana. Soon the movement had gained such widespread popularity that the people in many counties decided to vote for bonds for the improvement of their roads. Men who had on previous occasions opposed the issuance of bonds for any purpose caught the good roads fever and worked in their behalf. A recent meeting of the Southern Appalachian Good Roads Congress was addressed by G. Grosvener Dawe, managing director of the Southern Commercial Congress. In his address Mr. Dawe gave some exceedingly interesting figures. He said:

"The form of good roads enthusiasm, which expresses itself in bond issues, is unmistakable. The total bond issues voted on or discussed prior to voting and still remaining undefeated, from March to September inclusive is $17,956,000. The voting of bonds shows that the public mind now recognizes the permanency of a good road, and, therefore, posterity's interest in it. The votes by States give interesting light on the whole matter. Bond issues voted, or to be voted on, by Southern States, March to September, inclusive, 1909, follow:

Texas	$5,000,000
Tennessee	3,022,000
Georgia	2,110,000
Oklahoma	1,750,000
North Carolina	1,640,000
Florida	1,600,000
Virginia	1,196,000
Alabama	850,000
Mississippi	310,000
Louisiana	298,000
West Virginia	180,000
Arkansas	....
Kentucky	....
Maryland	....
South Carolina	....
	$17,956,000

"The tide of bond-voting was strong all through the spring and early summer, ebbed during August, and has swung on strongly again during September. Bond issues voted or discussed in Southern States were:

	States	Amount
March	5	$1,615,000
April	7	3,690,000
May	9	3,319,000
June	7	2,063,000
July	7	2,674,000
August	4	1,340,000
September	8	3,255,000
Total		$17,956,000

"The State of Georgia may be said to be the livest 'old' State in the South. It stands third on bond votes, having pledged itself $2,110,000 since March. But this does not even touch the edge of the activity. There is to be more money spent in the next year by counties not voting for bonds than the $2,000,000 mentioned above. Does this sound like determination? Stewart County, 600 miles; Pulaski, 300; McDuffie, 200; Crisp, 150; Ben Hill, 100; Dooly, 100. Thirty-six counties in Georgia are going at the road problem and with vigor. The explanations are many —newspaper agitation, the State geologists' work, automobile ownership, and the plain horse-sense of the farmer. They can all be summed up in the old adage, 'in union there is strength.' These elements in any State, when they once pull together, will move the State. 'Glorious old Georgia' is completing more than 10 miles of good roads a day. Over 4,500 convicts are at work in 105 counties of the 149."

So the movement started by John S. Cohen and the Atlanta *Journal* has become almost universal in the South, and is spreading every day.

E. M. Durant, Asa G. Candler, Jr., "The Men Who Built the Track"

Robertson in Simplex Negotiating the Last Turn

HOW ATLANTA'S GREAT SPEEDWAY WAS BUILT

By ASA G. CANDLER, Jr., President of the Atlanta Automobile Association

THE building of the Atlanta Speedway and the organization of the Atlanta Automobile Association was not in any sense the outcome of a long-contemplated plan. Instead it was all thought out in a few minutes' time, and once the start was made, not a moment was lost in completing the work.

One afternoon Edward M. Durant, of Atlanta, and myself were near Hapeville, a small town adjacent to Atlanta. We had made the trip out on business far remote from that of building an automobile track. As we passed a large tract of land the identical idea seemed to occur to both of us at the same time. The idea was spontaneous, one might say, and the very instant we began discussing the question it was settled in our minds that we would start the work at once.

The land we had seen was not all in one parcel, but several scattered pieces, and in order to secure what was needed we had to make a number of trades. This was done, and then work was started on the plant.

In the meantime the Atlanta Automobile Association was organized, and the land taken over by that organization. Officers were selected by the stockholders, and they were kind enough to make me president. Mr. Durant was elected secretary, and right here let me say that he has been a most valuable man in every detail of the great undertaking.

After the association was organized the task of getting the grounds arranged and having the course laid out was placed in the hands of Mr. Durant and myself. We did not want to lose any time in having the work completed and set a time for it to be finished. We decided to have the first meet on November 9, and continue up to and including the 13th of that month. We consulted with a number of contractors and they declined to undertake the job, for we were not ready to begin until July. The idea had occurred to us in June, and after getting the needed land we had no time to spare.

Many experts looked over the situation and declared it was impossible to complete the task in the time we had to give them. They would figure a while, and then with a shake of the head tell us it was not in the power of man to accomplish the undertaking. Just as it looked as if we would have to take the contract over and do the work personally, we found a firm that was willing to take a chance. It did not take us long to come to terms, and work began almost the day the contract was signed.

We got little encouragement from any one save our stockholders when it came to discussing the time for the onening. Nearly every one declared we had undertaken too big a job for the number of days we had in which to work. We were determined, however, not to break our promise, and soon had a night force working. In order to do this a special system of lights was put in. This was done, and there was no stop except when the weather became so bad there was no chance to go ahead. The men who took our contract were experts. They had the facilities with which to carry out their part of the agreement, and did so.

Atlanta Trophy: Height, Six Feet; Value, $10,000

The plan was not one for the purpose simply of making money. It was intended to advertise Atlanta, to show to the world that the claims made for the city are not idle ones. We wanted the best plant in the country, and I think we have it. But we have just begun. The grounds are to be beautified in every way possible, and we will not stop there either.

The recent try-outs given the course by some of the greatest drivers of automobiles in the world have served to show how near perfection is the course. There was not a complaint, not a suggestion to come from any of the men who drove over the course on Saturday, October 23, but there was praise from all of them.

The Atlanta Automobile Association is composed of leading business and professional men of Atlanta. The association is going to foster automobile racing on a high plane. Everything will be done to advance the sport and to protect it. There is to be no shamming. There is not a dollar of stock in the association owned by manufacturers of automobiles or of kindred enterprises. No make of machine will ever be favored by the association to the injury or inconvenience of another. The association is free from obligations, and its only object is to give the best possible entertainment and to establish itself in the world of sports as one of the great national organizations.

ATLANTA AS THE AUTOMOBILE CENTER OF THE SOUTH

ATLANTA GA., Nov. 3—If a man should sit down with an atlas, a pair of dividers, a railway guide, and a determination to locate the exact center of the South he would discover Atlanta. By the "South" is meant that portion of the United States on the torrid side of the Mason and Dixie line and east of the Mississippi River—that portion which includes Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Tennessee, and maybe Kentucky (though the claimed of that last-named State to a place in the South is contested now and then owing to the inadvertence of Kentucky in not seceding, back in the terrible '60's).

It is doubtless true that the Georgia capital, the "Gateway to the South," is not the exact geographical center of the Southern States. That honor goes doubtless to some less conspicuous city—Ty-Ty or Rome, Ga., maybe. But measured in terms of railroad miles Atlanta is just exactly that place. It has the honor of being nearer to every city in the South than any other one place. To cover the Southern territory from any one central point you must locate Atlanta.

This fact of central railroad location made Atlanta.

The Georgia capital is not blessed with any peculiar natural advantages. It hasn't the river that has made Memphis and New Orleans, or the ocean that keeps Savannah and Charleston on the map; it has no coal or iron like Birmingham; no rich farming country surrounding it like Nashville; it isn't a winter resort like Augusta, or a summer-and-winter resort like Asheville. It just happens to be "near the middle" in its location.

The Union Railway Station at Atlanta

Of course, it is by no means deviod of natural advantages, not least of its blessings being a wonderful year-round climate, but it would never be the big, bustling town that it is for any reason except its railroads and its location. This location has made Atlanta a city of Southern headquarters. Insurance companies, manufacturers, wholesalers, retailers, and now, at last, automobile manufacturers have chosen the city for their main office in Dixie. And these Southern headquarters have made the city rich and famous.

They have also made Atlanta a city of office buildings. Atlanta has more skyscrapers than any other Southern city, and the building of them has only just begun. It also has wonderful other buildings of various sorts, and an amazing supply of warehouses, including the new L. & N., which, when built, was the largest concrete structure of its kind in the world.

Atlanta is not alone famous for its office buildings and its office population. Fulton County, in which Atlanta is located, produced $15,000,000 worth of manufactured goods in 1900, and double that amount in 1905. Now the yearly amount is $40,000,000, and constantly growing.

Of course, the fact that Atlanta is the capital and largest city of a State that produces $100,000,000 worth of cotton a year has something to do with its growth, as has also the fact that it is practically the center of a group of States that grow $300,000,000 worth of cotton a year and turn out cotton goods worth $150,000,000.

All of which being true, is it any wonder that Atlanta has become the center of the Southern automobile business? Probably not, but even with all these facts staring in the face of any man who looked for them it was only a couple of years ago that Atlanta began to take its proper place in the automobile world.

From the time that the automobile makers broke gently into the South until a couple of years ago, all business was handled directly from the factories, through representatives in the various Southern cities. But the makers found this unsatisfactory as a method, because they were far from the actual scene of the selling battle and because they did not know Southern conditions. As long as the South was consuming few automobiles any selling method was good enough. But when the South woke up to the cars, the makers had to wake up to the South.

The honor of discovering Atlanta belongs to the Maxwell-Briscoe Company. This company had in J. M. Austin a live Atlanta agent, but it had been contented to do business in one small store, with the front part of the building fixed up crudely as an office and the back part as a garage. Then one day the announcement was made that the Maxwell-Briscoe Southern Company had been formed and that it would have a new place of business. At that point Atlanta began to exist as a Southern automobile headquarters.

The White company was only part of a lap behind. Before the Maxwell-Briscoe company was well in its new place the Cleveland makers shipped E. W. Gans to Atlanta, stationed him at the Piedmont Hotel, and closed a contract for a Southern headquarters. The company secured a handsome fireproof, concrete building, moved in, and immediately set the South ablaze. The success of the Southern branch was instantaneous and phenomenal. It sold all the cars that were assigned to it, and clamored for more. These were not then forthcoming, which caused disappointment.

What the White company was doing with high-priced cars the Maxwell-Briscoe company was doing with the lesser-priced machines. Its cars sold faster than the branch could get them, and a year in the South served to intrench the company most firmly. And, incidentally, it served to intrench Atlanta and the South most solidly in the heart and the pocketbook of the company, and only a year after the Maxwell-Briscoe Southern opened in Atlanta it was forced to vacate its original place and move into a new one, over twice as large. And soon after that the White company spread out to occupy more of the building it was in, and the business multiplied in proportion.

The third Southern branch opened was by the Buick company. This concern, though a bit behind the other two in discovering Atlanta went into it strong when it did make the start. The company secured a fine two-story warehouse and a garage on Edgewood Avenue and spacious showrooms on North Pryor Street, which were fixed up in a befitting style.

The other Southern branches are of more recent vintage—most of them, in fact, were opened this year. The Overland Southern Company, for example, has just been organized and did not get possession of its place of business, the old Peachtree Auditorium Garage, until October 15. This company has a broad territory and one of the largest garages in the South. The Olds-Oakland Company is another Southern branch of the vintage of

The Mansion of the Governor of Georgia

1909. Within the month it moved into its Peachtree Street showrooms, and it has not as yet secured its permanent garage, though the building is in process of construction.

The Haynes company practically established a Southern branch when it gave the agency for a very large part of the South to the Corker Auto Company. This concern, like the Olds-Oakland company, has closed for a big garage, and is soon to move into Peachtreet Street showrooms.

Another Southern branch secured by Atlanta within the year was that of the Lambert car, which is now handled for all the South by the Southern Auto & Equipment Company.

This represents the Southern branches now established in Atlanta. More are coming. Several companies, some of them of real prominence, are now looking over the local field, and another year will see them established in Atlanta.

Atlanta promises also to lead the way in the manufacture of cars. The White Star car, manufactured by the Atlanta Buggy Company, 80 Means street, is the first Atlanta car. This company began the manufacture of cars last year. The first product of the White Star factory was a high-wheeler. After a year of manufacturing the buggy type the company shifted to the conventional model, and is now getting out a highly creditable car. Another company has been announced which hopes to begin the actual making of cars by next spring.

As the tire center of the South, Atlanta has always been "it." Even before the car makers had discovered the strategic importance of the city, the tiremakers were "on." Early in the industry they had begun to establish Southern branches, and now practically all of the tire makers of importance have Southern headquarters in Atlanta.

There are no bounds to the possibilities of Atlanta as the center of the Southern trade. The enterprise in securing the Southern show helped to make certain Atlanta's position in the automobile world. The building of the big, expensive two-mile track will have its influence. The enterprise of Atlanta in getting up the runs from New York, from Birmingham, and from the Georgia cities will play its little part in focusing the eyes of the automobile world on Atlanta.

In Ansley Park—A Fine Residential Section

While the other Southern cities have been content to take such agencies as came to them, Atlanta has gone out for the big agencies and the Southern branches and has landed them. It has grown with bounds in the automobile world and there is no limit in sight. Atlanta is now the Southern headquarters of the automobile business, and from all appearances ever will be.

TWO THOUSAND PER CENT. INCREASE

Macon, Ga., Nov. 1—One motor car in 1902, five within the ensuing twelve months and 279 in 1909—these figures tell the growth of the motor car business in Macon. For as the sale of machines increased, agencies sprang up and garages came into existence, and the car dealers came to be regarded as one of the city's established business men. Macon eventually will be one of the motor car headquarters of the State. This is attributable to the fact that it is located in almost the geographical center of Georgia, with practically every principal railroad in this part of the country operating freight and passenger service in and out, and all prominent roadways—much the same as "all roads lead to Rome"—leading to it.

There are now six garages. Two of them compare with any in the South, both in size and in point of equipment. These garages are owned by the following: H. K. Burns, the Taxicab Company, Henry J. Lamar, Jr., G. Fred Ellis, J. W. Shinholser, Christian Huhn and John S. Schofield. The garages rent cars, repair them, sell supplies, and are the headquarters for as many agencies. Owing to the rapidly increasing number of cars in the city, each of the garages does a large business. The following agencies are located here:

Automobile and Machinery Co	Oldsmobile and Oakland
G. Fred Ellis	Ford
Maxwell-Briscoe Co.	Maxwell
J. S. Schofield	White
C. Huhn	Jackson and Reo
J. W. Shinholser	Chalmers-Detroit
E. C. Momand	Studebaker
Willingham & Wheeler	Velie
S. S. Parmelee & Co	Buick
Henry Jones	Overland
Southern Auto and Supply Co	Hupmobile

The good roads movement in this State was formally launched in Macon and received its first important impetus here, principally through the efforts of the late Ben. L. Jones. Bibb County roads are considered the best in Georgia, without exception, and as Macon is the county seat, the motorists here have many advantages for pleasant driving. There are numerous straightaway stretches beginning almost within the city limits, chief among them being the Columbus, Houston, Seven Bridges, Outing Club and North Highland roads. The county keeps its entire force of convicts constantly employed on these roadways, improving, building up and creating, and also employs nearly fifty State convicts, all under the same management, for the same purpose. Credit for much of the good roads work in recent years is due to Superintendent E. A. Wimbush. The city of Macon offers little or no restrictions for motorists, and the county puts no obstacle in the way of motorists. A municipal regulation against over eight miles an hour is not enforced.

Conservative estimates place the valuation of the motor cars and garages in Macon at nearly $800,000. The majority of the cars here are high-priced, while in one garage alone, that of G. Fred Ellis, which is just nearing completion, more than $100,000 is invested. This garage has a marble finish street frontage of 100 feet and a quarter of an acre store room.

Every agent in Macon is optimistic over the outlook for business. They state that a prosperous cotton season will insure the sale of scores of machines in this particular territory, if not in the city proper, and all of them are ordering extra cars in anticipation of this large trade.

ERA OF MOTOR CAR IN ALABAMA

Birmingham, Ala., Oct. 30—The era of the motor car has settled over the entire State of Alabama with irresistible force. The motor car in this State has become a commercial necessity. The boom of the car has been marvelous and unprecedented. That the popularity of the motor is to be permanent is illustrated in the fact that many of the local agencies have booked heavier than ever before for a future season's output.

Along with the motor car fever has come a persistent cry for good roads and more good roads. The good road movement is well launched in Alabama. North Alabama has taken firm hold. South Alabama is not far behind. Senator John H. Bankhead is canvassing the State at the present time in the interest of better roads. Enterprising clubs are making and planning to make long-distance journeys. The countryman is stirred up and will render valuable assistance.

The city of Birmingham up to the present time this year has licensed 543 cars. There are in Birmingham and its suburbs 782 machines. Among this number, practically every make is represented. There are fifteen motor car agencies handling practically every make, and Birmingham is preparing to manufacture cars. The Birmingham Automobile Manufacturing Company, with a capital stock of $100,000, and with E. F. Euslen, president of the Jefferson County Savings Bank, as president, has been organized. The new company will manufacture a six-cylinder machine. Here follows a list of the agencies and the machines handled by them in Birmingham proper:

Citizens' Automobile Co.—Marion, Overland and Ford.
C. C. Nixon & Co.—Cadillac, Pierce-Arrow and Pope-Hartford.
Southern Garage Co.—Packard and Franklin.
Highland Garage Co.—Marmon.
Drennen & Co.—Buick, Stevens-Duryea and Peerless.
Birmingham Garage Co.—Studebaker and Oldsmobile.
Loveman, Joseph & Loeb—Chalmers-Detroit, Thomas, Hudson and Stearns.
Cooper Garage Co.—Jackson and Hupmobile.
Maxwell Agency—Maxwell.
N. O. Tyler Co.—Reo and Kissel.
Walter Moore & Co.—Stanley steamer.
Magic City Garage Co.—Mora and Mitchell.
White Garage—White steamer and White gasoline.
Lambert Agency—Lambert.
T. S. Smith & Sons—Premier, American and Moline.

MANY AGENCIES IN THE FIELD IN MEMPHIS

Memphis, Tenn., Nov. 1—From a city practically unknown on the motor car map of the United States to what promises to be the mecca of the southern motor car world, is the rise of Memphis since 1901. It was in this year that the Bluff City was formally introduced to the horseless mode of travel, in the shape of a steam locomobile, and has gradually conceived the idea that the motor car is as much of a necessity as a luxury.

In 1901 Jerome P. Parker & Co., at that time exclusive dealers in bicycles, purchased six high-seated steam locomobile runabouts and after tireless efforts succeeded in disposing of the last one in 1903.

In 1903 other agencies were secured, the car business began to strike its roots and has gradually grown until there are now seventeen motor car dealers in Memphis representing about thirty factories. The present list is as follows:

McDonald Automobile Co.—Studebaker-Garford, Studebaker-Flanders and E-M-F.
Memphis Automobile Co.—Packard, Chalmers-Detroit, Baker electric, Babcock electric.
Jerome P. Parker Co.—Stoddard-Dayton, Overland.
Frank C. Blomberg Co.—White.
Cullen-Butler Auto Co.—Premier, Reo, Grabowsky trucks.
Fal Motor Car Co.—Factory branch.
H. A. White & Co.—Pierce-Arrow, Cadillac.
Bruce-Cubbins Co.—Locomobile, Stevens-Duryea.
Lily Carriage Co.—Peerless, Waverly electric.
Buick Motor Car Co.—Factory branch.
Rodgers-Oliver Co.—Hupmobile.
Southern Auto Co.—Maxwell.
Knox & Jevell—De Tamble.
W. S. Bruce & Co.—Ford.
Williamson & Hobson—Trucks.
Garages—McDonald Automobile Co., Jerome B. Parker Co., Cullen-Butler Auto Co., Memphis Automobile Co., W. S. Bruce & Co., Rodgers-Oliver Co.

The activity of the city in providing the means of travel has been ably seconded by the county authorities until to-day Shelby county, of which Memphis is the county seat, boasts of more than twice the extent of improved highways than any other county in the State. From an appropriation of $40,000 twelve years ago the annual appropriation for the building and maintenance of free gravel turnpikes has been increased until for the past five years it has aggregated $100,000 and as a result over 600 miles of free gravel turnpikes entice the traveler.

North Pryor Street, Which Is Atlanta's Automobile Row

MANY FINE PIKES AROUND NASHVILLE

Nashville, Tenn., Nov. 1—Nashville can make the boast that one of the first successful motor vehicles in America was made in its entirety in this city by a Nashville boy, G. Preston Dorris, who since has forged to the front and is now at the head of a successful motor car factory in St. Louis. Nashville also can boast that it has kept up with the procession in the motor car world, and prospects are not brighter anywhere in the world than they are right here for a still larger use of the car both for pleasure and for business. No other city in the country, and especially none other in the South, can offer the same advantages to the owner of a car as Nashville.

Rock City is the nickname that long has been given to Nashville, and this name is an explanation of the good roads. Nashville is built on one great solid rock. It is impossible to dig over three or four feet in the ground, except right in the river bottom section, without striking solid rock. A rock strata underlies most of middle Tennessee, but at a greater depth than right here at Nashville. But it is possible anywhere to get all the rock wanted for road-building without having to haul it a great distance. This has made road-building comparatively cheap and good solid pikes will be found for many miles around Nashville in every direction.

Duncan Dorris, next to his brother Preston and Mr. Chester, deserves credit for building up the motor car industry in Nash-

In Front of Georgia's State Capitol at Atlanta ville. Mr. Dorris opened his shop for motor repair work next to his bicycle shop in 1903. In two years his business had grown to such an extent that he in 1905 erected a big garage of his own just on the edge of the business portion of the city. Although the place he opened is 50 by 150 feet and at that time seemed to be far ahead of all needs, he has already become very badly crowded. This was the first exclusive garage in Nashville. The list has now grown to the following:

Chester Motor Car Co., agents for Studebaker and Mitchell, general public garage and repair work.
Nashville Motor Car Co.—Dorris, Buick and Stanley, general repair work and public garage.
Rock City Auto Co.—Reo, general repair work, garage, supplies.
Tennessee Automobile Co.—Studebaker and E-M-F, repair shop, garage.
Bell Antomobile Co.—Repair shop and garage.
Southern States Automobile Co.—Stevens-Duryea.
Howard-Cregor Co.—Chalmers-Detroit and Hudson.
E. E. Houk—White and Hupmobile.
Nashville Auto Livery and Repair Co.—General repair work.
J. S. Roller—Ford and supplies.
Nashville Taxicab Co.—Operating a line of cabs for public hire. It has its own garage and does its own repair work.

GOOD ROADS IN MECKLENBURG COUNTY

Charlotte, N. C., Nov. 1—Mecklenburg County is the premier good roads county in the entire South, and Charlotte, the county seat, is the leading motor car center of the two Carolinas. For a radius of fifty miles, a distance which laps over into South Carolina for forty miles, most all the cars sold are sold through contracts held by Charlotte agents. The city has a population of 45,000.

In the city there are 132 machines in daily use, and this number is being added to every few days. The county is the richest in the State and the spirit among the citizens is one of progressiveness and thrift. It is styled the Queen City of the South and the City of Electric Energy. Within a radius of 100 miles are 425 cotton mills, operating 5,511,543 spindles, 120,000 looms, and representing $150,000,000 in capital. There are twenty-six miles of electric railway, operating twenty-three cars. Seven banks have a total of $9,976,000 assets. The four building and loan associations have an authorized capital of $13,000,000. The city has fifty-three miles of paved and macadam streets.

Hand in hand with this wonderful growth is the motor car industry, which was introduced by Osmond L. Barringer. He bought a Locomobile runabout in 1899. In 1903 Mr. Barringer opened a salesroom and launched the business which was the first in this section and perhaps the first in the State. In a year he had placed six machines, and after that time the people began to buy more rapidly. The market has been growing ever since and to-day there are six concerns in the city selling motor-driven vehicles.

Of the 132 machines in the city twenty-two are used by physicians. This is about 60 per cent. of the physicians in the city.

In July last the local owners organized the Charlotte Automobile Association which now has a membership of eighty-five, or about 64 per cent. of all the owners in the city.

Through this section will be found the best public highways in the South. Mecklenburg County alone has 210 miles of macadam and more under construction. There are 46,850 miles of public roads in the State of North Carolina, about 800 of which are macadamized. The work of road building was begun in Mecklenburg County in 1884.

SCRAPPERS FOR ROADS IN WINSTON-SALEM

Winston-Salem, N. C., Nov. 1—Here we have a hundred cars, and hardly a week passes that the number is not added to. Here we have three garages, each doing a thriving business. Here we have a machinery factory preparing, with material ordered, for the manufacture of motor delivery wagons. And here we have the first car ever brought into North Carolina.

The oldest garage in the city is that of the Winston Automobile Company. This company, organized 2½ years ago, has placed many Maxwell machines in use, and the sale continues.

Next in point of age is The Motor Company, whose garage is situated on Main Street, next to the Zinzendorf Hotel, which was official headquarters for the night control of October 29 for the good roads tourists over the national highway from New York to Atlanta. This company has sold scores of Buicks and Studebakers. Though The Motor Company was organized as late as May 1, 1909, the business has grown to such an extent that in January the floor space of the garage will be doubled, making the house extend the entire length of a block.

The Southern Motor Car Company, organized May 8, 1909, is the State agency for the Cadillac machine.

HEALTHY CONDITIONS EXIST IN RICHMOND

Richmond, Va., Nov. 1—On August 1, 1905, William W. Archer registered the first motor car that had ever been entered on a license book in the State. The entry was made at Richmond police headquarters. As the manner of keeping the registry at that time had not been subjected to a test, the address of Archer does not appear with the issuance of the certificate. The machine which this motorist used was a Knox three-wheel gasoline car, seating four people.

Richmond and Atlanta, perhaps, lead the South in the number of motor cars which pass through the city limits. This has been greatly augmented by the work of the good roads enthusiasts going out from Richmond, Washington and Atlanta to all parts of the States between Virginia and Georgia. From the books of the State Auditor it may be seen tbat there have been issued already—to October 10—3,321 certificates for the right to use motor cars in the State of Virginia. As the State license fee is only a paltry sum of $2, one-fourth of which goes to the clerk who issues the certificate, the State already is looking toward a complete revision of the laws governing machines in Virginia, which will more than likely be changed almost in the entirely at the next session of the Legislature, which convenes in January.

The comparative figures in the State Auditor's office show that the year 1909 has given an increase in registration over 1908 of 1,400 machines or nearly as many as half the total registration since the year 1905. It is the beginning of the motor car age in the State and the fever has taken root in every State in the Southeast, to say the least of the Southern situation. The increase of 1908 over 1907 was 700 registrations, or half of that of the present year. The State Auditor estimates that one-half are in Virginia, or something like 1,700 machines.

From the books of the clerk of the chief of police, where city entries are registered without fee, there is shown a total since August 1, 1905, of 3,309 cars. These, also, are estimated to be about one-half owned by Richmond people and the others registered by visitors. The difference in the number registered in the city and State being only 312 machines, it would indicate that the road to Richmond is a Mecca or else that registration has been poorly carried on.

Taking the city registration, it would show that on January 1 of this year there were registered 2,110 motor cars. Going back a year the number was only 758. This is an increase of that year of 441, which, compared with the total to date of 3,309 cars registered, shows the increase to be remarkable.

To-day seven big garages are doing business in Richmond. They represent eight types of manufacture and every known style of these manufacturers. The agents and the machines are as follows:

Virginia Automobile Co.—Ford.
Richmond Supply Co.—Reo.
Foster Motor Car Co.—Franklin and Buick.
Ross & Schuluter—Overland.
B. A. Blenner—White.
Central Garage—Maxwell.
Gordon Motor Co.—Chalmers-Detroit.

In addition to these there are three agencies in Richmond for as many motor cycle companies.

Never in the history of the State has the good roads question assumed such proportions, and there can be no question of the fact that, though the poor farmer is used in stump speeches he is, or will be, the power behind the throne in the motor car.

Good Roads Tourists on Southern Tour Leaving Winchester, Va., on the Road to Staunton

LIKE ROLLING SNOWBALL, ATLANTA TOUR GROWS

NINE STATES have been met and conquered by the sturdy band of automobiles bearing the "Good Roads" banner from New York to Atlanta, and in each successive State the enthusiasm for the cause seems to grow. Each day's trip scored a new triumph. The tourists, in passing through communities where automobiles are seldom seen, spread the gospel of macadam, and in return received their own object lesson in the difference between what roads should be and what they often are.

The worse the roads, it seemed, the more hearty the greeting and the more intense the interest shown through the countryside so afflicted. Villages and cities poured out their people to cheer the tourists. Solitary crossroads, far from farmhouses or other signs of habitation, were marked by groups of farmers with their families, who in many instances had traveled scores of miles and waited many hours to see the cars speed past.

Schools were suspended for the day, and the fences near these little homes of learning were clustered with children, each a prospective advocate of good roads. Villages which have been the most clamorous in their warfare against automobiles have experienced a complete change of heart. All along the route the talk is of good roads and the means by which they may be obtained at the earliest date. As a popular educator the tour finds its crowning success.

Third Day's Run—Gettysburg to Staunton

STAUNTON, VA., Oct. 27—Never was Southern hospitality, famous the world over, more spontaneous or delightful than that which greeted the participants in the New York *Herald*-Atlanta *Journal* tour to-day. For 180 miles the procession was like the return of a victorious army; indeed, to the tour, victory seems already assured.

Starting from Gettysburg at seven o'clock this morning, they traversed the southern section of Pennsylvania, crossed the narrow western neck of Maryland and the northeast corner of West Virginia, dropping then into historic Shenandoah Valley.

It was the longest day's run scheduled for the tour of approximately 1,100 miles. Contestants were forced to drive their cars over roads of all sorts and conditions, and yet but one competing car was penalized for failing to make the day's trip within the schedule time, while another met with an accident which damaged the automobile and probably put it out of the contest, though luckily neither of the two passengers was injured. In addition, penalties were laid upon four contestants by Referee Scarritt for violation of road rules.

Near Middletown, Va., about sixteen miles southeast of Winchester, where the noonday halt was made for luncheon, the Oldsmobile, entered and driven by Frederick Weis, of Brooklyn, crowded close to the edge of the highway in seeking to pass the Craig, a non-contesting car entered by the Ajax-Grieb Rubber Company, which carried supplies of tires. As it came abreast of the latter machine a wheel of Mr. Weis' car struck a big stone flanking a culvert at this point, causing the Oldsmobile to skid violently into collision with the Craig. One of the rear wheels snapped off, sending the car into a ditch fringing the roadway.

The Thomas car, driven by Mrs. De Giers, of New York City, had the misfortune to break a steering knuckle, and as a consequence was forced to lie up for more than three hours while a roadside blacksmith mended the break. It had almost regained its schedule for the day's run, when just outside of this city it suffered three tire punctures. Because of the additional delay the car arrived late and received a penalty of 67 points.

Fourth Day's Run—Staunton to Roanoke

ROANOKE, VA., Oct. 28—Though to-day's route, approximately 93 miles, lay through the "backwoods" districts of the Blue Ridge and formed the most truly rural course yet traversed, village

Quaker Children Enjoying the Passing of the Tourists and Having Their Pictures Taken on the Alco

streets and secluded crossroads were dense with throngs that plied a welcoming bombardment to the good roads campaigners.

Roanoke struck the climax this evening with its roaring welcome. From the clouds of dust hanging over the roadways the cars shot into the streets that had been specially sprinkled for their comfort. The brass band blared its harmonies, while its citizens invited sore throats by the intensity of their chorus.

The day's run lay through historic territory. The tomb of General Robert E. Lee, in the ivy shrouded chapel of Washington and Lee University, in Lexington, was visited by the tourists en route. They were spectators of a special battalion drill by the cadets of the Virginia Military Academy, located in the same city, the institution where "Stonewall" Jackson was a professor of mathematics when he took up arms to fight for his country. They viewed the glories of Natural Bridge, where the noon halt was made for luncheon, and sent their cars climbing along the winding roads that pierce their way through the Blue Ridge Mountains.

For fifty miles out of Staunton, the new national highway, terracing constantly to higher levels, led the way up into the mountain altitudes. The village of Fairfield had arched its main street with a great banner, which voiced the words in big letters:

"Welcome, Tourists—New York to Atlanta."

Virginians' Welcome to the Good Roads Tourists

On the ridges hemming in the roadway, flanked to the left by the towering heights of the Blue Ridge, their forested slopes gay in the colors of autumn and blanketed with a bluish haze, groups had assembled as if in so many grand stands.

All but one of the thirty-five contesting cars rolled in at the finish on schedule time and without a single penalty levied upon them as a result of the day's run.

The car which failed to arrive was the Thomas, entered by Mrs. F. De Giers, of New York City. This contestant had the misfortune yesterday to break a steering knuckle. It had been supposed that the party had given up the contest, but this evening a telegram was received from Lexington, fifty-five miles away, addressed to the official checkers, and saying:

"Don't go to bed until we are checked in. Are enjoying moonlight ride. MRS. DE GIERS."

Fifth Day's Run—Roanoke to Winston-Salem

WINSTON-SALEM, N. C., Oct. 29—Through the grazing reaches of Virginia, the tourists carried their doctrine into the great tobacco-growing belt of the Carolinas. Mountaineers, buried in their little homes, clustered in the recesses of the hills, threw aside reserve and made the parade of the good roads pilgrims a triumph. Unchecked enthusiasm rang its tumult everywhere along the line. It stamped the countryside's united support to the movement which the tour represents.

Immediately after leaving Roanoke this morning, with the sun beaming from a clear sky, the motoring pilgrims struck eight miles of mountain grades. Hedged in by the forested hills, glowing in their autumn dress, the line of cars dashed through stream after stream, as they swept about the sharp corners and chugged up the slopes.

At Maggody Creek, in Franklin County, Va., twenty-one miles from Roanoke, came the most striking evidence of that State's loyal support of the good roads campaign. Until three weeks ago this stream was bridgeless. It was forded by chance automobiles and wagons, the approaches to the dash through the water being especially tortuous and treacherous with accumulated mud. Within that period, through the efforts of F. W. Clair and H. D. Dillard, members of the County Highway Committee, a modern iron bridge more than one hundred and fifty feet in length had been hastily constructed.

Four of the competing cars failed to arrive here within the period of actual running time allotted to the various classes.

F. D. Hughes, of New York, driving a Chalmers-Detroit, wired that owing to illness he and his wife would spend the night at Martinsville, Va., where the noonday stop was made for lunch, and would try to rejoin the tourists in Charlotte, N. C., where to-morrow's run will end.

The entrants delayed in reaching this checking station of the fifth day's run, aside from Mr. Hughes, included Mr. and Mrs. F. J. De Giers, of New York City, who have had trouble for two preceding days with their Thomas car owing to the breaking of a steering knuckle on Wednesday last; the Maxwell car, entered by its makers, which is understood to have broken an axle while fording Big Chestnut Creek, with its muddy approaches, back in Virginia, and the little Franklin car, which has been driven by George H. Storck, of Jacksonville, Fla.

A telephone message brought the information that the last-named car had stripped a differential gear.

Pacemaker Sees Some Southern Joy Riders Ahead

Sixth Day's Tour—Winston-Salem to Charlotte

CHARLOTTE, N. C., Oct. 30—North Carolina believes in the adage that actions speak louder than words. To-day's route lay, in part, over macadam roads that for excellence ran a close race for supremacy with the modern highways of New Jersey and Massachusetts. Within the last few months county after county has expended tens of thousands of dollars in bettering its roads.

High Point, N. C., centre of the furniture manufacturing industry of the South, and ranking next to Grand Rapids in its output of household and office furniture, flagged the cars and served the tourists, who had breakfasted heartily in Winston-Salem only two hours before, with sandwiches and coffee.

As was figured by a mathematical expert to-night, each tourist had partaken of nine different and distinct meals before coming into contact with the commissary forces of Charlotte at the close of the day's run this evening. The menus varied from roasted 'possum and baked sweet potatoes to the national ham sandwich and its universal associate, steaming coffee.

Charlotte opened wide its arms to receive the pilgrims. Its entire downtown district had been draped with incandescent bulbs that flamed it into a monster "court of honor." There was a reception committee large enough to have cared for an army. Here the weary tourists, who have gone to bed late for a week and risen at daylight to continue the spreading of their gospel, prepared to find rest over Sunday.

Of the six cars which have practically dropped out of the contest for the tour's prizes two of the entrants have flashed word that they will continue to run until the Atlanta goal is reached.

Joseph D. Boyd, driver of the Maxwell, entered by its manufacturers, was the author of a wire from Martinsville that he would try to rejoin the column before its departure from this city on Monday morning. Back at Stoneville, near the North Carolina line, George H. Storck has the village blacksmith laboring with the fractured differential of his Franklin car, and a telegram from him affirmed that he would continue to the Atlanta checking station.

A leaking gasoline tank on the Selden, entered by Evelyn Harris, of Atlanta, caused a lively fire to-night which nearly put several of the contestants out of the running. A cigarette-smoking pedestrian, as usual, started the trouble. However, the blazing car was quickly pushed away from its neighbors. It is hoped that the Selden can be put in condition to-morrow. Everyone is rejoicing at the prospect of a day of rest.

Seventh Day's Tour—Charlotte to Greenville

GREENVILLE, S. C., Nov. 1—This city is a growing center of cotton manufacturing, in the very heart of the industrial region of the "New South." The country roads are flanked by illimitable fields of cotton, where all hands are busy—or were, till the tour came by—gathering the snowy bolls. Villages were marked by humming cotton gins, and long buildings of new red brick in which the whirring of many spindles told its story of development. Electric power, gained from waterfalls in the distant hills, is in universal use; the fields are crossed by rows of steel towers bearing the high-tension cables.

Crowds, Mostly Women, that Lined the Roadside Cheering Thomas Car at a Hilltop near Shepherdstown, Maryland

Entered by the Chamber of Commerce of Roanoke, Va.

Winston-Salem's Board of Trade Seeks Population

The ferry over the Catawba River, 11 miles out of Charlotte, was a new experience to many of the tourists. The single barge was linked to a long cable that crossed the stream, and was propelled partly by the force of the current and partly by long poles wielded by the negro crew. Each trip took two cars across, and occupied five minutes, so two hours elapsed before the forty-four had been transferred. Owing to this delay, the cars were not formally checked out for the day until the river had been crossed.

King's Mountain, where Revolutionary history was made, furnished an inspiring example of the practical results of the good roads movement. Within the last five months a stretch of macadam has been built, in many places blasted through the solid rock, with many bridges reducing grades and crossing streams.

The noon stop was at Gaffney, S. C., where the tourists lunched on tons of barbecued 'possum and young pig. Spartanburg, too, had tables set in its public square, with piles of sandwiches and gallons of steaming coffee. In the Hotel Ottaray, at Charlotte, there was a public reception, and Mayor John B. Marshall voiced the city's welcome.

Eighth Day's Tour—Greenville to Commerce

COMMERCE, GA., Nov. 2—This city welcomed the tourists this evening with a demonstration unsurpassed anywhere on the route. In the main street, a squad of 'possums peered down on the crowds from a persimmon tree walled in with bales of cotton. Confederate veterans armed with shotguns fired a volley as each car appeared, and the mill whistles were tied open for hours. At an open-air mass meeting, John N. Holder, speaker of the Georgian House of Representatives, made the official address.

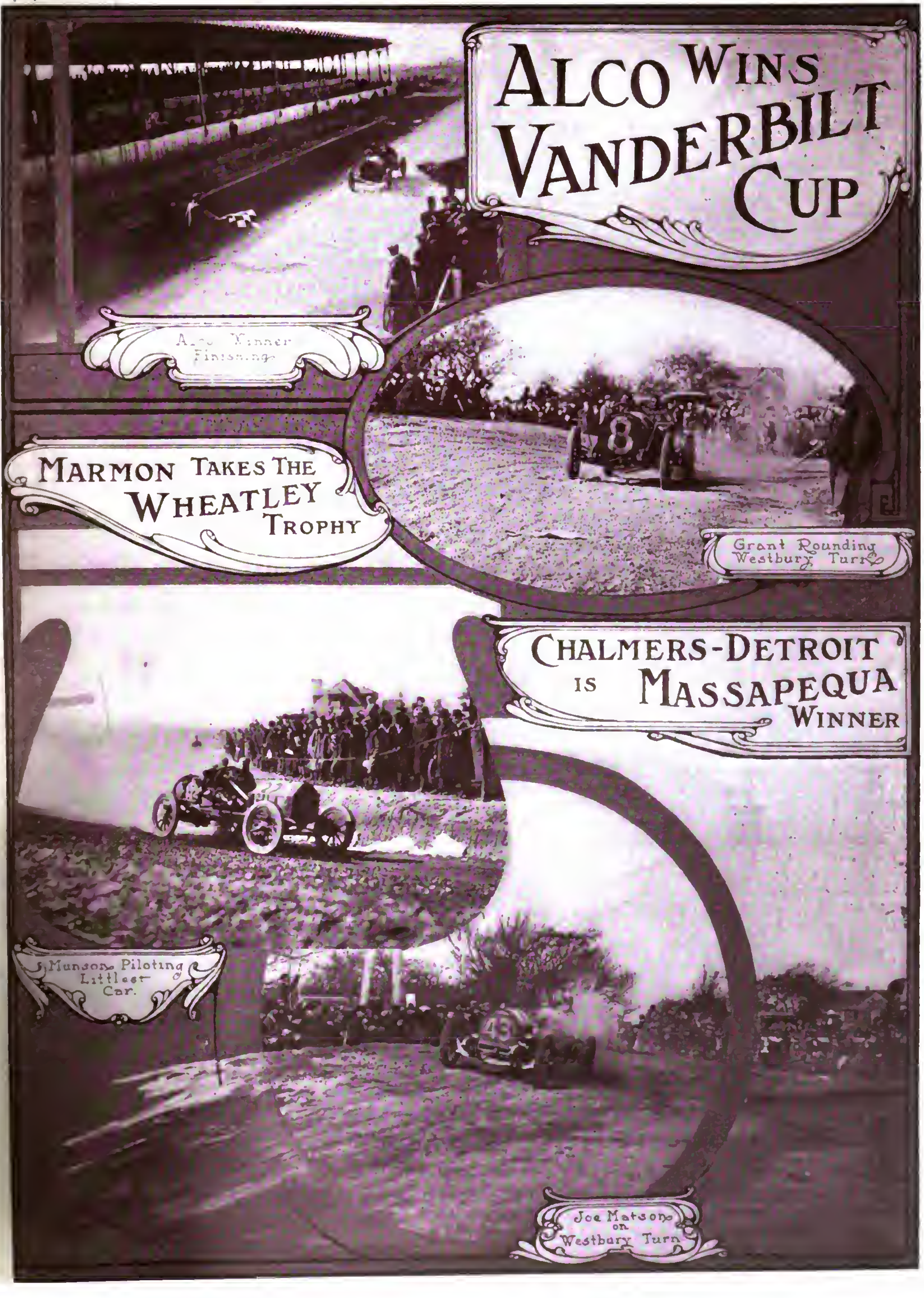
To-day's run of 110 miles brought several contestants to grief, and the number of perfect scores has fallen to twenty-six.

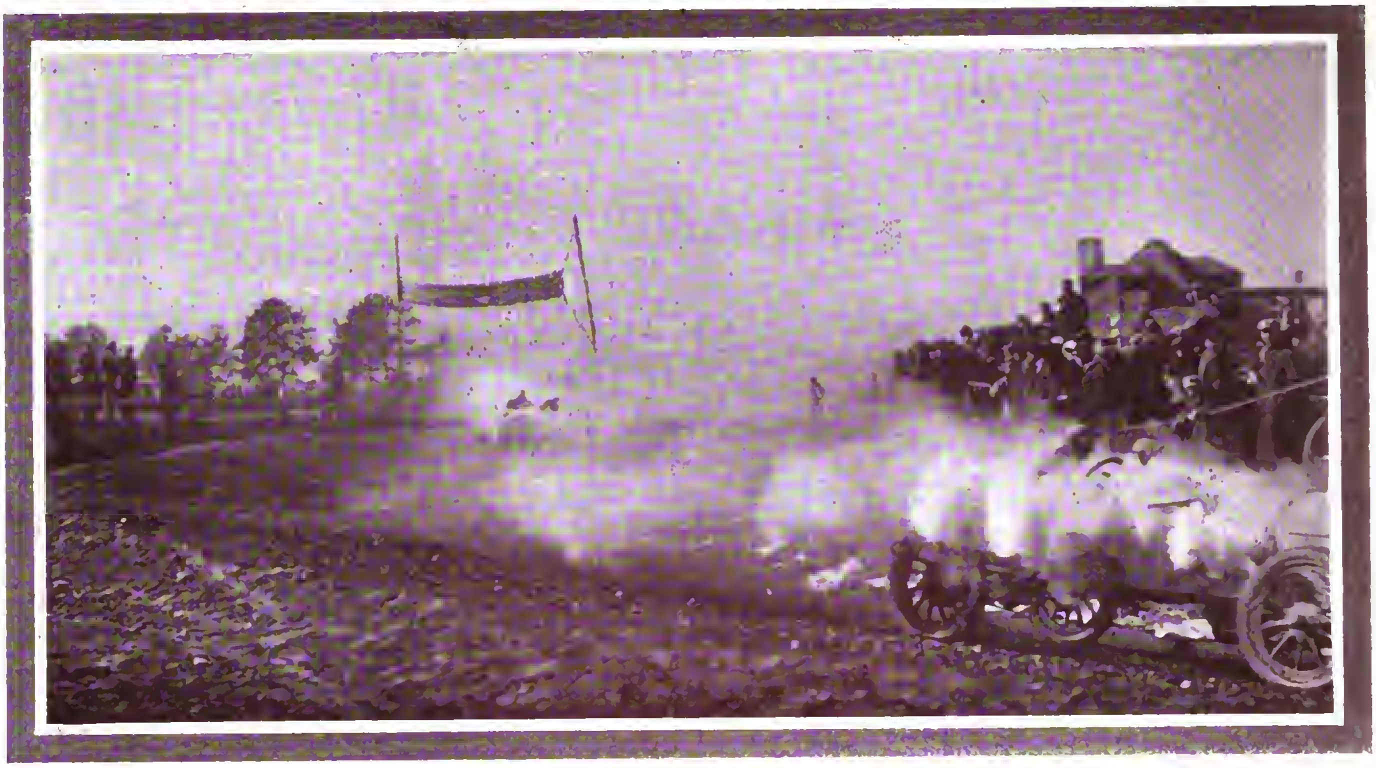
Twelve miles out of Greenville the Jackson, driven by Jacques Futrelle, sustained a bent axle. The roadside blacksmith overcame this trouble after some delay, but near Anderson, S. C., in trying to avoid a farmer's wagon, Mr. Futrelle ditched the car. The Maxwell, which became a non-contestant several days ago, attempted to act as Good Samaritan, but broke a gearshaft in the effort. Both machines are expected to be in line for the start to-morrow.

The White Star, Atlanta's pride, twisted its crankshaft, and was towed in by Mrs. Cuneo and her Ranier. W. A. Kelly's Knox broke a throttle connection, and came in late with a penalty of 148 points. The Winston-Salem Studebaker lost a rear wheel near Lavonia, S. C., but was repaired and got in with only 27 points penalty chalked up against it.

To-morrow's charge on Atlanta begins at seven o'clock. The tourists are tired but happy, for everywhere they have seen results of their good roads gospel, and the promise of even greater advances in the months immediately to come. More than a thousand miles have been covered, and the goal is but 81 miles distant. A thousand cars are expected to form the escort into the Gate City from Decatur; but the Atlantans will have a hard time to beat the records for hospitality which have been made already along the route.

White Car After Leaving Berryville on the Main Highway Leading to Winchester, Virginia


ALCO WINS VANDERBILT CUP
Alco Winner Finishing
MARMON TAKES THE WHEATLEY TROPHY
Grant Rounding Westbury Turn
CHALMERS-DETROIT IS MASSAPEQUA WINNER
Munson Piloting Littleer Car.
Joe Matson on Westbury Turn



Grant's Six-Cylinder Alco Overhauling Knipper's Chalmers-Detroit "40" on Westbury Turn.

RESULT OF THE VANDERBILT

1. ALCO,	Grant,	4:25:42	62.77 m.p.h.
2. FIAT,	Parker,	4:30:58[3]	61.55 m.p.h.

FINISH OF WHEATLEY TROPHY

1. MARMON,	Harroun,	3:10:21[2]	56.76 m.p.h,

FINISH OF MASSAPEQUA TROPHY

1. CHALMERS-DETROIT,	Matson	2:06:52[2]	58:4 m.p.h.
2. MAXWELL,	Dearley,	2:28:28[4]	51:1 m.p.h.
3. MAXWELL,	See,	2:30:24	50.4 m.p.h.
4. HUDSON,	Ainslee,	2:31:47[2]	50.0 m.p.h.

SIX consistent cylinders in an Alco car intelligently driven by Harry F. Grant survived most successfully in the fifth competition for the Vanderbilt cup. Survived is the correct word to use in connection with the telling of the name of the winner, for the classic event, with its usual Long Island setting, never before had a course which so severely tried the enduring qualities of the participants. Shortening the circuit by more than half that of previous years, reduced the county roads mileage but retained the entire length of completed parkway, which has a surface that exacts strenuous toll as the price of racing speed. And on Saturday last the 278.08 miles contained over twice as much as was included in the 1908 course.

Even most of the wiseacres overlooked the level-headed Grant in the reckoning, losing sight of the fact that he had Lowell's big prize as good as won when on the concluding lap the breaking of a chain robbed him of victory and caused the stellar honors to go to Robertson. Missing the Fairmount Park race because of an eleventh-hour misfortune almost as exasperating as the happening at Lowell, may have had much to do with placing the Grant-Alco combination in the possible, but not in the probable column. Robertson had added another to his long list at Philadelphia, and, though the winner of last year's Vanderbilt, the sturdy George didn't consider the inducements sufficient to bring him to the starting-line this time. Hence, the form-pickers had slight call to compare the two in predicting a winner, and Grant's work was not appreciated.

While it is true that the 1909 Vanderbilt field rated as the least brilliant in its history in the matter of known drivers, it is apparent that the caliber of the cars, remembering their stock chassis basis, excelled in all-around enduring qualities despite the meager number of finishers which overcame the punishing effects of the parkway passages. To appreciate how severe this was, one had to learn of, or, better still, be a witness of what abuse came to the cars during the practice period.

Grant sized up the situation like a general, for while some of his opponents were beating the life out of their cars, he pursued the even tenor of his way, confident that the seekers of fast lap honors would eliminate themselves before the 22 circuits had been completed. Grant's final circuit was his fastest, it being at an average of 71.9 miles an hour. For the entire race, his speed was at the rate of 62.77 miles per hour, slower than the 64.38 of Robertson in 1908 over a better course.

Strang was a "down-and-outer" in two laps, his Fiat suffering from a broken radiator. Mitchell's Simplex disappeared in the third round with a broken crankshaft. Hearne was the next to become a non-combatant, the second Fiat cracking a cylinder and breaking a connecting rod. Chevrolet overtaxed the Buick with the fastest lap of the race, cracked a cylinder, and then became an onlooker in the fifth round. And so the rivals retired, one after another, until only two finishers remained with two others up and doing.

Grant had followed his own ideas, heedless of the others, and gradually had worked his way to the leadership and the winning of a noted cup. Parker, a driver who is of a promising sort, figured as the runner-up in the remaining of the three Fiats, and, owing to a confusion among the officials, the announcement had been made that he was in the lead. Amateur Wishart, with a three-year-old Mercedes, and Elmer Knox, with the quite notable two-cycle Atlas, were navigating the circuit when Referee Vanderbilt called off the race.

Preceding this action there had been a flurry of excitement when a protest emanated from the Alco pit that its car had not been given credit for all of its laps, one being short in its score. Arthur Jervis, pioneer of cycle races galore and a logical graduate into automobiling, had not taken any chances with so-called official score-taking, and when he surprisedly became aware that the car in which he was interested ran second instead of first in the minds of timers and scorers, his aggressive objections quickly culminated in an admission that the official score was in error. Starter Wagner just had time to rush for the check-block flag and then wave it in the face of the finishing Alco. Naturally there was a demur from the Fiat camp, where the delusion had been cherished that Parker was on his winning round, but the evidence adduced left no doubt as to the right of the Alco to the place; and so the referee ruled.

As the result showed, the distinction between the Vanderbilt cars into classes 1 and 2, according to A. A. A. rules, was needless. Of the cars which belonged properly in class 2 (301 to 450 cubic inches piston displacement), none finished, although No. 7 Chalmers completed 19 laps and No. 5 Atlas was still running when the race was stopped. For this reason, there was no award in this class, the special Donor's trophy being withheld.

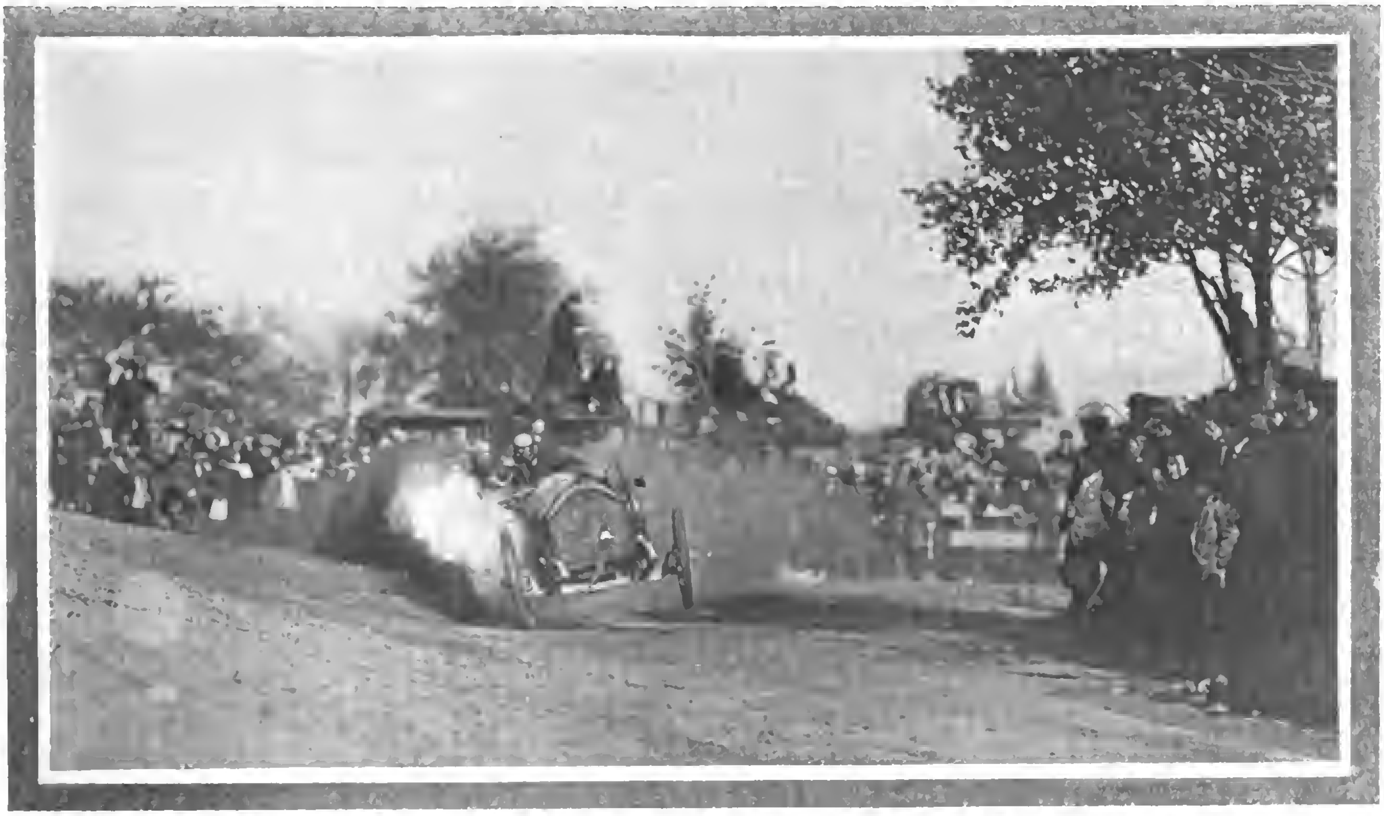
What little interest there was in the race for the Wheatley Trophy, soon died a natural death. Beginning with the very first lap, Harroun driving Marmon No. 32 took the lead and held it through to the finish, being the only one to conclude the whole fifteen circuits of the track. This runaway match was profitable for the driver, since in this race the prize was increased by a purse of $1,000. Some idea of the "cinch" which Harroun had may be gleaned from the statement that a lead of 7 mins. at 50 miles had been doubled at 100, and increased to 16 mins. at the 150 mark, which was the last distance covered by his nearest competitor. The time while not wonderful, would have put this car in fourth position, had it been in the big race.

From the point of real interest, the little car race supplied what was wanted, for two-thirds of the starters fought it out until the checkered flag stopped them. The Chalmers team, with a substitute driver on one car, early assumed a commanding lead, and ran one, two for all laps from the third to the ninth, Costello heading the list in the first previous to his disappearance, and the little Hudson, the midget of the race, edging into second place on the second and third. Unfortunately, "Buster" Brown fell by the wayside in the tenth, and the two Maxwells beat out the other Detroit car. Like the winner in the Wheatley, this winner would have been placed in the big race.

Keeping a concise and prompt record of a score of cars on a twelve-mile circuit is a bit more difficult than doing the same thing on a course twice as large. Both officials and spectators became painfully awake to this fact, for Peter Prunty had a less number of announcements to make than at any previous Vanderbilt event. Lack of knowledge of what was taking place undoubtedly had much to do with loss of interest and the departure of not a few before the conclusion. No sun found its way into the wind-swept grandstand, which did not hold its customary crowd, and no music helped to enliven the occasion.

As a matter of fact there was an evident air of economy in the air which indicated that the affair was being conducted upon business principles solely, a policy which frequently is detrimental in sports when carried to an extreme. The crowd was New Yorkish in both quality and quantity, and Society with a capital "S" that graced the occasion came mostly from the Long Island colony. Sir Thomas Lipton was a pleasing figure; John D. Rockefeller, though said to be present, escaped the camera brigade and pressmen generally; and Jack Johnson, colored holder of fistic laurels, aroused antagonism by his obstreperous presence. George Robertson watched proceedings from the pits in front of the grandstand, though few recognized the 1908 winner. Robert Lee Morrell, chairman of the 1905 Cup race, was present, but Jefferson deMont Thompson, the 1906 and '08 chairman, was an absentee, as were many other noted autoists from other cities who have seen the event in previous and more national years. Present President Gary and ex-presidents Morris and Hoyt, of the A. C. A., all whom are members of the Motor Cups Holding Company, were on hand.

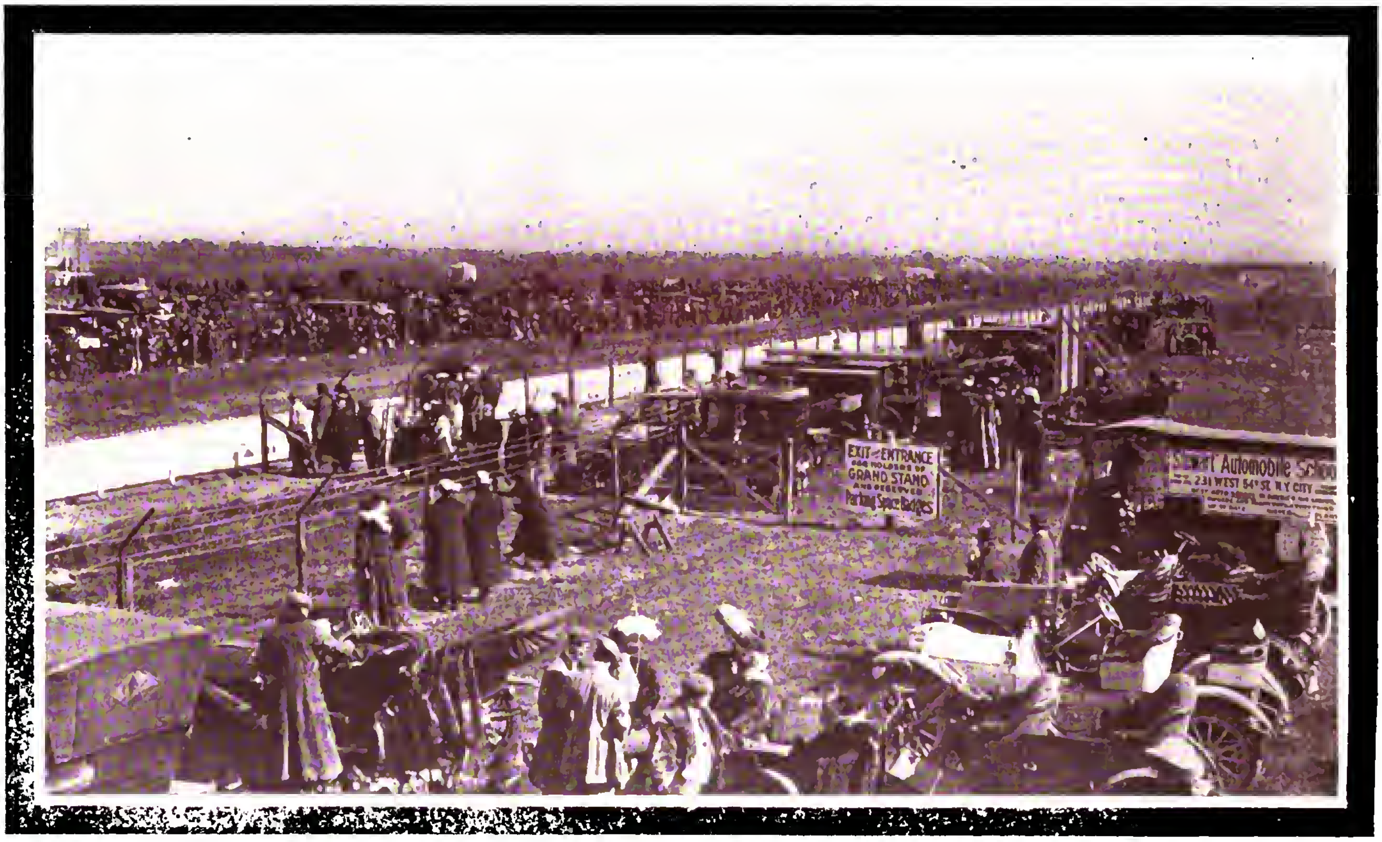
President L. R. Speare, of the A. A. A., the racing board of which has hitherto constituted the nucleus of the cup commission, attended in company with President J. T. Coughlin, of the Worcester Automobile Club, and W. E. Metzger, of the Manufacturers' Contest Association. S. B. Stevens, of the A. A. A. Contest Board; F. H. Elliott, secretary of the A. A. A.; R. Lincoln Lippitt, of the Rhode Island Automobile Club, were among the other few automobile personages of note.



Knipper in His Chalmers-Detroit Sensationally Rounding the Curve at Old Westbury Turn

THE DETAILED STORY OF THE VANDERBILT CUP

LAP 1—Of the 15 cars that started in the Long Island Classic, a 6-year-old Mercedes, driven by a 20-year-old amateur, Spencer E. Wishart, of Greenwich, Conn., was in first position at the completion of the circuit. Chevrolet, in a Buick, was but 11 seconds behind him, with 20 seconds separating him from Seymour in the Isotta, who was third. Knipper in Chalmers No. 7 followed six seconds later, and the balance of the field finished the circuit in the following order: National No. 10 (Aitken), Apperson (Harding), Chalmers No. 9 (Lorimer), National No. 11 (Merz), Marmon (Stillman), Simplex (Mitchell), Alco (Grant), Atlas (Knox), Fiat No. 14 (Parker), Fiat No. 4 Hearne), Fiat No. 1 (Strang). Strang met with hard luck, a stone crashing into his radiator and damaging it beyond repair.



Along the Finishing Stretch Cars Were Not as Numerous as In Former Years, Though the Course Was Well Protected

Lap 2—Chevrolet forged to the front in this lap, and second honors were divided between Wishart and Knipper, whose times were tied; fourth position was taken by Seymour's Isotta, and Mitchell forced his Simplex into fifth place from tenth position in the preceding lap, making the best time for the lap—10:47. Lorimer maintained seventh position with Chalmers No. 9, and Aitken and Merz in their Nationals followed. Grant advanced his Alco one position in this lap, and was followed by Stillman's Marmon. The balance of the field was unchanged. Strang made an effort to get his broken radiator repaired and again started in the race, but the effort was futile.

Lap 3—Chevrolet, Wishart and Seymour finished the lap in one, two, three order, and Knipper dropped to fourth position. Lorimer advanced from seventh to fifth position, Harding's Apperson staying sixth. The order of position of the rest of the cars was unchanged except that they were advanced a notch, the Simplex going out of the race on this round with a broken crankshaft. Hearne had considerable trouble with a broken crankcase and was at the repair pit most of the round.

Lap 4—Chevrolet made the fastest time of the race in this lap—9:56[2] for the circuit—and looked a sure winner if his speed kept up. Wishart, Seymour and Knipper kept up the chase in their respective positions, and Aitken advanced his National from seventh to fifth position, nipping Lorimer at the tape. Harding dropped to seventh place, and Grant advanced from ninth to eighth position. Merz and Stillman followed, and Parker got his Fiat into eleventh place, the Atlas and Hearne's Fiat following.

Lap 5—Three cars went out of the race on this lap, Chevrolet's Buick, which was leading; Aitken's National, and Hearne's Fiat. The first mentioned broke a cylinder near Meadowbrook, the National cast a wheel near the same town, and Hearne's Fiat went to quarters with its broken crankcase. Wishart's Mercedes led at the lap's conclusion, Isotta, Knipper's and Lorimer's Chalmers, Apperson, National No. 11, Alco, Marmon, Parker's Fiat and Atlas following.

Lap 6—Seymour's Isotta, that was in second position, broke a part of the front axle and was withdrawn. Wishart's Mercedes again led, and the balance of the field was advanced a position without relative changes by the Isotta's withdrawal.

Lap 7—Wishart's Mercedes had trouble with a pressure pipe which broke, and lost its lead, dropping to fifth position. Knipper and Lorimer advanced their Chalmers to first and second positions, and Harding's Apperson was third, with Merz's National fourth. Grant's Alco still held sixth place, and as the Marmon went out with a cracked cylinder, Parker's Fiat and the Atlas advanced one point each in position.

Lap 8—There was no change in this lap in the positions of the first four contestants. Parker secured fifth position for his Fiat by making a bit faster time for the lap than Grant, who still clung to sixth place. Continued repairs on the Mercedes placed Wishart at the foot of the column with Atlas preceding him.

Lap 9—In this lap the only change was a shift in position for the Alco, which jumped into fifth place due to Grant's steady and consistent driving.

Lap 10—This round saw the first six cars unchanged in position. The Atlas had some trouble and Mercedes regained seventh place.

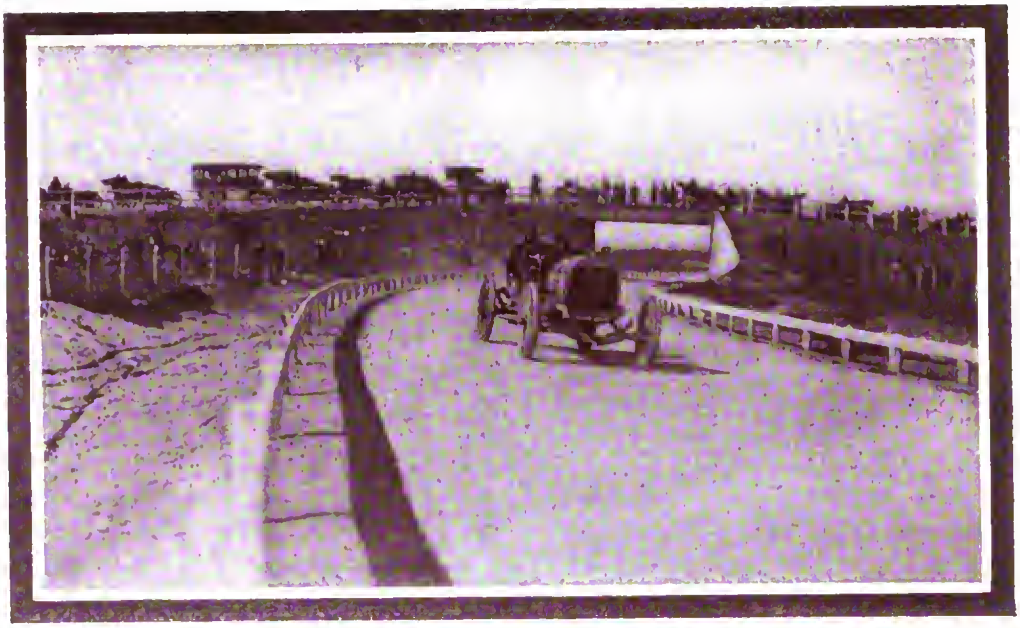
Lap 11—The official scorers evidently failed to see the Alco in this lap and did not credit Grant with it when he crossed the tape. He was unquestionably in fourth position according to the timers' computations, and everybody but the scorers seemed to recognize the fact. (As the scorers' error was corrected by the officials at the conclusion of the race, he is credited in the laps that follow with his correct position). Harding's Apperson went out on this lap with a broken steering knuckle near Massapequa Lodge. The rest of the relative positions were unchanged.

Lap 12—Lorimer gained the lead in this lap while Knipper changed a tire at the pit. Grant advanced his Alco to third position, putting Merz back into fourth place.

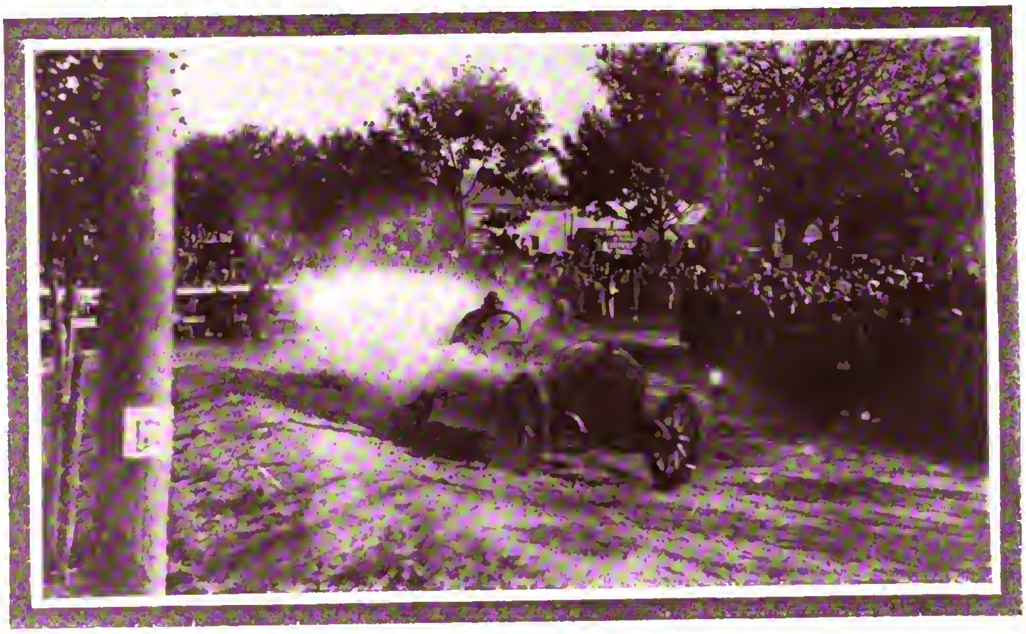
Lap 13—This was an unlucky lap for Lorimer. He broke a cylinder and was out of the running. Merz withdrew his National in this lap and the field was narrowed down to five competitors, which were lined up at the lap's conclusion as follows: Knipper's Chalmers, Grant's Alco and Parker's Fiat, closely bunched for first, second and third, and Wishart's Mercedes and Knox's Atlas trailing.

Laps 14 to 19 (inclusive)—Knipper's Chalmers maintained its lead during all these laps, closely followed by Grant's Alco and Parker's Fiat. In the 14th lap the Fiat gained a slight advantage over the Alco,. but lost it in the 15th. After that the positions were unchanged. The Mercedes and Atlas were kept going.

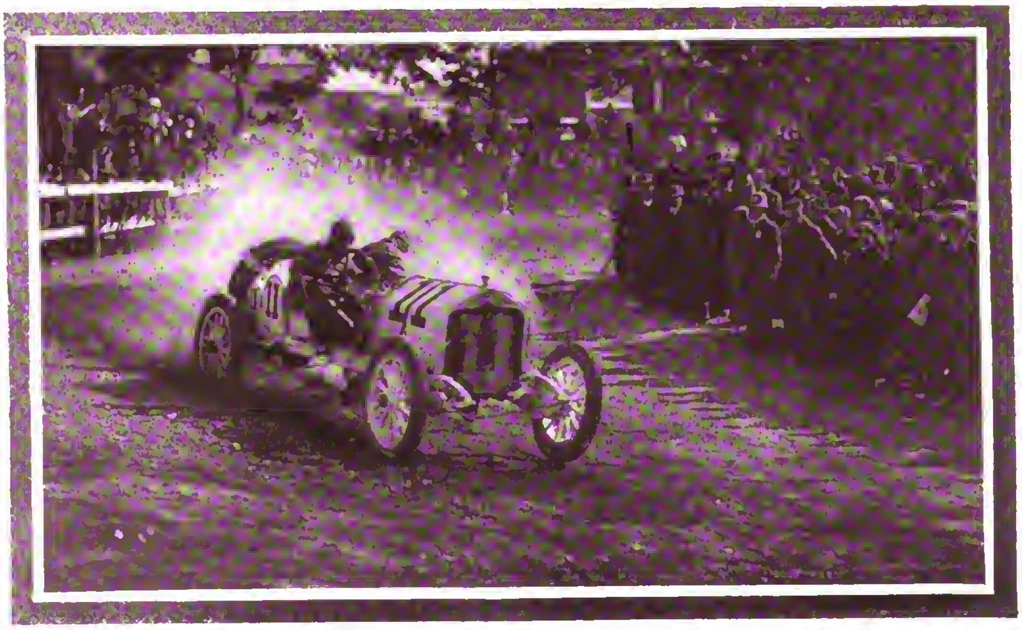
Laps 20 to 22 (inclusive)—In the 20th round Knipper had trouble wtih the lubrication of his car. There was a stoppage of oil and one of the connecting rod bearings heated up. He could not get under way again in time to finish the race. The Alco advanced into first position and maintained the lead till the finish, with Fiat a good second, and Mercedes and Atlas still running when the race was called.



Knipper Handled the Chalmers-Detroit With Consistent Skill, Taking Turns Spectacularly



Two-Cycle Atlas Attracted an Unusual Amount of Attention



Merz and the National Which Once Looked Dangerous

TABULATED STORY OF THE RACE LAP BY LAP, VANDERBILT CUP RACE, MOTOR PARKWAY, LONG ISLAND, OCT. 30, 1909. DISTANCE 22 LAPS, 278.08 MILES

No. Car and Driver	1 12.64 Miles	2 25.28 Miles	3 37.92 Miles	4 50.56 Miles	5 63.20 Miles	6 75.84 Miles	7 88.48 Miles	8 101.12 Miles	9 113.76 Miles	10 126.40 Miles	11 139.04 Miles	12 151.68 Miles	13 164.32 Miles	14 176.96 Miles	15 189.60 Miles	16 202.24 Miles	17 214.88 Miles	18 227.52 Miles	19 240.16 Miles	20 252.80 Miles	21 265.44 Miles	22 278.08 Miles	M.P.H.
8 Alco..................	13:18	24:50	36:10	47:18	62:03	73:23	86:16	103:29	114:31	125:27	*	147:25	158:26	175:26	186:29	197:22	208:37	222:37	233:26	244:10	255:09	265:42	62.77
Harry F. Grant...... F. W. Lee	13:18	11:32	11:19	11:08	14:45	11:20	12:51	17:13	11:02	10:56	*	*	11:01	17:00	11:03	10:52	11:15	14:00	10:49	10:43	10:58	10:33	
14 Fiat..................	18:43	31:03	43:08	55:07	67:12	78:59	90:51	102:42	114:38	126:39	138:43	150:41	162:41	174:46	186:56	199:07	211:18	223:21	235:18	247:12	259:07	270:58^{3}	61.55
E. H. Parker Tony Scudelari	18:43	12:19	12:05	11:58	12:05	11:47	11:52	11:51	11:56	12:01	12:03	11:58	12:00	12:05	12:09	12:11	12:10	12:03	11:56	11:54	11:54	11:51^{3}	
7 Chalmers-Detroit.......	11:36	22:33	34:23	45:56	57:20	68:42	79:55	91:13	102:32	113:52	125:21	140:14	151:37	163:18	174:55	188:33	201:26	213:38	230:43	Out on 20th lap, oiling troubles			
William Knipper Robert Muller	11:36	10:54	11:50	11:33	11:24	11:22	11:13	11:17	11:19	11:20	11:29	14:53	11:23	11:40	11:36	13:38	12:53	12:12	17:04^{2}	running when race was stopped			
16 Mercedes.............	11:10	22:33	33:45	44:55	56:07	67:23	85:04	133:17	145:06	156:40	170:15	200:54	212:21	223:58	236:10	248:56^{3}	Completed 17th lap and						
S. E. Wishart Robert Gibson	11:10	11:23	11:11	11:10	11:12	11:16	17:40	48:13	11:49	11:34	13:35	30:39	11:26	11:37	12:11	12:46^{3}							
5 Atlas.................	13:34	29:57	42:43	55:46	69:03	81:45	94:29	108:55	121:47	158:48	201:14	225:07	246:37	259:40	Running when race was stopped.								
Elmer Knox A. F. Duffault	13:34	16:23	12:46	13:03	13:17	12:41	12:44	14:26	12:52	37:00	42:26	23:53	21:29	13:03									
9 Chalmers-Detroit.......	12:01	23:37	35:07	46:38	58:02	69:17	80:30	91:49	103:15	114:36	125:49	137:07^{2}	Out on thirteenth, broken cylinder.										
L. B. Lorimer W. R. Burns	12:01	11:36	11:29	11:31	11:23	11:15	11:12	11:19	11:25	11:21	11:13	11:18											
11 National.............	12:07	24:06	36:01	48:04	60:06	72:19	84:30	96:45	109:14	123:16	135:42	148:32^{3}	Out nn thirteenth, broken cylinder.										
Charles C. Merz John Herr	12:07	11:59	11:55	12:02	12:02	12:13	12:10	12:14	12:19	14:02	12:26	12:50^{3}											
6 Apperson.............	11:53	23:34	35:14	46:51	58:24	69:56	81:29	96:16	108:04	119:37^{3}	Out on eleventh, broken steering knuckle.												
Hugh N. Harding F. W. Clifton	11:53	11:41	11:40	11:37	11:32	11:32	11:33	14:46	11:48	11:33^{3}													
12 Marmon.............	12:11	24:58	38:00	50:48	63:34	77.56^{3}	Out on seventh, cracked base of cylinder.																
Harry Stillman Joe Dawson	12:11	12:47	13:02	12:48	12:46	14:22^{1}																	
17 Isotta...............	11:30	22:49	33:46	45:16	56:42	Out onsixth, broken axe jaw end boss.																	
Joe Seymour Ed. Grabow	11:30	11:19	10:57	11:30	11:25^{2}																		
15 Buick...............	11:21	22:30	33:30	43:27	Out on fifth, broken cylinder.																		
Louis Chevrolet Joe Nelson	11:21	11:09	11:00	9:56^{2}																			
10 National.............	11:46	23:59	35:46	46:37^{3}	Out on fifth, lost wheel.																		
John D. Aitken H. S. Wilcox	11:46	12:13	11:46	10:51^{3}																			
4 Fiat..................	20:25	34:09	61:26	77:40^{1}	Out on fifth, broken crankcase.																		
E. A. Hearne Jack Tower	20:25	13:44	27:17	16:13^{4}																			
3 Simplex..............	12:31	23:18^{1}	Out on third, broken crankshaft.																				
Leland A. Mitchell W. F. Casey	12:31	10:47																					
1 Fiat..................	106:47^{4}	** Out on third, broken radiator, etc.																					
Louis Strang Joe Pazzo	106:47^{4}	**																					
2 American............. Willie Haupt William McMichael	Broke crankshaft day before and did not start.																						

*Time as given out officially includes two laps.

**Strang's time was given out as for one lap, although he completed two

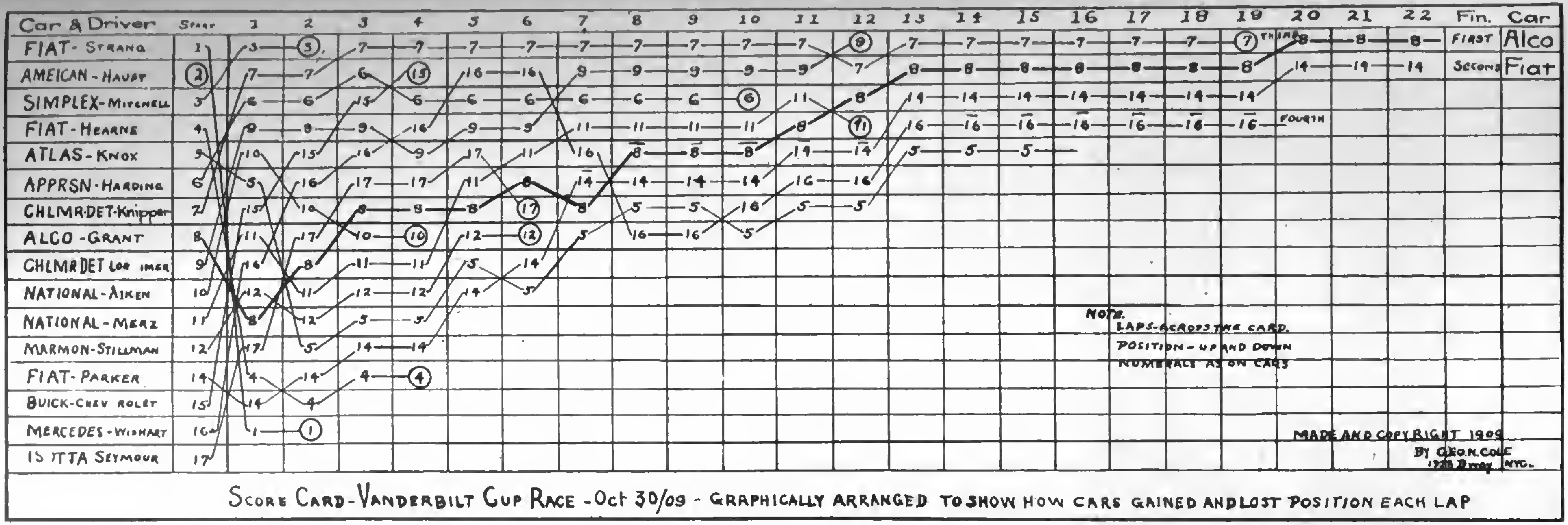
NOTE—Where lap times do not agree with totals, fractions have been dropped.

RECORD OF THE FAST AND SLOW LAPS OF EACH CAR

Car and Driver	Lap	Fastest	M.P.H.	Lap	Slowest	Average
Alco—Grant..............	22	10:33	71.9	8	17:13	11:56^{2}
Fiat—Parker..............	6	11:47	64.5	1	18:43^{1}	12:19
Chalmers—Knipper.........	2	10:54^{4}	69.4	12	14:53^{3}	12:08
Mercedes—Wishart.........	1 & 4	11:10	67.9	8	48:13	15:33^{3}
Atlas—Knox..............	6	12:41^{4}	59.7	11	42:26	18:33
Chalmers—Lorimer.........	7	11:12^{3}	67.5	1	12:01^{1}	11:25^{3}
National—Merz...........	3	11:55^{1}	63.5	10	14:02	12:22^{4}
Apperson—Harding.........	6	11:32	65.6	8	14:46^{4}	11:57^{4}
Marmon—Stillman..........	1	12:11	62.2	6	14:22^{1}	12:59^{3}
Isotta—Seymour...........	3	10:57	69.2	4	11:30^{1}	11:20^{3}
Buick—Chevrolet..........	4	9:56^{3}	76.2	1	11:21	10:51^{4}
National—Aitken..........	4	10:51^{3}	69.8	2	12:13^{3}	11:39^{3}
Fiat—Hearne.............	2	13:44^{1}	55.1	3	27:17	19:25
Simplex—Mitchell.........	1	12:31^{1}	60.5	2	23:18^{1}	11:39
Fiat—Strang.............	1	106:47^{4}	....	1	106:47^{4}	106:47^{4}

AVERAGE SPEED OF THE LEADERS

Car	Driver	Miles	Time	M.P.H.
Alco................	Grant..........	278.08	4:25:42	62.77
Fiat................	Parker..........	278.08	4:30:58^{3}	61.55
Mercedes............	Wishart..........	202.24	4:08:56^{3}	48.07
Atlas...............	Knox............	176.96	4:19:40	40.93



Score Card-Vanderbilt Cup Race-Oct 30/09 - Graphically Arranged to Show How Cars Gained and Lost Position Each Lap

EXPLANATION OF SPEED—POSITION CHART

The card shows the time in which each car finished the lap. The laps are arranged in vertical lines from left to right as numbered at the top, the first column being the start, and the position of each car in that lap is shown by its distance from the top of the column. Of course, at the start of the race the cars were in their regular order, and their numerals show in that manner. Then, as the car progressed during the race, its numeral is shown in the column of each lap, in the position in which that particular car was placed at the finish of that lap.

These various positions are connected by lines, for readiness in following a car, and it has the additional advantage of showing exactly what cars passed each other during a lap, as every intersection of these connecting lines shows that the car whose line has the greatest inclination up, passed the car or cars which have a less inclination. Thus, during the second lap, the registration of the passing will be between columns 1 and 2, and it will be noted that car No. 15 passed cars No. 5 and 10; but it can likewise be noted that car No. 11 passed car No. 5, because of the less dip of the connecting line for No. 11 than of the connecting line for No. 5.

Having entered the numbers of the cars in their order for each lap, they can then be joined as the race progresses, by the connecting lines, so that one has a continuous score at any time, showing the exact performance of each car in a graphic method and one which is very easily kept by anyone interested.

LAP BY LAP TIMES OF RACE FOR MASSAPEQUA TROPHY, DISTANCE 10 LAPS, 126.40 MILES

No.	Car and Driver	1 12.64 Miles	2 25.28 Miles	3 37.92 Miles	4 50.56 Miles	5 63.20 Miles	6 75.84 Miles	7 88.48 Miles	8 101.12 Miles	9 113.76 Miles	10 126.40 Miles	M.P.H.
43	Chalmers-Detroit "30"..... Joe Matson	13:00 13:00	25:42 12:42	38:48 13:06	51:26 12:38	64:36 13:10	77:43 13:07	90:47 13:04	103:47 13:00	116:54 13:07	129:52^{2} 12:58^{1}	58.4
46	Maxwell.......... Martin Doorley	14:56 14:56	32:08 17:11	46:41 14:33	61:16 14:35	76:53 15:37	90:30 13:37	105:04 14:34	119:26 14:22	133:59 14:32	148:28^{4} 14:29^{3}	51.1
44	Maxwell.......... Arthur See	15:02 15:02	29:15 14:12	44:39 15:24	59:33 14:44	74:31 14:58	89:30 14:59	104:39 15:09	119:50 15:11	135:06 15:16	150:24 15:18	50.4
42	Hudson "20".......... George Ainslee	14:17 14:17	25:27 11:10	41:16 15:49	57:08 15:52	72:57 15:49	88:42 15:45	105:36 16:54	120:19 14:43	136:02 15:42	151:47^{2} 15:45-	50.0
41	Chalmers-Detroit "30"..... W. R. Brown	14:32 14:32	28:01 13:29	41:38 13:37	55:08 13:30	68:38 13:30	81:15 12:37	96:01 14:16	109:39 13:38	121:23^{1} 11:43^{2}		
45	Maxwell.......... Thomas Costello	12:36 12:36										

DETAILED RESULT OF THE RACE IN CLASS 3 FOR THE WHEATLEY HILLS TROPHY, DISTANCE 15 LAPS, 189.60 MILES

No.	Car and Driver	1 12.64 Miles	2 25.28 Miles	3 37.92 Miles	4 50.56 Miles	5 63.20 Miles	6 75.84 Miles	7 88.48 Miles	8 101.12 Miles	9 113.76 Miles	10 126.40 Miles	11 139.04 Miles	12 151.68 Miles	13 164.32 Miles	14 176.96 Miles	15 189.60 Miles	M.P.H.
32	Marmon.......... R. W. Harroun	12:39 12:39	25:04 12:24	37:31 12:27	50:09 12:38	62:49 12:38	75:11 12:22	87:17 12:05	100:12 12:55	112:17 12:05	125:14 12:56	138:07 12:53	150:48 12:40	163:49 13:01	176:52 13:03	190:21^{2} 13:28^{4}	59.76
33	Columbia.......... R. W. Wilcox	15:29 15:29	29:11 13:42	43:17 14:06	57:07 13:49	70:50 13:42	85:06 14:16	98:46 13:39	112:16 13:30	130:51 18:35	149:51 18:59	162:30 12:38	176:36 14:06				
31	Marion.......... A. Munson	33:16 33:16	65:37 32:21	108:15 42:37	142:30 34:15	174:31 32:01	193:20 18:48	216:35 23:15	240:32^{4} 23:57^{2}	Still running when race was called off.							
34	Moon.......... Philip Wells	15:10 15:10	30:08 14:58	44:11 14:03	58:06 13:54	76:03 17:57	91:20 15:17										

Grant Negotiated the Westfield Turn at High Speed, Hugging the Pole Unusually Close

HOW THE LEAD SHIFTED DURING THE PROGRESS OF THE VANDERBILT CUP RACE

No.	Car	1st Lap	2nd Lap	3rd Lap	4th Lap	5th Lap	6th Lap	7th Lap	8th Lap	9th Lap	10th Lap	11th Lap	12th Lap	13th Lap	14th Lap	15th Lap	16th Lap	17th Lap	18th Lap	19th Lap	20th Lap	21st Lap	22nd Lap
8	Alco	11	10	9	8	7	6	6	6	5	5	4	3	2	3	2	2	2	2	2	1	1	1
14	Fiat	13	13	12	11	9	8	7	5	6	6	5	5	3	2	3	3	3	3	3	2	2	2
7	Chalmers	4	2	4	4	3	2	1	1	1	1	1	2	1	1	1	1	1	1	1			
16	Mercedes	1	3	2	2	1	1	5	8	8	7	6	6	4	4	4	4						
5	Atlas	12	12	11	12	10	9	8	7	7	8	7	7	5	5								
9	Chalmers	7	7	5	6	4	3	2	2	2	2	2	1										
11	National	8	9	8	9	6	5	4	4	4	4	3	4										
6	Apperson	6	6	6	7	5	4	3	3	3	3												
12	Marmon	9	11	10	10	8	7																
17	Isotta	3	4	3	3	2																	
15	Buick	2	1	1	1																		
10	National	5	8	7	5																		
4	Fiat	14	14	13	13																		
3	Simplex	10	5																				
1	Fiat	15																					

MARMON HAD IT EASY FOR WHEATLEY TROPHY

LAP 1—Four starters that got away in the contest for the Wheatley Hills trophy reached the scorers' stand at the conclusion of the circuit in the following order: Marmon (Harroun), Moon (Wells), Columbia (Wilcox), and Marion (Munson), the ultimate winner taking the lead at once.

Lap 2—Harroun's Marmon still led, and Wilcox's Columbia gained second position from the Moon, driven by Wells. Munson had considerable trouble with his Marion, and the time spent at the repair kit put him hopelessly out of the running.

Laps 3 to 15 (inclusive)—It was a virtual walkover for Harroun and his Marmon, as he was never headed or even pushed by the rest of the contestants. Wilcox's Columbia, which was in second position, was on its 13th lap when the contest ended, and the Moon withdrew on the 7th circuit. The Marion was far behind, but still running when the contest for the Vanderbilt Cup ended on the completion of the twenty-second lap.

CHALMERS HAD MOST SPEED OF LITTLEST ONES

LAP 1—Thomas Costello who drove Maxwell No. 45, led the field of six starters for the first round in the race for the Massapequa honors. Joe Matson, who piloted the Chalmers "30," finished a close second, and Ainslee, with his Hudson "20," was third. Brown, who drove the other Chalmers "30," showed up fourth at the scorers' stand, and Doorley, who drove Maxwell No. 46, was in fifth position, followed by the third Maxwell entrant, No. 44, driven by Arthur See.

Lap 2—In making this circuit Ainslee brought his Hudson "20" to the front of the field from third position. He was a shade ahead of Matson's Chalmers, which maintained second place. Brown's Chalmers followed, and was in turn succeeded by See's and Doorley's Maxwells, respectively. Costello had trouble with his motor and withdrew from the race.

Lap 3—Matson's Chalmers gained first position in this round of the circuit, and the Hudson followed closely. There was no change in the positions of the other cars.

Laps 4 to 6 (inclusive)—With Matson still leading, Brown brought his Chalmers into second position in the fourth lap, the Hudson dropping to third place, with the See and Doorley Maxwells following. These positions were maintained.

Lap 7—The only change in position was with the Hudson, which dropped from third to fifth place.

Laps 8 to 10 (inclusive)—Relative positions were unchanged, the two Chalmers leading the field, with Matson ahead, until the concluding lap, when Brown, who was gaining slightly on Matson, threw a rear wheel near Massapequa turn. The other competitors were a lap behind, but completed the distance in good order, the Maxwells driven by Doorley and See getting second and third places, respectively, and the Hudson a good fourth.

Promptly at Nine O'Clock the First Car Was Sent Away, It Being No. 43 Chalmers-Detroit, with Matson Driving

WHY IT WAS THAT SOME OF THE CARS DIDN'T WIN

NEVER in the history of the Vanderbilt Cup race has there been such a depletion of the ranks of the contestants. The strangest part also is that the lack of finishers was not due to long tire delays, in the majority of the cases, but to mechanical difficulties alone.

In proportion to their numbers the little fellows, headed by Joe Matson in the Chalmers, made the best showing. Four of them finished, and five of the six starters were running on the ninth lap. Compare this with the showing of the big cars, as well as that made by the cars in the Wheatley Hills sweepstakes. In the Vanderbilt, two cars finished and five were running at the finish. In the middleweight event, the Marmon had a walkover, and the Columbia was well in the rear, but still running.

Compare the results of the former Cup races and we find that the number of those who fell by the wayside is almost as great as the number that went by the board in the first of these classics in 1904. In other words, but 29 per cent of the cars were running at the end of the race. A partial explanation is that the 1909 Vanderbilt course, though shorter than in previous years, was a particularly hard one for the cars. It is undeniable that the surface of the parkway, when covered at high speed, subjects the cars to severe treatment—much more severe than will be met with over even average country roads.

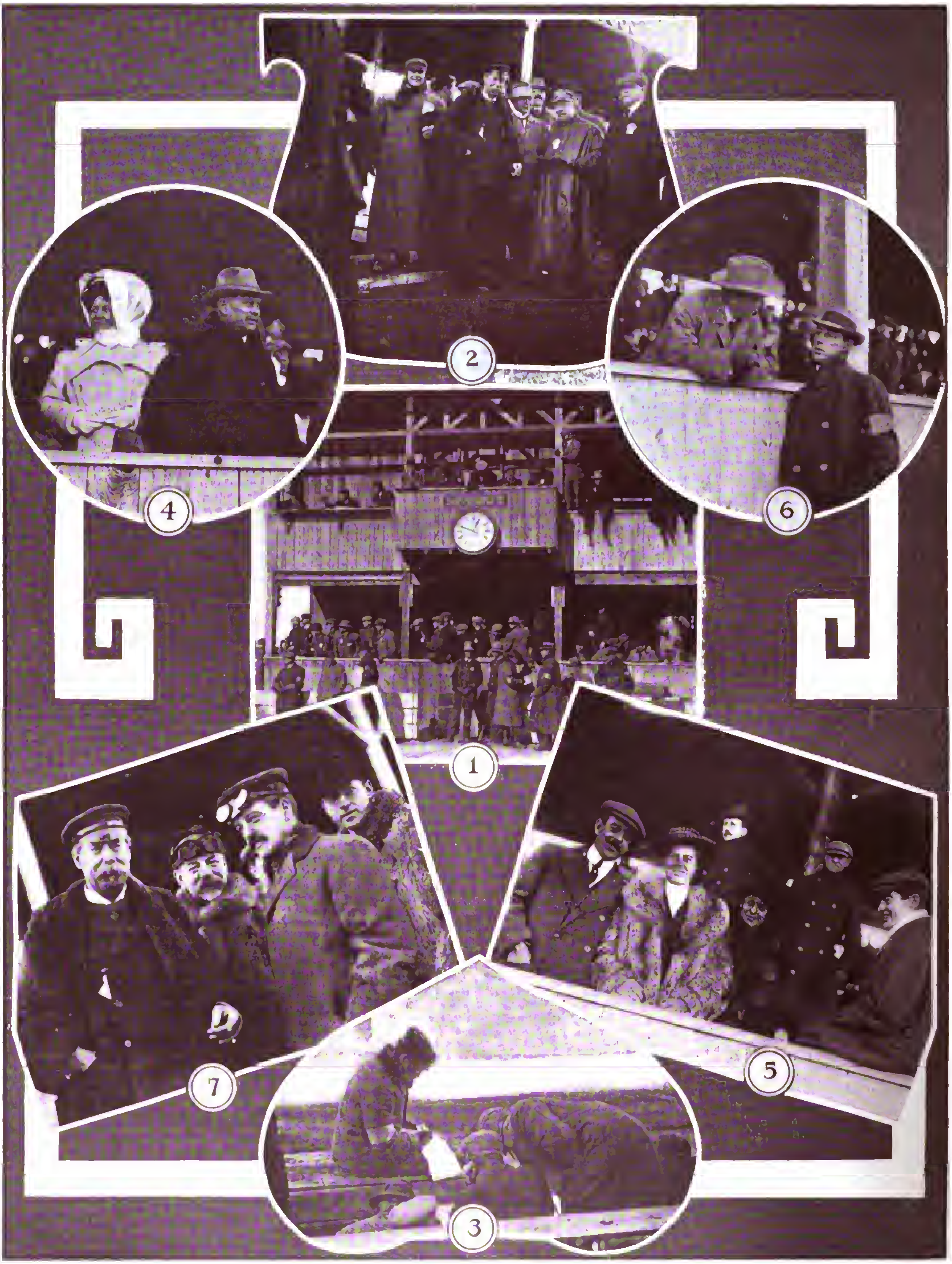
Very little of trouble which overtook the cars could be remedied at the pits. All that met with accidents on the road could not be ascertained absolutely, but such as was confirmed will be set down below.

Briefly the causes by which the various cars were eliminated are as follows: Strang's Fiat had a broken radiator; No. 2 American broke the center main bearing and sprung the crankshaft the day before the race; No. 3 Simplex broke its crankshaft on the third lap; No. 4 Fiat, driven by Hearne, cracked the second cylinder and punched a hole in the crankcase, on the fifth lap; No. 6 Apperson turned over, on account of a broken steering knuckle, so it was reported; No. 7 Chalmers, driven by Knipper, had an air-bound oil pump so that the motor ran dry and a connecting rod bearing seized; No. 9 Chalmers, driven by Lorimer, had a piston seize; No. 10 National broke a rear wheel and also smashed the rear construction, while his team mate is reported to have suffered from engine trouble; No. 12 Marmon, driven by Harry Stillman, broke a water manifold and cracked a cylinder; No. 15, Chevrolet's Buick, also ended up with a cracked cylinder; No. 17 Isotta had the misfortune to crack a steering knuckle, due, it is stated, to taking a ditch in attempting to pass the Alco.

So much for the Vanderbilt cars, and now for the smaller ones. "Buster" Brown, who was driving the Chalmers, on his last lap and in second position, had the rear axle break, and when the left rear wheel dropped off he was out of it; No. 5, Costello's Maxwell collided with a tree on the second lap; No. 31, a Marion, took from 10 to 30 minutes each lap to replace inlet manifold gaskets. The fate of neither the Columbia nor the Moon could be ascertained at the grandstand.

Observed at the Grand Stand Pits

Several interesting episodes took place at the pits. Interest waned considerably as the stops became less frequent and the number of contestants smaller. However, the reason for the various stops at the pits and the time lost at each may prove of interest. First to stop at the pits was Hearne in the Fiat. The motor was missing badly and the spark plugs were changed. Next to lose time was the Marion No. 31, spending 5 1-2 minutes replacing inlet manifold gaskets. No. 34 Moon lost two minutes on the fifth lap taking on two new tires. Immediately after the Isotta came down the course on its sixth lap very slowly. It was soon learned that a steering knuckle was bent and cracked. In close order came the Marmon No. 12, which required 1 1-2 minutes to fill up with water, after which it failed to show up again on the seventh lap. On the third, Marion again stopped for inlet manifold gaskets; otherwise, the car was running nicely.



(1) Where Officials and Pressmen Held Forth

(2) Sir Thomas and Other Hibernians

(3) Referee Vanderbilt Considering Scoring Error

(4) Judge and Mrs. E. H. Gary

(5) Lawrence Waterbury, Polo Expert; Miss Sears, Tennis Champion; Alfred Vanderbilt, Coaching Enthusiast

(6) August Belmont and Harry Payne Whitney

(7) Sir Thomas Lipton, Commodore F. K. Bourne, W. K. Vanderbilt, Jr., Dave Hennen Morris

Grant on the sixth lap pulled up at the pit to have two tires changed. Grant must be credited as being the coolest and most collected of the drivers in the whole race. Even though 15 minutes behind the leaders, at one of his stops he appeared no more hurried than if he had been as much ahead. It was with this very attitude that he took the opportunity to clean his spark plugs while waiting for the tires to be changed. Altogether 4:45 minutes were taken to put on new tires and clean the spark plugs.

At this juncture the Fiat No. 4 drew up at the Fiat pit, on the fourth lap, and when the hood was raised the reason for his slow approach was clearly evident. A 4-inch hole was punched in the lower cylinder wall of the second cylinder. In addition the crankcase had been crushed open. All were indications that a connecting rod had let go. No. 6 Apperson on its fourth lap stopped at the pits to tighten up the clutch, which seemed to be slipping; 2:45 minutes were required in all.

No. 16 Mercedes, which up to the seventh lap had been holding a good position, was forced to stop on account of a broken pipe from the reducing valve to the gas tank. An attempt was made to repair it temporarily with tape, but the frequent stops afterward proved that young Wishart was unsuccessful. Next to stop was Knipper on the Chalmers. A right rear tire was replaced and the tanks were refilled, 2:15 minutes being required by the change. Wishart, with the Mercedes, stopped on his eighth lap for 35 minutes to do more work on the broken pipe. No. 31 Marion again made a stop for the same reason.

About this time Strang appeared again, just completing his first lap. The second lap was never attempted, for the timing gears had not only made a hole in the cover, but also in the radiator. On his tenth lap Grant in the Alco made a second stop, to put on a new front tire and filled up his tank, 2:45 minutes being required. No. 31 had now begun to stop regularly each lap to put in new gaskets. No. 16 followed suit, and continued operations from lap to lap, working on the air pipe to the gas tank. Only 20 minutes were lost this time, and in addition two fresh tires were put on front. Knipper stopped on the tenth lap to change a right front tire, which was accomplished in 1:20, being one of the fastest changes made at the pits. At this juncture the report came that No. 5 Atlas was off the course, and this was confirmed by the two slow laps which it made, its tenth and eleventh being 37 and 42 minutes, respectively.

On the eighteenth lap, Knipper, who was leading the Alco by nearly ten minutes, had to stop to put oil in the crankcase since that in the supply tank could not reach the motor. Seven and one-half minutes were lost in this work. His failure to stop on the next lap for another supply resulted in the seized bearing. Despite this fact it was reported that the motor was again running, but the race was called before the car could finish the lap.

On the fifteenth lap the Atlas stopped for more oil and gasoline. The motor was kept running the entire time of the stop and a peculiar phenomenon was always evident. The motor was of the two-cycle variety, and when throttled down would miss and exhaust an explosive mixture into the atmosphere. This gas would then be set off by the exhaust from another cylinder. The effect of the explosion was not felt near the car, but at a distance of about ten feet from the exhaust pipes.

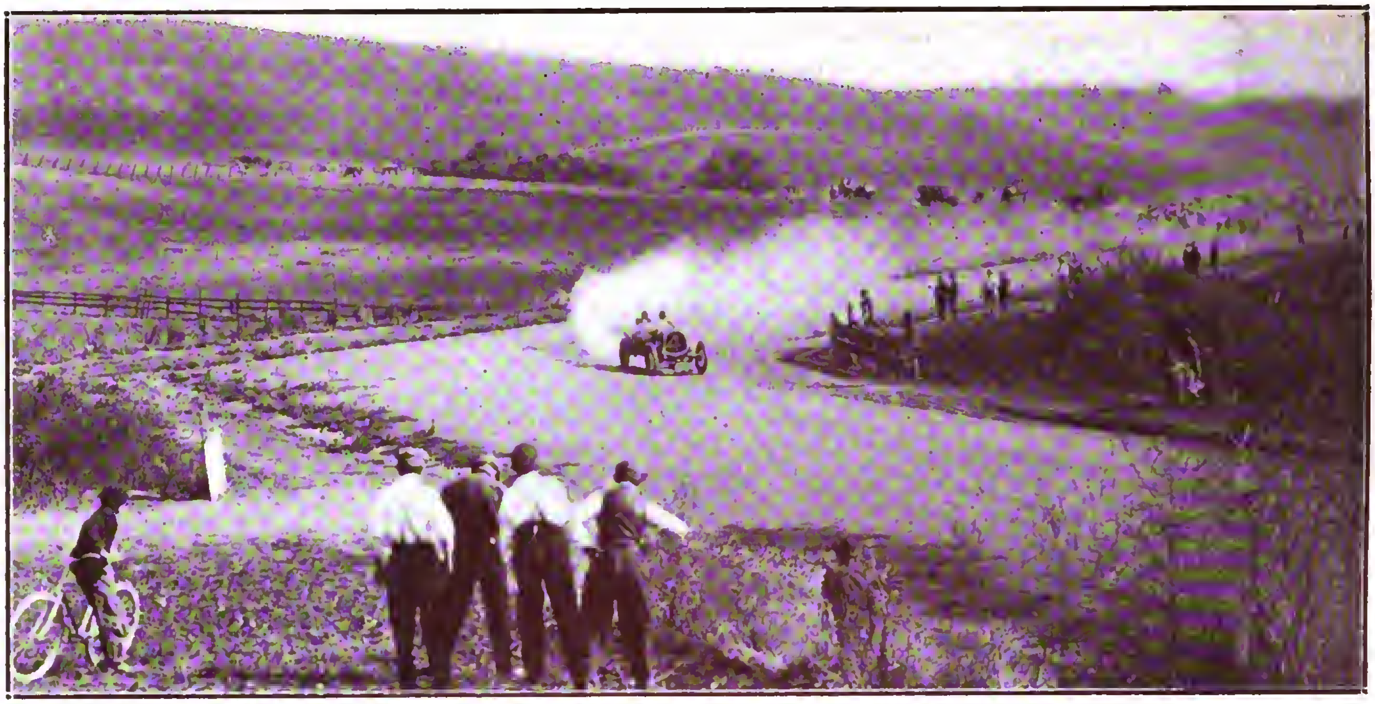
The last man to stop at the pits was Wishart in the Mercedes, and since the race had been called off he made no attempt to start again.

Tires, Magnetos and Oil of the Winners—The three races showed consistent performances for well-known makes both of magnetos and tires. Michelin scored first and second in the Vanderbilt and first in the Wheatley Hills and Massapequa Sweepstakes. Grant's Alco, Parker's Fiat, Harroun's Marmon and Matson's Chalmers-Detroit all depended for their shoeing on the tire made in France and New Jersey.

The magneto question brought forth a similar unanimity, although the nationality favored was German, also well Americanized. The vital sparks on Alco, Fiat, Marmon, and Chalmers-Detroit were generated by Bosch armatures revolving within Bosch magnets, timed by devices of the same make; and Bosch especially proved its merit on the six-cylinder Alco by turning one-and-a-half times engine speed and producing three sparks on each revolution.

In lubricants the chief victory goes to Harris oil. Grant chose this brand to "soothe the worrying cranks" of his Alco, and apparently his judgment was vindicated by the perfect satisfaction it gave on the 278-mile course, keeping the mechanism in condition for the final four-lap spurt at 70 miles an hour. These four successive rounds, in 10:49, 10:43, 10:58 and 10:33, clinched the race by opening up a five-minute gap on the nearest rival, and proved the perfect condition of the car at the finish.

Leaving the Parkway and Taking to the Country Road Near Westbury—Arthur See's Maxwell in the Foreground



Fleming in the Pope-Hartford Making His Way Around the Wiggle Turn, Considered Very Dangerous

ALMOST A RECORD AT PORTOLA RACES

SAN FRANCISCO, Oct. 25—This section of California has had its first real road race, and it was a "hummer." At first, it was thought that the Western as well as the American distance record had been smashed, but a remeasurement of the course showed that it was much shorter than had been thought. Consequently, the time was not quite as good, and the record was narrowly missed. At that, the West has done some very fast racing, fast enough to make people "sit up and take notice." As recorded in last week's issue of THE AUTOMOBILE, the big race and the little race were both won by Jack Fleming driving a Pope-Hartford, while second in the longer distance and first in the middle class were the prizes won by Henshaue's Apperson Jackrabbit.

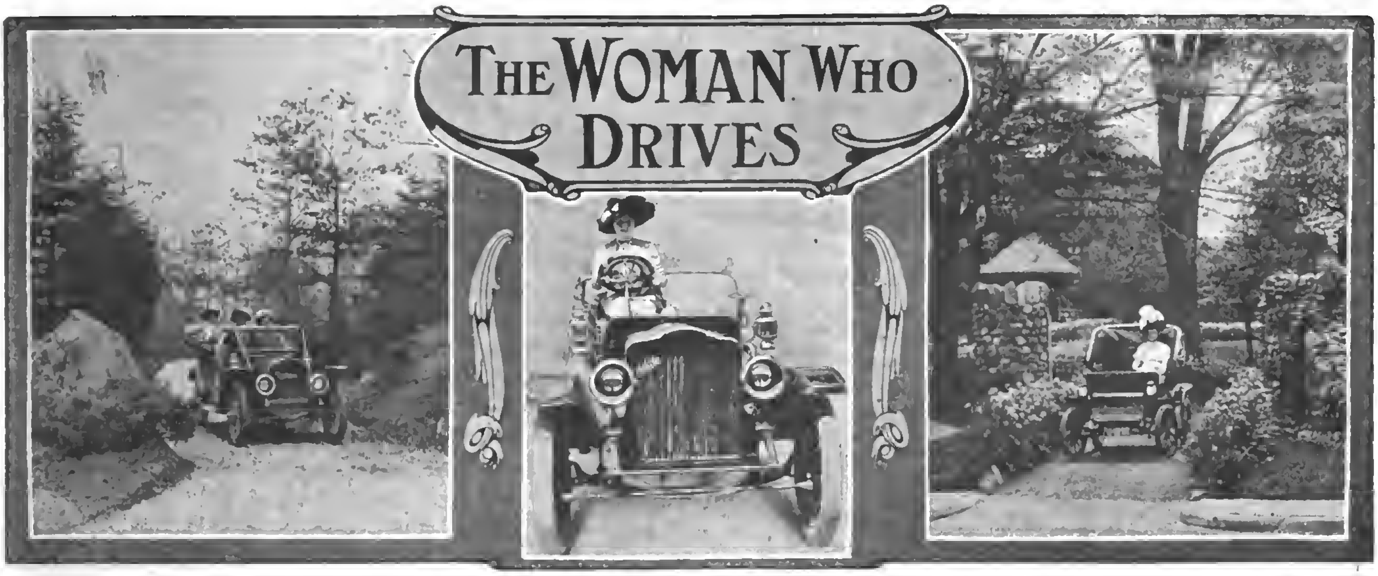
FASTEST LAP OF EACH CAR IN PORTOLA RACES

No.	Car and Driver	Piston Displacement	Lap	Time	M.P.H.
4	Pope-Hartford—Fleming	299.44	6	19:00	66.88
12	Lozier—Michener	476.51	10	19:01	66.81
13	Apperson—Henshaue	519.34	10	19:23	65.5
15	Stearns—Soules	533.24	8	19:24	65.45
9	Buick—Murray	318.08	5	19:47	64.1
14	Stearns—Bonney	533.24	7	19:58	63.56
16	Stevens-Duryea—Onthank	588.21	2	20:22	62.5
7	Chalmers-Detroit—Warner	302.18	1	21:29	59.2
5	Pope-Hartford—Potter	299.44	3	21:42	58.6
1	Maxwell—King	241.16	1	21:44	58.5
10	Buick—Christensen	318.08	1	23:02	55.3
3	Autocar—Morris	......	1	23:03	55.2
11	Knox—Free	373.06	2	24:10	52.6
6	Comet—Hall	301.58	2	28:07	45.3
2	Sunset—Hall	255.35	2	1:48:00	11.78

ELAPSED TIME OF EACH LAP OF PORTOLA ROAD CONTEST, DISTANCE 12 LAPS, 254.16 MILES

No.	Car	Driver	1st Lap	2d Lap	3d Lap	4th Lap	5th Lap	6th Lap	7th Lap	8th Lap	9th Lap	10th Lap	11th Lap	12th Lap	M.P.H.
4	Pope-Hartford	Jack Fleming	20:07 20:07	39:16 19:09	58:06 19:40	1:17:48 18:52	1:37:13 19:25	1:56:13 19:00	2:15:23 19:10	2:42:46 27:23	3:02:07 19:23	3:21:14 19:05	3:40:15 19:01	3:59:18 19:03	63.72
13	Apperson	Harris Henshaue	22:00 22:00	21:25 19:25	1:01:45 20:20	1:21:56 20:11	1:44:56 23:00	2:11:46 26:50	2:31:31 19:45	2:50:54 19:23	3:13:33 22:39	3:32:56 19:23	3:58:51 24:55	4:17:54 20:03	59.13
12	Lozier	Harry Michener	21:00 21:00	41:27 20:27	1:01:58 20:31	1:33:15 31:17	1:53:26 20:11	2:22:11 28:45	2:44:02 21:15	3:04:02 20:00	3:23:57 19:55	3:43:58 19:01	4:09:42 25:44	4:29:57 20:14	56.49
14	Stearns	D. A. Bonney	20:04 20:04	40:33 20:29	1:02:42 22:09	1:38:13 35:31	1:58:28 20:15	2:18:30 20:02	2:38:28 19:58	2:59:19 20:51	3:21:95 21:46	4:01:12 40:07	4:25:49 24:37		
15	Stearns	Charles Soules	20:09 20:09	39:41 19:32	59:21 19:40	1:19:58 19:37	1:39:29 19:31	1:58:57 20:28	2:24:37 25:40	2:44:01 19:24	3:03:36 19:35				
3	Autocar	Walter Morris	23:03 23:03	47:32 24:29	1:11:20 23:40	1:38:39 27:27	2:02:00 23:21	2:26:35 23:21	2:49:30 47:20						
9	Buick	Frank Murray	25:04 25:04	45:51 20:47	1:05:50 19:59	1:32:38 26:48	1:52:25 19:47	2:27:48 35:23							
11	Knox	Frank Free	24:31 24:31	49:41 24:10	1:14:27 24:46	1:38:07 24:40	2:03:05 24:58	2:29:17 26:12							
6	Comet	E. J. Hall	44:35 44:35	1:12:00 28:07	2:29:27 1:16:45	3:04:27 35:00	3:39:34 34:07								
5	Pope-Hartford	George Potter	22:15 22:15	48:28 26:13	1:10:10 21:42	1:39:27 29:17									
10	Buick	Carl Christensen	23:02 23:02	47:52 24:50	1:12:02 24:10	1:49:15 37:13									
16	Stevens-Duryea	C. Onthank	41:03 41:03	1:01:25 20:22	1:42:16 40:51	2:22:24 40:08									
7	Chalmers-Detroit	Howard Warner	21:29 21:29	43:15 21:46											
2	Sunset	Harold Hall	2:37:57 2:37:57	4:25:57 1:48:00											
1	Maxwell	C. O King	21:44 21:44												

The Woman Who Drives



IN the last generation not one woman in a hundred did anything outside the four walls of her own home; to-day, on the other hand, there is hardly one in a hundred who is not interested in some form of out-door sport or recreation. A woman driving her own automobile forms no unusual sight at the present time and attracts scarcely passing attention.

Every woman who drives should become thoroughly conversant with the mechanical part of her car and should be able to overcome the ordinary troubles which may arise. Each, too, should prepare herself as far as possible in guarding against troubles which are likely to occur even with the best motor.

The chief obstacle in many cases when a woman wishes to become a skilful and independent driver is her own nervousness. She is continually anticipating troubles, instead of giving her attention to a systematic study of her car with a determination to succeed and overcome the ordinary troubles which may arise.

Another type of woman automobilist is she who considers that she "knows it all"; who, because she can manage the steering wheel, which is the very easiest of the many things to learn, and with only a superficial knowledge of the parts mechanical, considers herself a really competent motorist. She probably learns how to remove and clean a spark-plug and a few other of the smaller details, and then goes driving about the country thinking herself capable of making a repair if needed. When the time comes, however, she quickly learns her mistake; she either finds herself dependent on the aid of some passing autoist or else sends for an expert and so confesses her ignorance.

Which is more to be pitied from the automobiling standpoint —the woman who is ignorant of the essential features of a gasoline motor on account of a nervous indisposition to understand it, or the woman with a shallow smattering of things mechanical which she flatters herself is all-sufficient? Certainly, neither of them is competent to drive a car unless accompanied by an expert. That they escape trouble is simply due to good luck and most decidedly not to any mechanical knowledge they possess.

What the Beginner Should Learn—Every woman who contemplates driving a car should make it her aim and ambition to learn the working features of the motor, to familiarize herself with the different parts and know what should be done in cases of emergency. It is necessary to use one's head much more than one's muscle.

Many little things must be learned by heart before one can become a really competent driver.

Test the batteries occasionally; see that the spark coil buzzes in tune; keep the spark plugs clean and see that the current passes through them; never allow the motor to run without lubricating oil or to become overheated; don't try to run the motor with the water circulation shut off.

Neither should the motor be over-lubricated; blue smoke from the exhaust is the sign of over-lubrication, and black smoke shows that too much gasoline is being consumed. Both cause sooted spark plugs and dirty valves.

Gasoline should always be strained before being put in the tank, as the merest trifle of dirt or grit is sufficient to clog up the carbureter. There are some troubles that cannot be guarded against, but dirty gasoline is one thing that should never be allowed to cause annoyance.

Always avoid allowing the motor to race, but keep it at the speed at which it runs most efficiently. All useless revolutions of the motor when it is running idly are many moments loss of its life, not to mention an unnecessary waste of gasoline, lubricating oil and bearing metal.

There is an economic and pleasant speed for every engine, just as there is for a living person, a speed at which a person can walk and run without taxing the muscles or destroying the tissue of the system. So with the piston of an engine. In the duty of an engine, driving the car and running light are two entirely different conditions. When working, the engine has the flywheel effect of the car behind it; it is backed by a ton of metal in motion with itself, and so is held steady.

Running light, on the other hand, has nothing to balance it except its own comparatively small flywheel. Therefore before declutching one should throttle down the engine, and before starting throttle down to the point where the engine will most easily take hold.

Never draw up with the brake if possible; it wastes tire rubber every time it is done. Instead, withdraw the clutch in anticipation of the stopping point and just make the standstill with the brake.

Distinguishing the Good Drivers—Skilful driving does not consist of running at high speed close to vehicles or other obstacles and then jamming on the brakes to avoid a collision. When driving in town—or anywhere, for that matter—if there is ever any doubt whether the car can get through, don't try it.

Don't go near the pavement too suddenly, for a deaf person or one engaged in other thoughts may step off in your path.

When passing a car head on, blow the horn loudly enough to reach the ear of a person walking across behind the other car. Always go too slow rather than too fast.

Some women understand the construction of a gasoline motor well enough to take it apart and put it together again, but of course there are many women to whom working around machinery covered with oil and grease is too distasteful ever to allow them to get much practical knowledge in this respect.

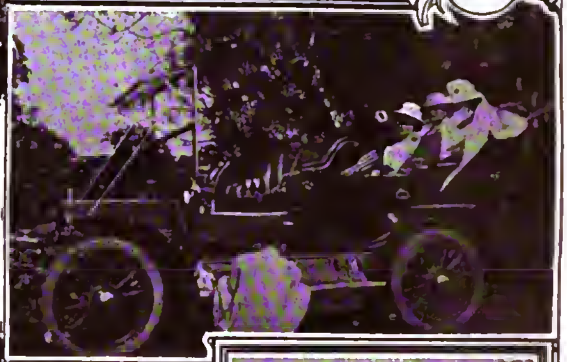
When the average woman of intelligence makes up her mind to become possessed of the necessary knowledge it does not take her long to develop into a careful and successful automobilist who can enjoy the pleasures and benefits of the sport.

Autoing in Out-of-the Way Places

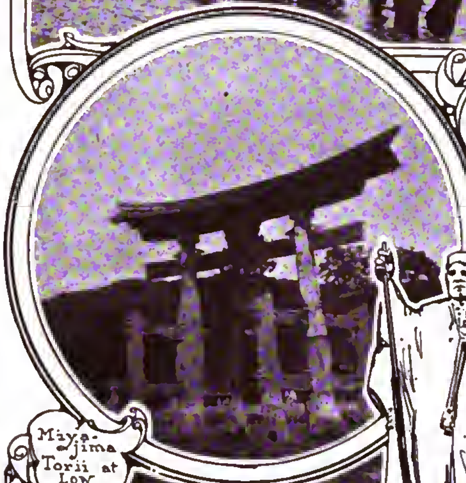
By Frederick K. Stearns

Anurad-hapura

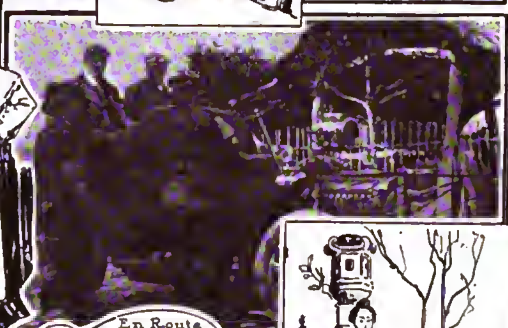
In Ceylon "The Morning Bath."



Singapore. Misses Allen and Stephens Mr. F. K. Stearns



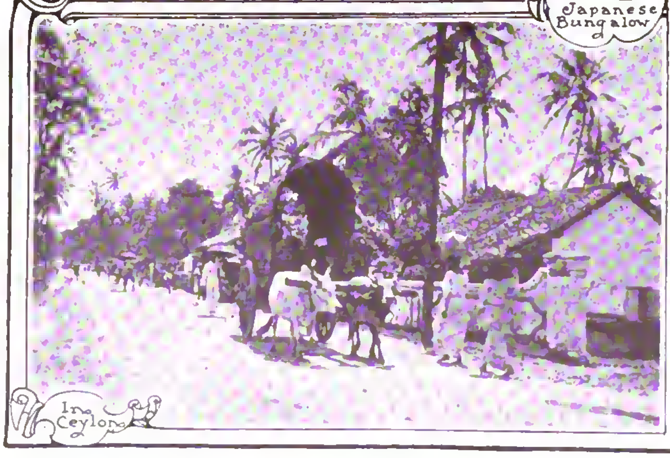
Miya-jima Torii at Low Tide



En Route to Kamakura

Bronze Daibutsu of Kamakura. Messrs. Swaine, F. K. Stearns and S. C. Stearns.

A Japanese Bungalow



In Ceylon

Ceylon "Where only Man is vile"

THERE may be other nations as gracious as the Japs in their treatment of foreigners, as considerate of the feelings of the stranger within their gates; if so they have managed to keep their identity carefully concealed.

One bright morning we took a car in Yokohama—a Ford, by the way, of the earliest vintage, but which the owner assured us was the best ever—and started for Kamakura, a naval station some miles distant on the bay. The road was none too wide and at one point we encountered a huckster's wagon, built like our oldtime two-horse drays and drawn by a lumbering bullock. Through intent or oversight, the driver had backed his cart across the road in such a manner that it was impossible for us to pass. Stopping the car, our chauffeur got out to assist the huckster in turning around, but the bullock took fright at the puffing of the automobile and backed abruptly into the ditch, dumping out everything there was in the cart. It was a most unfortunate occurrence, and we got out intending to make out apologies to the huckster.

Did he curse us? Did he invite us to take a thrashing at his hands? Did he threaten to have us arrested as the average American would? He did nothing of the kind. With a deprecatory wave of the hand he bade us refrain from lamenting. Then, to our astonishment, he poured forth the most profuse apologies, begging that the "honorable gentlemen" might pardon such a worm of the earth as he for having gotten in their way. Every time we started to say anything we were checked by a fresh outpouring of apology, the peddler not even seeking to right his cart until he had offered numberless regrets couched in the humblest terms for an accident in which, as a matter of fact, he should have shared none of the responsibility.

But if the Japanese are models of politeness to foreigners, they have no trouble understanding each other in the event of an altercation. One day we unwisely decided to abandon motoring for the time being, and, securing one of the only two carriages available, drove about Tokio behind a spirited team guided by a nearsighted native who was far from being an expert with the reins. He had a penchant for turning corners with two wheels of the carriage in the air, and after one such effort the horses plunged through the front of a barber shop, playing havoc with the flimsy structure. We proposed stopping and compensating the proprietor for the loss sustained, but Katsuyama, our guide, would have none of it, assuring us that as our destination was only a block or so away he would remain and fix matters up.

"Give him five or ten dollars, enough to fix his shop up again," was our parting injunction.

A little later Katsuyama and the barber, both chattering wildly and with much waving of arms, came down the street surrounded by a crowd in which were several policemen.

"What do you think," stormed Katsuyama, when we had forced our way through the crowd to his side, "the greedy devil refuses to settle."

"How much did you offer him?" we inquired in unison.

"Thirty-five cents," replied Katsuyama, fairly burning up with indignation. "and he wouldn't take it. He wanted more, the greedy devil."

He got more, too, in spite of the vehement assertions of our guide that he was a robber. Thereafter we stuck to motoring or to rickshas.

Katsuyama furnishel little or no cause for complaint, however. A Japanese guide gets a commission on every purchase made by members of his party, and he is always on hand to collect it. Whenever we entered a shop, to which Katsu usually piloted us, however trifling the purchase, he would call the proprietor aside and in his blandest manner inform him that he was Katsuyama. That settled it, Katsu pocketing his commission in the most matter-of-fact manner.

All this was legitimate, however, and on the road Katsu proved himself a wizard in many respects. He had the most wonderful lunch basket imaginable, and in producing delicacies therefrom displayed all the dexterity of a magician. When we halted by the wayside Katsu got the "honorable" hot water and brewed us each a bowl of the most delicious tea. Then from that marvelous basket appeared in order cups, saucers, plates, knives, forks, spoons, napkins, cakes, biscuits, jam, potted meats, fruit, "tan san" water, and, if wanted, Scotch and soda. Had we called for hot toast there is every reason to believe he would have fished it out from the innermost depths of that seemingly inexhaustible basket. Katsu was a wonder, and it was with sincere regret that we finally parted company with him.

Auto Still Attracts Attention in Japan

In spite of the general progressiveness of the people, an automobile is still a *rara avis* in Japan, attracting universal attention whether in the city or out in the country. Japan has not taken the road question seriously as yet, at least so far as making provision for automobiles is concerned. The highways are for the most part ordinary, in many cases being positively bad for all save native carts and rickshas, which everybody uses.

However, you soon forget all about the roads, so interesting are the sights encountered. Not the least of these are the children that make every village a human ant hill. They line roadway, grave visaged little brownies, and stare solemnly at the strange looking equipage as it puffs along. Wee tots, mere babies themselves, have still smaller ones strapped to their backs, often fast asleep, with their poor little heads bobbing about in a manner that threatens dire results to their necks. A little thing like weight appears to be no handicap to these sturdy youngsters, and it is a common sight to see a child running and playing with another half as large strapped to its back.

They are a quiet race, but seem to extract a deal of fun from life, and there is always a smile and so much politeness.

The ride from Yokohama to Kamakura is delightful, the road part of the time skirting the sea and again running through farming country and villages where the air is literally filled with kites, great big red and black fellows, soaring about and presenting a most grotesque appearance.

Kamakura has many famous temples and other buddhas, the greatest of which is the Diabutsu, a bronze buddha fifty-seven feet high, set in a grove of very ancient pine trees. It is also a naval station, and you are not allowed to take photographs there. However, there is nothing to prevent getting one of the priests to take them for you.

Japan a Joy to the Traveler

Aside from its lack of good roads, Japan is a joy forever to the traveler. On every hand there are little tea houses, exquisitely appointed, where the daintiest of Japanese maids serve you with tea, stand at your side and endeavor to carry on a conversation in their quaint "pidgin" English, and puff industriously at your cigarettes.

The artistic sense of the Japanese is everywhere apparent, but its highest stage seems to have been reached in the location of these tea houses, with their arbors of wistaria and the little settees scattered about in the shade. They are "toy" houses, and the furnishings and people correspond to a nicety.

Japanese civilization is much older than our own, which may account for some of the customs that obtain. It is a trifle disconcerting to have a Japanese maid come pattering into your bedroom just about the time you have discarded those articles of apparel prescribed by the dictates of polite society in your own country, and blandly ask if you are in need of anything. Likewise, for the first few times you fail to appreciate the thoughtfulness of the girl who noiselessly slides into your room, prepares the water for your bath, and remains to see that your ablutions are properly started. They think nothing of it. In many of the hotels in small towns there are few if any doors with locks, merely panels that slide back and forth, and the "bellhops" enter and leave at will. They don't believe in doing two things at once, these quaint little maids that are employed in all hotels, with the result that there is a constant pitter-patter of sandaled feet, and a regular procession of attendants with your "honorable" hot water, or after your "honorable" boots or something else. In the morning before you arise they serve you with tiffin (lunch), and the last thing at night they are on hand to see that you are comfortably settled. They are a decided improvement over the average American or European bellboy.

A room in a Japanese hotel is designated by the number of mats on the floor. You can get a four-mat, a six-mat, or any sized room you desire. Often that is about the only thing they contain. At Onimichi there was a little tea house whose doors and ceilings continually interfered with the altitude of a man from the Occident, and where the four-mat room was just what its name implied. At night they brought out a double portion of quilted mattress, with a quilt nearly a foot thick for a coverlet. Fortunately the house stood on the edge of the sea, and as they pushed back the paper windows, thus admitting plenty of air, it was possible to sleep without suffocating.

If Japan's roads are a disappointment, which, however, is more than offset by the exquisite beauty of the country, its flowers that beggar description and the courtesy of its people.

Ceylon's Highways Were a Surprise

Ceylon's highways prove a distinct surprise. Never outside of Massachusetts and one or two other Eastern States have we ever found in America such splendid roads as traverse "the isle of spice." In Colombo they are of macadam, made from red stone that gives a decidedly pleasing effect. You are limited somewhat in the matter of motoring, owing to the size of the island, but every foot of it is well worth seeing. The cars found here are mostly of English make, the one we employed being an Argyle, powerful enough but rather old-fashioned and by no means up to the standard of present American makes.

Three days are required in doing the island, about one hundred and fifty miles being covered daily, although a week or more might be spent to advantage in this manner. From Colombo to Putalam, a government "rest house," which you reach early in the afternoon, the road skirts the seashore. From there it leads into the interior, winding through the jungle. Monkeys entertain you with their antics in the trees, and once a jackal slid across our path, but aside from this the jungle was no worse than the thick woods to be encountered almost anywhere in America, while the roads were so fine as to be almost disappointing.

Anuradhapura, one hundred and twenty-five miles from Colombo, and the turning point for motorists who return to Colombo by way of Kandy, is a delightful spot, the rest house being set in an old garden of banyan trees, with jasmine, roses and lilies.

The sacred Bo tree and Rock temple are points no tourist should overlook. It is worth a long journey to see the solemn-visaged high priest who holds a screen before his face while he pronounces a blessing upon you, and then, attired in the gaudiest of robes, takes a gigantic key and with measured tread leads the way to big brass doors in the rock where a buddha, carved out of solid rock, sits contemplatively viewing the surroundings.

The Hottest Place on Earth

Penang is another place where you can motor with comfort, that is, unless you are desirous of taking a comfortable bath afterward. The cars in use here are of an ancient type and not quite powerful enough, but Penang is one of the most interesting places imaginable. The bath? Instead of the diminutive tin tubs that are made to do service throughout most of the Orient you find a huge earthen jar, holding twenty gallons or more of water, with a tin dipper attached. Divesting yourself of your apparel, you stand on the cement floor—about the only cool thing in Penang—and pour water over your head and shoulders, letting it trickle down over the body.

The roads running out from Penang are as near perfect as could be and lead through tropical forests, past plantations of pepper and cocoanut, with all manner of palms, and with flowers overrunning everything. They say Penang is the hottest place on earth, Aden not excepted. Perhaps it is, but you are not required to exert yourself here. Nobody does, and with a motor car, plenty of servants to do everything for you, and such magnificient roads and scenery, Penang proves an ideal spot.

When You Go to Singapore

Unless you have taken a motor ride with Joe Constantine, famous the world over as manager of the Raffles Hotel, you have not done Singapore. Joe knows every point of interest that can be reached with a motor car, and in his company you forget that Singapore is but a degree and a half above the equator, and that the breezes come from "the mouth of hell." A moonlight ride about the city and its environs in a motor car is an experience never to be forgotten.

Bombay and Calcutta have automobiles in abundance. On the other hand, when you reach Hong Kong it is to find that the few autos there are owned almost entirely by private individuals. We had the rare good fortune to take several rides of short duration, but that was the only place in China where we found any automobiles; nor did we encounter any through Japan until we reached Yokohama.

From an American car of the present day to the antiquated machines found in the far East is a far cry. On more than one occasion we wished that we might encounter a live American who possessed a real machine in these lands where there is so much to see and where one accustomed to getting about expeditiously is often sorely tried by the leisurely Oriental methods.

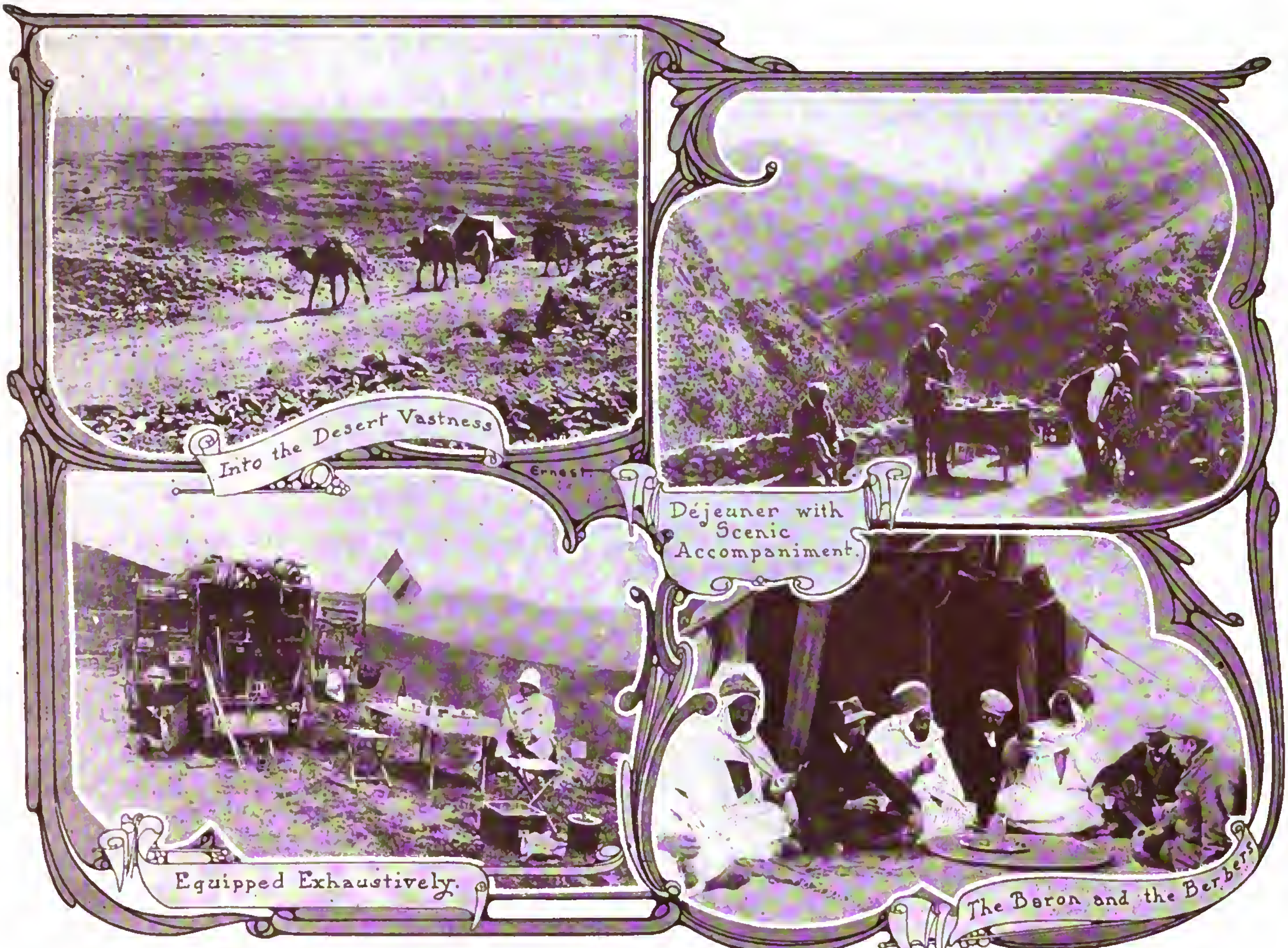
BEST ROUTE WASHINGTON TO RICHMOND

CONSIDERABLE diversity of opinion has existed as to the best route between Washington, D. C., and Richmond, Va. Officers of the Gordon Motor Company, of Richmond, which concern has been very active in the Virginia good roads movement, announce that the following route is the most desirable:

WASHINGTON—	
16.9	Fairfax
23.6	Centreville
31.0	Manassas
36.4	Bristow
49.1	Catlett
55.1	Calverton
60.0	Midland
68.2	Remington
71.3	Elkwood
73.9	Brandy
77.2	Inlet
80.0	Culpeper
89.9	Crooked Run
98.0	Madison Mills
101.0	Orange
110.7	Gordonsville
117.0	Green Springs
120.2	Trevilians
124.8	Louisa
135.0	Cuckoo
142.6	Jackson
178.0	RICHMOND

Recently, C. C. Hildebrand, sales manager of the Stevens-Duryea Company, covered this route with a "six," in company with Gordon company officers. Mr. Hildebrand calls attention to the progress in roads building in Virginia, where J. E. Pennypacker, of the office of public roads of the Department of Agriculture, has been aiding in a vigorous campaign. Quoted in a Richmond paper, Mr. Pennypacker says:

"America is entering upon a great era of road-building, and other States than Virginia are in the van. Other States are spending millions, where Virginia is spending thousands, and to keep abreast of the general progress she must bend every energy to the task and do it quickly. Virginia has wonderful possibilities as an agricultural State—every product of the temperate zone is possible to her farmers, and all at a profit. Twenty million urban dwellers are at her threshold waiting to buy. Good roads constitute the "sesame" which will unlock the treasure."



AFRICAN TOUR OF A BELGIAN SPORTSMAN

Baron Pierre de Crawhez ranks among the "Old Guard" of Continental automobilists, and in the early days of the sport won considerable distinction as an amateur driver of racing cars. He is president of the sports commission of the Automobile Club of Belgium and president of the Automobile Clubs of Namur and Luxembourg. Although a Belgian, and nominally a resident of Brussels, his address is usually, as he would say, "*partout.*" Recently he has been touring in Algeria in a specially equipped car which made him quite independent of civilization. The ingenious arrangements by which every emergency is forestalled make an instructive study. The baron penetrated the Atlas Mountains, through which the French have built many of their famous roads, and made several excursions into the Sahara Desert. Game of many kinds, both feathered and fourfooted, is abundant there, and the natives as a rule are law-abiding and inclined to assist the traveler. The region is as yet rarely visited by automobilists.

FOR 1910 PRINCE HENRY TOUR

BERLIN, Oct. 15—At a meeting of the Imperial Automobile Club and the Society of German Motor Car Industrials, the preliminary regulations for the 1910 Prince Henry tour were laid down. It was decided to run the contest on German territory only, and to hold it from June 1 to 8, with Berlin as the start and Homburg as the final stage.

The itinerary is as follows: Berlin, June 2; Brunswick, June 3; Cassel, June 4; Rothenburg, June 5; Strassburg, June 6; Coblence, June 7; Homburg, June 8.

Two speed trials, both on the flat, will be held, the first on the opening day on a route between Geuthin and Magdeburg, and the second to wind up the event on the Taunus course.

A new formula will be worked out for these races, but the very superfluous, because circumvented, handicap of last year will be dropped. All vehicles of 8 to 25-horsepower are eligible. The minimum weight to be 77 kilos, with an additional 25 kilos for every horsepower over eight, exclusive of spare tires, of which at least one must be carried.

There are great changes in the management of the I.A.C., as Herr de la Croix, the general secretary, has withdrawn from his post, Rear Admiral Rampolt having been elected in his stead. Herr de la Croix remains, however, on the representative committee in place of the late Dr. Levin-Stoelping.

RECENT FRENCH TRADE STATISTICS

The French trade statistics for the first nine months of 1909 afford very interesting reading compared with those of the same period of 1908, as they show a very considerable increase in the sale of both American and English cars in France, coupled, in each case, with a drop in France's return business, which, in America's case, shows a decided slump. The figures in pounds weight run as follows:

Exports 1909 Lbs	Exports 1908 Lbs.		Imports 1909 Lbs.	Imports 1908 Lbs.
300	1,000	Austro-Hungary	73,300	27,500
2,500	200	Argentine	461,000	334,100
400	——	Algeria	551,100	372,000
75,500	78,100	Belgium	1,428,800	877,700
——	——	Brazil	103,600	169,300
83,400	39,000	England	4,852,600	4,871,400
166,700	218,500	Germany	781,600	935,400
118,300	112,300	Italy	236,300	162,700
——	——	Russia	366,800	286,000
51,200	21,500	Switzerland	251,500	168,700
12,400	4,500	Spain	264,800	241,600
——	——	Turkey	44,700	49,200
42,700	8,100	United States	646,100	875,500
7,000	4,400	Other Countries	794,100	746,700
560,400	487,600	Pounds	10,856,300	10,117,800

GOING SOME OR AUTOING OVER FIGURATIVE ROADS

By S. Ross

AS paint or polish is ofttimes used to conceal defects, so does a certain figure of speech allow things designated by it to parade under false colors. Most of the wagon roads in southwestern Washington rank as such merely by courtesy of the hyperhole. while the hills are really hills hy divine right of unmolested geology. Of Seattle to Portland I wail, and "awfully" tired, if not equally disgusted, will be the autoist who essays the trip.

Considering the roads, "going some" might apply to my first day's traveling, though my odometer marked up but 130 miles. And, aside from a slow leak in a rust-cracked inner tube, which I repaired in 40 minutes, I had no mishap the first day. The 130 miles meant beyond Toledo, Wash., a small town on the Cowlitz River.

The then possession of the experience since gleaned would have led me to accept the advice of the White Steamer man, who, at the Cowlitz ferry, on the morning of my second day, urged me to camp in the shade of a large sycamore on the river's bank and ship by steamboat to Portland the next morning. For on the second day my mishaps seemed to have set in with vim and vengeance. From Seattle to Chehalis, a distance of 98 miles, the roads are very good; but 14 miles south of Chehalis one strikes the hyperbolic roads—gawky travesties on the name of respectable highways—routes that bespeak not of a citizenship of empire, but of slothful creatures who are "down shod to care" and who infest the crags. Something needs injecting. The last half of the road from Chehalis to Toledo is mostly planked, with divers planks missing or criss-crossed, and rough corduroy and pools of mud interspersed.

I made the trip in a two-cylinder, 12-horsepower runabout of the best grade, and marvelous it is what steep hills the little Autocar wonder climbed. Each cylinder seemed trying to outdo its mate, so well balanced was the commutator. Truly there are no hills steeper anywhere, and well-regulated communities will not tolerate hills as steep or rugged. Then there were several bridges which I had to cross on low gear at lowest speed—bridges of poles and logs heterogeneously conglomerated.

12 H.P. Autocar Beating 35 M.P.H. on Natural Macadam

Over Decadent Planks—Divers Planks Missing

Through Tumwater, Oldest Settlement in Washington

Through Pheasant and Grouse-Habited Forest

It is only slightly figurative to say that many of the hills have the tilt of eggs we order fried.

At a small town called Napavine (the first syllable would well suffice) I took a boy's word, got on the wrong road, and soon ran into over three miles of the roughest corduroy in the world before again reaching the main road. In the restrospect, my trip seems one unbroken spell of mishaps. After starting to the Cowlitz ferry he second day I missed the road when but 200 yards from the ferry, and went over three miles and return over the roughest road of my journey, except the above-mentioned corduroy.

Five minutes after ignoring the advice of the White Steamer man I had a small blow-out, caused by using an old casing too highly inflated. Getting the bull-dog slugs to let loose, and putting on the extra tire of my equipment, required a full hour's work. It was eighty something in the shade and I worked in the sun. These troubles conspired with a loose radiator hose to prevent my going more than 8 miles by 2 p. m. of the second day. Yet I deserved the trouble caused by the leaky hose, for I had had notice, as runs the phrase imputing negligence, on a previous run, of the insecure clamp and its hair-trigger propensity to drain my radiator.

Seven miles from the ferry I passed the upturned (then righted) car of Prosecutor F. J. Heney, which had rolled down 20 feet of a fresh sandy fill-in. A pile of fir boughs lay across the lower end of this embankment, and one of the twigs struck the underhanging stop-cock of my radiator and let all the water out by the time I had reached a bridge 200 yards beyond. Being without a bucket, I had to empty my carbides on a newspaper and twice clamber down 100 feet of a precipitous, densely undergrown gorge to get water enough to prevent my engine from overheating before I could reach a more accessible supply. Then, before I had gone a stone's throw, the pleasant road jarred the loose hose completely off the radiator pipe and spilled all the water I had lugged up from the ravine. I smiled not, nor was I silent, and my language vouchsafed no relationship to

Job. By what I then thought the kindly ministration of some overseeing power of compensation, I soon found a small pool in a quiescent brooklet, and from it I filled my tank. I put as tight a garter on the radiator's hose as I could with common wrapping twine. I have since learned many of the pronounced uses of hay wire, and will hereafter carry a good supply in my repair kit.

Near the town of Castlerock I came to another hill of the erectness of fried eggs. It was corduroyed, and among the transverse poles was a log 8 inches higher than the poles. With the low gear I poked the front wheels over the log, then opened the throttle some to get the rear wheels across, and the thud of the car as the rear wheels crossed choked down the engine. The hill was so steep that the log would not scotch the rear wheels while I let out the clutch to crank the engine. In preference to backing down the hill and making the whole ascent again, I backed diagonally into the bank at the side of the road, rolled the log out of the road, started up my engine, and managed to reach the top by letting out the clutch and on the brakes when the engine threatened to choke down, about every 4 feet. I had not gone half a mile from this widely known hill when, as a result of the incessantly rough jarring it had received, the copper bar which connects the units of the spark coil parted, broken in twain. At a nearby house a kindly frau helped me find a piece of galvanized wire, which I bent into a connector for the units of the coil.

I then had fairly decent roads until within a few miles of Kalama, where I struck a hill of marvelous erectness. An obtuse biped in the form of a contractor was grading the road to eliminate a steep, boulder-strewn hill there and had graded away the approach to the old road so that wagons and automobiles, alike, had to climb, if they could, a 40-degree slope to reach the highway. After delivering a brief philippic against any one, mutt or fool of other degrees, who would put a road in such condition I went in quest of the county commissioner, who lived in the small town. In this officer I found a man of discernment and good-roads spirit who put "five strong men," as Beaucaire says, to grading down the bank. With these five men pushing I climbed "straight up" to the old road.

For the next 12 miles I paralleled the banks of the Columbia, except when the railroad required all the valley between the river and the jutting hills, and then the wagon road was left as a thing of meagre concern to find its way as best it could over the ridges primevally marked out by geological processes. With no further trouble, other than a constant refilling of the tank, I reached Woodland at the close of the second day.

On account of high water in the Columbia River making the nearest ferry over the Lewis River unapproachable (though I tried it and got stuck in the mud for 90 minutes), I had to go eastward seven miles to the other ferry, the one at Etna. Risking the redundancy, I must say that the old ferryman there was truly a good samaritan from Altruria, for he furnished a piece of good hose and helped me fasten it non-leakably in place of the pestiferous one which had lost me five hours out of two days, and for a compensation which would little more than tip a garage employe for cranking one's engine. This dispenser of blessful aid also directed me how to avoid the worst hills between there and Portland. The route recommended was through View and Lewisville, and about 12 miles longer than the usually traveled road by way of Lacenter. Yet I had trouble enough with two hills, having to scotch the rear wheels and start the engine several times, to the tune of blistered hands, ere I reached Vancouver at 8 p. m.

It eventuated that I was not to be singly visited with radiator troubles, for the violent jolts of the roads by courtesy had so often thrust the water tank against the flywheel just beneath that a hole was worn through the tank, causing rapid loss of water therefrom. The radiator was thus emptied and my engine choked with heat when I reached View, a town easy to see, with its one store and no dwellings. There a young man in charge of the store (it was Sunday) brought out his soldering irons and made a fire to heat them while I took off the tank. We soldered a piece of tin over the hole and thinned portion, after I had so concaved the bottom of the tank with my foot that it could not again evince any affinity for the flywheel. Another envoy from Altruria had, in extravagant phrase, saved my life, and for what I felt was too small a recompense after I had paid him twice the amount asked. After 27 miles more of "good roads," on which I broke the leaf of a spring, I reached Vancouver just as a three days' and nights' downpour of rain set in. Late in the forenoon of the next day the rain vanished into "Oregon mist," and I went the seven miles of smoothly planked roads and paved streets into Portland. Then the rain lavished itself upon the earth till newly cut hay began to rot and the enormous, unequaled cherries of that clime to crack open on the trees. For three days the newspapers urged the weatherman for a change and the weatherman bulletined "Fair," but the rain ignored the program and kept coming as from an "exhaustless urn"

At 3 o'clock in the afternoon of the fourth day since the rain began I found the roads fairly dry and good as far as Salem, Ore., a pretty and prosperous little countrified city with wheat fields within its limits. The city was in its "glad rags" and heyday mood having its annual cherry fair. Doubtless no finer display of cherries and berries was ever got together.

Just south of Salem the next morning I found very good roads, and from worthy reports that the same kind of highways led practically all the way through the State, I was expecting a fine ride to far south of Eugene that day, when the most prolific source of a motorist's troubles belched forth a liberal supply. My carbureter set up a noise like a pair of cats trying to blind one another with saliva. The pump joined the chorus and failed to circulate the water, causing the engine to overheat and knock. I managed to get back to the garage in Salem, where both of the

One of the Beautiful Waterfalls Encountered En Route afflicted parts were overhauled. The pump was choked by a wad of leaves from the water I had poured in unstrained a few days before. But no evidence of disorder was visible in the carbureter, its secrecy remaining to cause the most serious trouble of my whole trip. I then started south again, but when I had gone the same three miles which I had made on my first start my carbureter spat like a Dowie flock of cats, and the engine would not budge the car, except on the low gear. I again turned back and in rampant disgust, and got "fixed up" by a good citizen who was a good mechanic, but who overlooked the salivated carbureter. As soon as he let me loose I "hiked" for Portland, hoping to there take a boat the next morning for Kelso, a town on the Lewis River just above the Columbia and about one-third the way from Portland to Seattle. I expected to make the return trip in two days, as the boat would reach Kelso about 1:30 p. m., and I had almost made Kelso from Seattle in one day. But I was told in Portland (on Friday, the day of blessings) that the boat would not leave for Kelso until Monday. Being determined not again to drive the road to Kelso, I remained in Portland, while it rained, until Monday, when the boat loaded three automobiles for Kelso. Two young men with a Studebaker and myself went ashore at Carroll, six miles from Kelso, and were in Kelso a full hour ahead of the boat. Crossing the Cowlitz River at Kelso we found the road very good to some distance north of Castlerock. Here my recurring troubles took a fresh start. My car balked on a hill of easy grade. I tested out all connections and found that both cylinders were firing well enough, but that the left cylinder would not run the engine. After more than an hour's probing for the trouble's throne (for the ailment was king), a family of three came along in a touring car southward bound, and the man and son, in their goodfellowship of the road, spent another hour helping me to ascertain that about a third of the left exhaust valve had broken off. Detaching it, I rode with the accommodating family to Castlerock, where I took the ferry across, the family continuing south to Kelso. The only machinist in Castlerock did not have his lathe set up and informed me that I would have to go to Kelso to have a valve made. If on time, the train for Kelso would have gone 15 minutes before, but, luckily (once) for me, it was an hour late. I took the train, engaged the well-equipped machinist in Kelso to make a valve, went to supper, which I was too fatigued to enjoy, returned to the shop and got the valve after a short wait, bought a ticket for return to Castlerock on the first train, waited in the depot until it came at 2.30 the next morning, reached Castlerock at 3 o'clock, rowed across the river in a boat I managed to detach from the ferry and walked nearly four miles to my docile car by full daylight.

With oiled emery powder I ground in the new valve as best I could, inserted it in place, then had to spend nearly an hour getting the machine from the slippery fern patch on the road. After some five miles of smooth going a wet red hill put a check to the steadiness of my speed. After three attempts on low and four on reverse gear I climbed the hill. The next hill, a few miles beyond, was still steeper, with the steepest part corduroyed and a stream of more power than grandeur trickled over the logs, causing my rear wheels to spin. At a nearby house I borrowed a shovel and bucket and carried gravel and dry dirt until the road was so that the wheels would take hold.

I had no more trouble with hills, for after about twenty miles of road, embracing bumpy corduroy, mud holes and deep sun-baked cattle tracks for most of the distance, the carbureter gave forth a belated Fourth-of-July sound, and both cylinders were without compression. The trouble was beyond my power to diagnose, so I at once sought help in the form of a wagon and team to tow me 14 miles to Chehalis. Expressing my willingness to pay well for it, I found a farmer with a light wagon and good team who let his son tow me over 14 miles of splendid road while I sat with one hand on the steering wheel, the other holding a handkerchief over my mouth and nose to shut out what I could of the dust. It was a lovely ride; but I persuaded myself that I was—sure to get where I started this time.

The mechanic at Chehalis found both washers jarred off the intake valves. This was done by the carbureter's holiday activity. That and a loose engine part was all the trouble he could find. Still the carbureter kept its secret like a Mason. After a night's good rest and good meals (the first since Portland), I started for Tacoma. When half the way and going well, but with diminished power of the engine, a rear wheel picked up a ten-penny nail head first. Two lads helped me spend over an hour trying to pump up an inner tube in which a broken spring, stowed in the car with it, had bitten a hole as big as a bean. I then started on a flat wheel to run five miles, but stopped and put in another extra tube. As a passenger from there to Tacoma I carried a man who had rendered some assistance and whose presence was a desirable offset to the likelihood of more trouble, for "croaking" points were getting numerous.

We made Tacoma at a good speed, and at my passenger's house we *enjoyed* a good dinner, and I left for the 41 miles to Seattle. As I reached the long hill about seven miles out of Tacoma my carbureter again got miserly with its gasoline, and I had to climb most all the way on low gear. After crossing the hills I discovered that the tire which I had inflated a few hours before was flat. Its flatness had likely caused the hard pulling up the hill. Caring not a whit for tires or any of the other adjuncts of my Pandora's box car, I went the next seven miles on the low gear and flat tire. Having expected to reach Seattle by 10 p. m., I crawled into Auburn, almost half way, at 12:30 a. m.

By 11:30 the next morning I had patched an inner tube and so adjusted the carbureter that I could run on the high on the best level roads. Then, when within one mile of the condensed-milk town of Kent, the carbureter put a quietus to the engine, the while I rested and ate a box of strawberries bought from the Jap pickers there. Cranking my engine, I ran but 100 yards when the gasoline gave out. By telephone I got a mechanic to bring a supply from Kent and we went in on low gear to his garage. Taking off the carbureter and pouring it full of gasoline, he ascertained that the cork settled too far down on the valve spring—that the cork was log-soaked, as he termed it. He so bent the spring as to overcome the trouble, and I came the 18 miles into Seattle at a rate that our Legislature recently declared an inhibited speed.

So ended the trip.

"Gone Some" would apply to my car, pocketbook, and self. Oh, the checks I drew; Oh, the gold I "blew" bringing my runabout through those ways called roads.

As a pleasure jaunt, of course, the trip was not worth while, but as an argument of the need of good roads—half-decent roads—it was most convincing. And here's a wee hint to automobile makers: A good road from Seattle to San Francisco would do more than oceans of advertising to insure motoring its share of popularity in this domain, and is quite a necessity to that end.

KENTUCKY CLUBS WORK FOR BETTER ROADS

Louisville, Ky., Nov. 1—In line with the growing sentiment all over the South in favor of better roads is the local automobile club's strong stand for State aid in highway construction. The roads in a large part of Kentucky are in very poor condition and badly in need of repair. Under the present laws this work is left to the individual counties, many of which, especially in the mountainous districts, are too poor to devote any considerable sum for the purpose.

To remedy this state of affairs, the Bosworth-Wyatt amendment has been proposed, and will be voted on Tuesday. Its purpose is to remove the constitutional obstacles to the appropriation of State funds for road-building. The amendment has been indorsed by commercial organizations and a practically united press. In response, to a letter from Senator Bosworth, who is president of the Kentucky Good Roads Association, resolutions in favor of the amendment were adopted at a special meeting of the board of directors of the Louisville Commercial Club, and the Louisville Automobile Club is, of course, in favor.

Building a Motor Parkway

How The Way Is Cleared

A Narrow Road Near Smithtown

Near Central Islip

Parkway Near Smithtown

EASTWARD the Motor Parkway will ultimately reach as far as Riverhead, if it does not actually go to the extreme eastern end of Long Island. For the present, however, the plans call for its construction as far as Lake Ronkonkoma, to which point the land has been secured. This vast undertaking is one which should interest others than those immediately concerned with it, since the work will be so thorough as to make it, when finished, a model for road builders of the better class all over the world.

In a great work of this character, the difficulties to be overcome are many and various; the necessary financial work preparatory to the actual raising of money must be completed; the money itself raised, land obtained at the least possible price and with the least possible friction; roads to cover this land planned; contracts let, and work started. Beyond all that, there are many petty points to be cared for in the letting of the contracts, the prosecution of the work and in many closely allied things.

More than all this, it is important that the contracts go to those contractors who will prosecute the work with the greatest vigor, since, in the present work at least, the element of time enters to a large extent and it is desired to finish the work as at present planned in the least possible time. So the contractor must be selected with this idea in view as well as from a full consideration of his ability to put onto the work the number of men and teams to push things along as swiftly as is desired. When all this has been done, and followed up continuously so as to make sure that the good work will continue, the road is in a fair way to assume shape as such.

The position just sketched out is the one in which the promotors and management of the Long Island Motor Parkway finds itself in to-day. The pictures above give some idea of the work as it is being pushed adong. To depict this in words as well as the pictures above would be to tell an interesting story.

Much of the ground which the parkway is to traverse is now covered with timber, tall and stately, if not actually virgin forest. This must be cut down, but since the land owned is but a narrow strip, a little more than the width of the road, care must enter into the cutting of this timber. The reason for this is not alone the value of the lumber, which the trees represent, but also the matter of trespassing on another man's land.

Then, when the trees have been removed and disposed of, the roots must be pulled out of the ground, so that the latter may be run over and plowed up by means of horse-drawn gang plows. This removal of the stumps is no easy task either and one in which some element of danger enters, for frequently dynamite must be used to get out all of the stumps and roots.

Back of the teams which grade and fill come more teams with broken stone, from which the real foundation is made. This is spread on roughly by wagons, after which gangs of men spread it to accurate levels. The first appearance of self-propelled machinery is noted at this stage, with the appearance of the huge and ugly rollers. They roll the leveled stone to pack it hard.

Wire netting is spread over the surface of the rolled stone to act as a binder. Then the large moulds for the cement must be constructed and set into place to limit the movement and extent of the nearly-liquid cement until it has set.

Coincident with this must come the appearance on the busy scene of the mixing machinery for the cement, as this work is not economical when done by hand. This would seem to close the story, but the cement must set, after which the molds are to be removed and bad spots, if any, in the surface must be removed or filled by the use of grout, which is but cement in a very thin liquid form. The cracks between the adjoining blocks of cement are similiarly filled, so that the whole finished surface is as smooth as the proverbial billiard table.

The second section of the Long Island Motor Parkway was opened to the public on Nov. 1. The new section is about half way between Broadway on the north side of the island and the Jericho Turnpike in the center. Its general direction is east and south, and is nine miles long, which, with the eleven miles previously opened, makes the total completed length of the parkway twenty miles. The new western entrance of the parkway is located opposite Deepdale, W. K. Vanderbilt, Jr.'s estate on the Great Neck Road. The parkway is being extended to the east from Bethpage Lodge, the present eastern terminus to Lake Ronkonkoma, a distance of thirty-two miles, on which a force of 400 men is employed. This latter portion will probably be opened next Fall, and will complete the entire distance of fifty-two miles, as now planned.

THE PATRON SAINT OF AUTOMOBILISTS

By FRANCIS MILTOUN.

MASCOTS and good-luck emblems have chiefly been wanting among automobilists. The writer had a friend who lived in Paris and went in for motor boating on the Seine, who had a Greek bronze of Narcissus which he had incorporated into a figurehead for his boat. It was a dainty sentiment, but incongruous. Still less does the automobile to-day, a sort of a cross between a decapod locomotive and a submarine (certainly no one will say that an automobile has really beautiful lines) lend itself to symbolic embellishment.

The Chenard-Walcker models for this year have had an eagle with outspread wings, cast in bronze, capping the radiator inlet, and the Royal Automobile Club of Great Britain and Ireland grants its members the privilege of having their radiator stoppers cast in the form of a royal crown, while the German Emperor has a similar emblem topping off the lamps and other accessories of his luxurious Mercedès and Benzes. But, all the same, it is forcing things a bit, like the gaudy red paint and brass trimmings of the before-the-war locomotives in America.

These interpolations are as nothing compared to what certain soi-disant patriots from America touring in France sometimes perpetrate. I have seen, at Aix-les-Bains, a "Teddy bear" as big as a Newfoundland dog perched on the canopy top of a big touring car; and a couple of square yards of American flag streaming out from behind is no unusual sight on the cars of those insatiate mortals to whom notorious conspicuousness is fame. Needless to say, they will pay for their fun when it comes to settling up their accounts, whether it is in souvenir post cards at two sous apiece—which every one else buys for fifty centimes a dozen—or cocktails at thirty sous—which is only a little Vermouth poured out of a bottle, with a dash of bitters in it—the same that a Frenchman at the next table gets for forty centimes.

One thing is perhaps permissible, and that is the adoption, if one chooses, of the inconspicuous plaque now so frequently seen on the dashboard of an automobile in France depicting the good Saint Christopher at his traditional occupation of safeguarding the traveler on his way. It is a pretty custom and in keeping with the spirit of things. The plaque, in bronze, silver, or silver gilt, costs anywhere from ten francs to a hundred and was originated by a "Boul' Mich" jeweler of the Latin Quarter, from whence so many things of taste come into being.

We are "traditionalistes" all of us, say the French, and we are, no doubt; each of us has his favorite legend, motto or saying, and, though the holy Christopher may have little or nothing to do with the mechanism of an automobile, he, of all the saints in the calendar, has ever been the best friend of travelers. Saint Fiacre could not be especially favorably disposed toward travelers setting out on a journey by automobile, and Saint Peter, with his ever-present sharp-pointed stones, is too suggestive of destruction of tires. Of Saint Clou (*quel horreur*) we will not speak; and Saint Denis, who lost his head, is the last person to be taken as an example by a chauffeur. There is, to be sure, Saint Eloi left, who was a blacksmith; he might be useful at times, fault of a better, but he was of a doubtful sobriety. In brief, then, Saint Christopher, by every right, is the ideal saint for the automobilist.

Saint Christopher is the ideal traveling companion; he never complained; he never spoke, except on suitably-called-for occasions, and, above all, he brought good fortune and timely aid to the weary traveler. All hail, Saint Christopher!

Transferring Trout from the Automobile Tank to a Can in the Epicurean District of Paris.

In an epicurean district, such as the Etoile quarter of Paris, freshly caught fish are a necessity. Unfortunately, trout streams and breeding beds cannot always be located near large cities, and although fish may be plentiful it is difficult to deliver them in the center of the city with all the freshness demanded by refined tastes. The railroad is far too slow for this class of work, for the Etoile clientele not only demands its fish fresh, but alive. The automobile, therefore, had to be requisitioned, and has very successfully solved the problem by bringing a daily supply of live trout from streams one hundred miles away to the doors of the fashionable hotels and elegant apartments of the Etoile quarter

THE AUTO AS SEEN BY THE MAN FROM KANSAS

By E. S. Graham

NO final word about the value of the automobile will be said until the people of the Middle Western States have risen in their places to address the chair.

Among them, of course, with his accustomed modesty and shrinking timidity, will be the man from Kansas—this citified countryman, this countryfied townsman—who, like the sunflower "the badge of all our race," equally at home in city street or country roadside—not only looks with unblinking eye at the sun of progress, but turns occasionally to observe the landscape.

This man may speak some day on the previous question, and not in flower language either. His words ought to have some weight, for out here in Kansas are all conditions favorable to the working out of the automobile question; long, straight roads, interminable distances, an out-of-doors worth while, and a people not only predisposed by heredity and cultivation to gadding about, but given to commercializing their pleasures. E'en

> "Though on pleasure bent
> He had a frugal mind."

It is not surprising, therefore, to see automobiles in great and ever increasing numbers scudding along our paved and tree-arched Kansas streets and past our league-long fields of corn and wheat.

"If that machine had a yoke of oxen and a tar bucket it would look like an old-time prairie schooner," said a pioneer.

"Prairie scooter, you mean, Grandad." "That is what she does, any way," was the answer. It voiced the case.

In justification of these remarks reference is made to the following extract from a report of the Kansas State Tax Commission, published in the Topeka *State Journal*, Aug. 3, 1909:

"In going over the lists of personal property in Kansas it was found this morning that at the present time there are 4,516 automobiles in the State. Last year the taxes took in only 2,156 cars. The value of the autos this year is stated at $2,619,300 compared with only a million last year. One of the surprising facts is that most of the motor cars of the State are owned in the central and western counties, and the farmers are at the top of the list."

But does there not exist in the West any prejudice against the automobile? Naturally, yes. Prejudice, prayer, and profanity have been the running mates of public carryalls on their first trips since man ceased going afoot. These vanished, however, with the convincing of the people that the vehicles were safe, pleasurable, and useful.

Steamboats passed through the days of scared and praying negroes on shore and swearing mate on deck unto eminent service to valley folk. Locomotives have long since tooted past —where, pitchfork armed, upon the right of way

"The embattled farmer stood"

—to comparatively safety and pleasure in railway travel. To quote a train advertisement: "He who rides may read" at dollars and dollars per read. May even ride, read, sleep, dine, or die simultaneously. Pay the porter, and he does the rest.

But this new machine of ours, called variously as you ride in or jump from before it, "a buzz wagon," a gasoline "buggy," a "joy" or "devil wagon," this automobile—has it no foe? Yea, truly, like the old-time prairie schooner it has a Man with a Musket. Unlike the old-timer he does not ride, but takes aim at the flying machine from the roadside fence. Prejudice? Yes. Prejudice a plenty everywhere against the automobile.

Why? Three reasons. First: the automobile has been heretofore too exclusively a pleasure vehicle; not a useful one. Second: it has become the greatest death-dealing machine in the world. Third: the absolute indifference of some drivers to the fate of persons injured.

What must be done? Three things: The auto must be adapted to the business uses of a busy people, as well as to the pleasure excursions of the idle rich. It must cease to be a "battle wagon." Last and, consequently, Western people must be reconciled to its universal use.

Nature has already done much to adapt her subjects to the demands of the auto. Our old hens have developed wings on their feet—Mercury-like, that they may rise to the occasion, so to speak, when caught red-handed—or red-footed, to be more accurate—in following their occupation of running for rods down the road ahead of the machine, the chauffeur of which, too far from his Presbyterian church to get out his letter, that he might do full and complete justice to the occasion, is swallowing to the point of explosion all sorts of unsayable things. Playful Western puppies are learning to respect the auto, and so seldom do they annoy the passing auto with that postlude of thrilling yelps with which ancient Fido went to his untimely reward.

Our respectable farm horses no longer indulge in unexpected comic valentine antics at scent of gasoline. The pedestrian, too, is acquiring eyes in the back of his head.

We all know that many of the evils referred to are passing, or never existed, in the West. We all know, and are very glad to say, that no more considerate, intelligent, free-hearted man ever took his neighbor out to ride or stopped to pick up a hurt puppy in the road than our average Western autoist. Long life to him, say we! May his gasoline never give out, may he bowl gaily up the hill of life, and coast softly down the other side into the garage of serene old age!

But before he goes we wish to speak to him a minute. He has some work to do, this man whose wealth, power, and influence are counted with his generosity.

Here is a part of it: If he would see public prejudice against his class entirely disappear, he must assist us in controlling the speed maniac—the man who, perfectly safe and considerate while driving the family Dobbin, is transformed at touch of brass lever into a "high gear" fiend, indifferent alike to the rights on King's Highway of trundling babyhood, jogging old age, or walking poor. This man must pass from our midst, and our good autoist should assist at the demise or transformation. The published statement of a Western motor club that would assist in detecting and prosecuting its own members who violated the speed limit is a case in point. Public prejudice disappears rapidly under such treatment.

Our good autoist has still another chore to do, if he would totally disarm public prejudice. His machine has been used too exclusively by pleasure seekers to make it popular with those to whom leisure and pleasure are denied. The toiling, digging public has unwittingly confounded the innocent auto with its laughing, sometimes jeering, pleasure-seeking burden.

What's the remedy? Set this great, upholstered, insolent-horned fellow to doing the world's work. Let the auto haul and peddle and pull loads; then will the people shake its lever with a brother's grip and accord it peerless precedence on the highway. Another case in point is that of a Kansas farmer. His auto is a part of his working outfit. In it he goes to market, to mill, and to fair. Little prejudice exists in his community against the auto. Little prejudice would exist anywhere if the machine were not only the people's pleasure car, but their business vehicle as well. We wait the early day.

Another way in which this good autoist, to whom we referred several miles back, may serve his State and self is in organizing State-wide motor clubs, such as are enjoyed in other countries, the members of which are devoted to touring the country over a finely constructed and popularized system of good roads.

What the Universal Use of Good Roads Would Do

As this is not a report of the Roosevelt Country Commission, only two effects will be given here. First—Sectional differences would be overcome. If oil men would take a run through the short grass country, if corn men journeyed thus through the wheat belt, it might not take half a session of the State Legislature to perfect an organization and get down to *legismaking*. Second—These good roads and the universal use of them would do more than anything else to break down the barrier between city and country life. Away with that invisible, unreasonable thing called "The corporation line," that depopulates our farms, crowds our cities, and saps our country's strength!. Let the only perceptible difference between city and country homes and people be that of distance, not of kind or quality.

Send out along these auto roads city people country-bound to discard inconsistencies of dress, undue restraint of manner, unashamed ignorance of common things, to learn something of the joy of out of doors, of the beauties and blessings of country living, and the work and worthiness of its people. Then "Edythe's" wigwam headgear and "Chawley's" pancake caput cover might disappear, and both young people refrain from telling their cousin Alfalfa Apple-seed what they know of the milk weed as a dairy by-product.

Send out along these roads more and more, the country people to learn, as have our Western farmers, that the automobile annihilates distance; that neighbor, theater, church, and school are now ten or twenty minutes away, as they say in Boston, instead of as many miles, and lo! country life is changed in the twinkling of an eye or the tooting of a horn from loneliness to companionship, from unlikeness to likeness in all material things, from a slavish grind to inspiring effort.

Even the farmer's wife who remains at home may from her kitchen window catch a glimpse of a new spring bonnet dashing past which may be the inspiration of her own Easter headgear; although the creation's artistic shape may be molded from clothes basket or milk crock, she smiles more sweetly on John when he comes in to supper.

Send out along these roads a tallyho load of college boys, waving their gorgeous pennants and emitting barbaric yells. They might scare the calves and colts to death, but they would bring trailing back to the college door many a farmer boy.

Break down the barrier between city and country life. No merchant should be patronized who keeps a special line of goods for the "country trade." No milliner should prosper who offers differentiating impossible hats to country girls. A clothing store should be closed by the police that wilfully and maliciously sells a country boy a coat that marks him as "Rural Route No. 3," ten miles out, as plainly as if 'twas chalked on the back of him. "Don't take the boy off the farm" has been the plea for a decade. There is only one answer to that: "Take the farm off the boy." These auto roads will do it, are already doing it in our State of Kansas, U. S. A.

When all our careless chauffeurs are deported; when all our gumbo roads are Roman highways; when all jayhawkers go a-motoring, a-marketing, a-journeying to and fro—then shall our modern prairie schooners, 1910 model, shorn of prejudicial opposition out here in this land of freedom, of business, of roads, and of distances come into its heritage of universal use.

These things are but visions of a wakeful slumber, do you say? Maybe so, but you get the time extended on your Western Homeseekers' limited life ticket, and wait and see.

THE AUTOMOBILE CALENDAR

AMERICAN

Shows, Meetings, Etc.

Nov. 6-13.........Atlanta, Ga., Auditorium-Armory, National Automobile Show, auspices of National Association of Automobile Manufacturers. Samuel A. Miles and Alfred Reeves, General Managers, 7 East 42d Street, New York City.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Jan. 17-22........Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows Building.

Jan. 24-29........Detroit, Wayne Hotel Gardens, Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19........Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dai H. Lewis, Manager, 760 Main Street.

Feb. 19-26........Newark, N. J., Essex Troop Armory, Automobile Show, New Jersey Exhibition Company.

Feb. 21-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 22-26........Kansas City, Mo., Convention Hall, Fourth Annual Automobile Show.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

March 19-26......Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show. D. H. Lewis, Manager.

FOREIGN

Nov. 12-20.......London, Olympia, Eighth Annual International Automobile Show, Society of Motor Manufacturers and Traders.

AMERICAN

Races, Hill Climbs, Etc.

Nov. 6-8.........Phoenix, Arizona, Road Race, Maricopa Automobile Club.

Nov. 8-9.........Savannah, Ga., Georgia Highway Reliability Contest to Atlanta, Savannah Automobile Club.

Nov. 9...........Atlanta, Ga., Track Races, Atlanta Automobile Association.

Nov. 14-17.......San Antonio, Tex., Four-Day Track Meet, San Antonio Automobile Club.

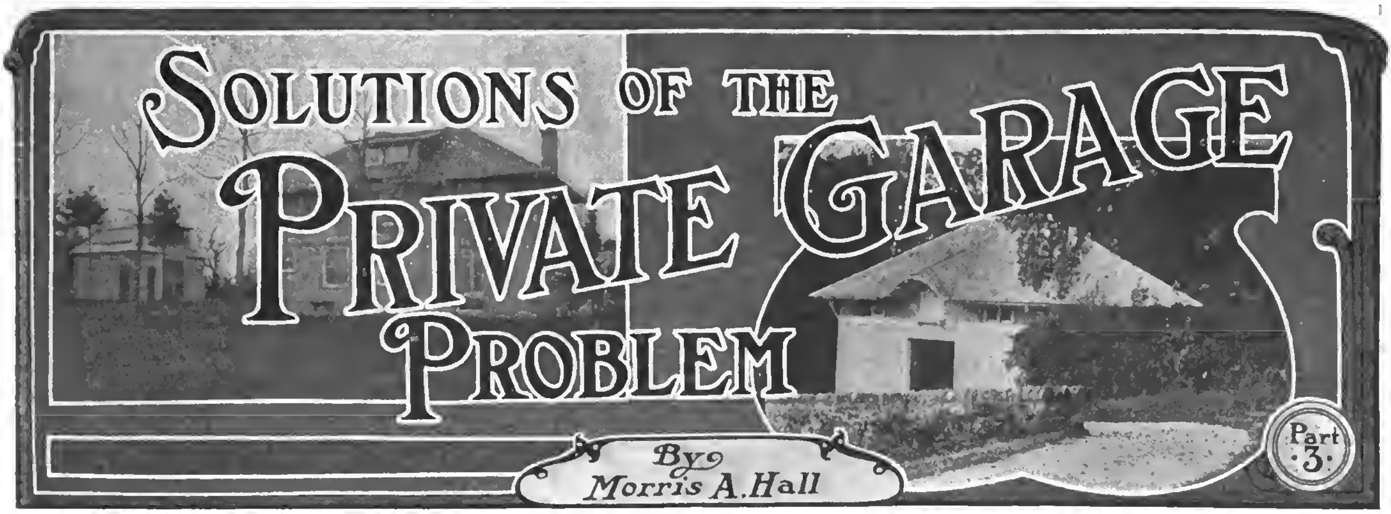
Nov. 19-25.......Redlands, Cal., Hill Climb, Mile High Hill Climb Association.

Nov. 20-21.......New Orleans, Annual Fall Meet, New Orleans Automobile Club. Homer C. George, Secretary.

Nov. 22..........Denver, Col., Start of "Flag to Flag" Reliability Run. G. A. Wahlgreen, Manager.

Dec. 29-30.......Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

Feb. 4-6.........New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.



Small Concrete Garage Correctly Located and Well-Designed Neat-Looking Frame Structure

PRINCIPAL among the reasons why the personality of the owner should affect the size of the garage building, especially the private garage, is that one man can work in very small compass, while another must have a great deal of room. This was exemplified by a case which came to the notice of the writer some time ago. Two men shared a small frame garage, each having a car. The building was rather small, its dimensions having been dictated by economy as one could reason out from the fact of two men using one garage. Small as it was, there was room for both cars, each on its own side, and with about two feet all around. This sounds like a whole lot of room to work in, and was sufficient for one of the men. But for the other, it was not half enough, so that when he had to do any repairing of a fair day, he always did it outside, while on bad days he pushed his neighbor's car out and did his work. using that side of the garage for elbow room.

This explains how and why the personality enters into the matter of size, while the influence of size on the economy has been discussed previously. Summing up, then, the prospective builder arrives at the three sizes of his car, and adding to that the clearance dimension, as determined, has settled upon the inside size of the garage which he is to build.

It is important that the outfitting of the building with work benches, drawers, cabinets, and the like be planned out beforehand, since the size of all these things enters into the ultimate garage size. Thus, it would be more than foolish to figure on a three-foot clearance on each side, and then put a three-foot wide bench on each side, as that would take up all of the room, so that no work could be done inside.

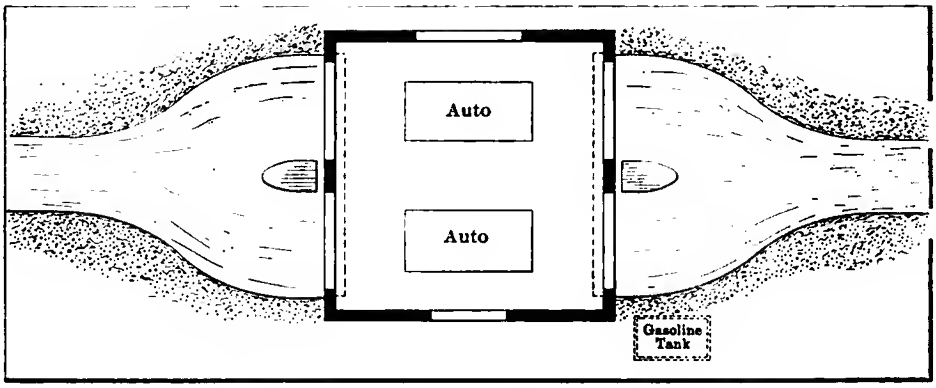
As the table published last week showed, the over-all length of cars varied from 12 ft. 6 in. for a 16-horsepower car up to 14 ft. 8 in. for a 50-horsepower car, or, in round figures, from 12 to 15 feet. The width, on the other hand, varied little, 5 ft. 2 in. being the minimum and 6 ft. the maximum. Then, if the latter figure be taken, one will be perfectly safe.

Size for a Single Small Car—Now, if the car be small, and the house be figured very close for just one car, it would seem as if not less than two feet would do for a working space, all around the car. These figures added to the smallest size give 8 ft. by 14 ft. 6 in. In addition, no one would think of building without a work bench, the least reasonable width being 2 ft. Moreover, hardly any one would think of building a special building without figuring on some sort of a locker for clothes, or parts of the car not in use. If a width of 2 ft. 6 in. be left along the back for this purpose, the whole inside size becomes 10 ft. by 17 ft.

Things done always carry more conviction than mere plans, hypothetical, or possible schemes, so it will be advantageous to consider a few more private garages which have been built with economy the paramount idea, and of a size which approximates the one just settled upon as about right for a single small car. To take these up before starting on the subject of plans for building as well as building materials, and the method of handling them, then, will be both logical and of more interest than would the reverse process.

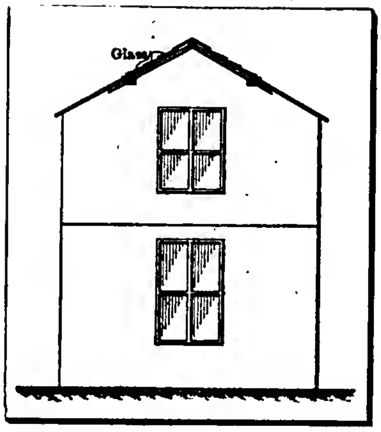
All three of the houses to be described were of wood; first, because it presented the least difficulty in construction, and, second, because it was the cheapest. The sizes vary somewhat, according to the various personalities. Thus, an eastern man built himself a garage of wood, measuring 16 by 24. Considering that he could use all of this space for himself and the car, the structure was made a story and a half high, the upper half story being utilized as a general storehouse.

Cement was used for the light foundation walls, as well as for the floor, to be described later. The building was regularly framed of dressed hemlock, and the sills, of 4 in. by 4 in. size, were bolted to the cement foundations. The outside of the frame was sided with a good grade of pine siding, regular cornice, window, and door frames being used. No sheeting was used, either inside or outside. To reduce the danger of the floor buckling, it was laid in squares, one at a time, like a sidewalk.



Plan of a Suggested Arrangement for Two Cars

Intelligent Placing Saved Maneuvering Space—By locating the house some 15 feet back from the driveway, and at right angles to it, so that the car could be driven in on a single turn and out in the same way but opposite direction, the owner saved building extra maneu-



End View of Garage Shown on Previous Page

vering space, as well as dispensing with the expense of a turntable, used by many where space is at a premium.

Doors were double and placed at the front end. The sides were lighted by means of two double-sash windows on one side, and a window and a door on the other. The loft had a window at each end. As to the utilization of the corners to the best advantage, the owner showed equally good head work. The two corners behind the doors were filled up by the stove and a big cupboard, respectively, while one of the back corners was occupied by the stairs up to the loft.

Clear across the back end ran the work bench, on which were placed both a wood vise and a machinist's vise. The anvil was located on a low bench about 1 ft. by 4 ft., and was portable, being moved around as needed. A hand drill press was attached to one of the side wall posts, as was also a corundum grinding wheel. Overhead, a light carrier track allowed of the removal of parts of heavy weight from the car to the work bench, without much manual labor, while suitable shelves and racks were set in all over the building, in various convenient places.

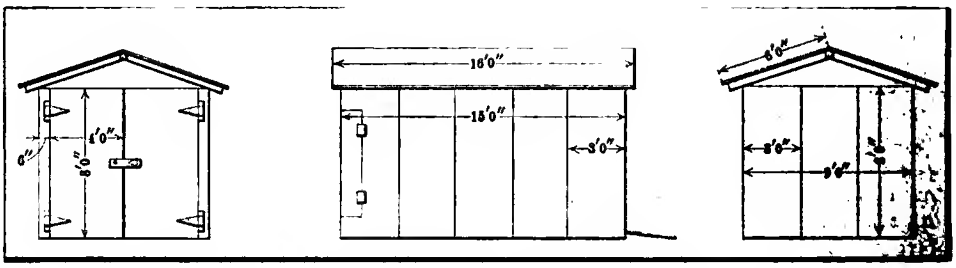
Placed in the center of the floor was the pit, over which the car stood normally. In case of using the garage for two cars, the dimensions being large enough to allow this, the pit was simply covered over with loose boards, a rather heavier one being selected to come directly under the one pair of wheels on each of the cars.

Gasoline was stored outside of the building, while the car was washed on the drive outside. No attempt was made to keep water from freezing in winter, as the owner did not use the car then, and the water from the jackets was drained off. The whole cost of this building, as described, but without any of the equipment, was just $200. This, however, was nearly three years ago.

Cost Depends Pretty Much on Owner's Constructive Ability—The above was one of the cases in which the owner did very little work himself. To take up another instance, we have the case of a man who built his own house complete, thus saving much money, and, as in a previous case, gaining much exercise and recreation from the process. Like several which have preceded, this man was a doctor.

The garage was built on the rear end of a city lot, and consequently was somewhat restricted as to size. The dimensions finally adopted were 13 ft. deep by 18 ft. wide, the latter being limited at that figure by the width of the lot. Since the floor space was not great, the owner built it two stories high, giving plenty of storage space. It was, as shown in the two figures, of frame construction, but set on a brick foundation. The walls were weather-boarded, and the roof covered with tin. In this there were two skylights, one on each side, while the floor was made of cement.

While the plan view shows a square house, the one as built, of course, was not square, this plan representing the owner's idea of his second house. The end doors are two in number



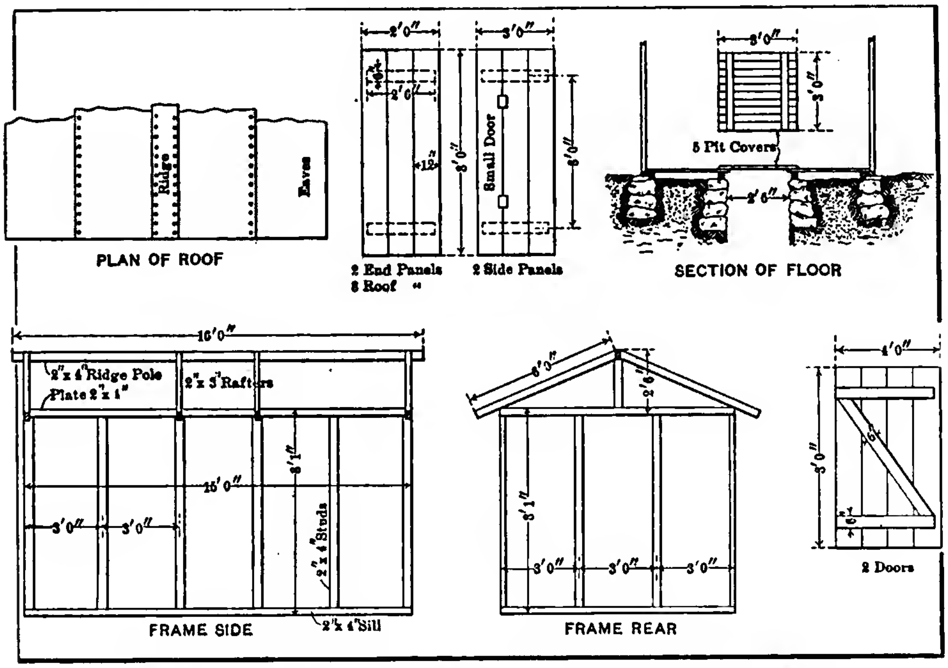
Three Elevations of Very Low-Priced Frame Garage of More Than Ordinary Merit

to allow of the individual entrance and exit of two cars, while the rear doors are the same, the arrangement being such that the cars came in at one end and went on through, out at the other.

In looking at the skylights something peculiar will be noticed about them. They are not regular, being glass laid flat on z-shaped galvanized iron members, without putty. This was an experiment, which has proved to be all right, keeping out rain perfectly. The whole cost to the owner was $100, but could not be duplicated for that, as he did every bit of the work himself, being a practical though not a practising builder.

Smallest Building at the Least Cost—What has been said before on the subject of economy has but led the way for the description of the smallest building yet described, which was built at the lowest price it has been the writer's fortune to come across. The actual size was but 9 ft. by 15 ft. outside, so that the available inside space was less than 8 ft. 6 in. by 14 ft. 6 in. While small, the owner has plenty of room, so he says, to do all necessary work upon the car.

Wood is the material of which it was made, this being built up on the panel system, for the reason that the owner did not own the house, but rented; therefore had to figure on moving the garage at some future time. The frame work, as the small constructional drawing shows, was of 2 by 4, set on sills of the same size, and surmounted by rafters 2 by 3, supporting a 2 by 4 ridge pole. Two sizes of panels were con-



Some of the Structural Details of Very Low-Priced Frame Garage

structed, one 3 ft. by 8 ft. and the other 3 ft. by 15 ft. The latter were used for the floor, two being used, one on each side of the pit. The former being used for the walls and roof, six for each side were necessary, three for the closed end, eight for the roof, two for the door, and the two for the floor, making twenty-one.

Two feet six is the width of the pit, and to cover it when not in use five panels, each 3 by 3 ft., were made with beveled ends. All material was bought at wholesale prices, being cheap Norway or Mississippi pine or hemlock. This is preferably dressed on one side to receive the paint or tar paper. The quantity of material used was as follows, this including everything:

One-Inch Lumber Required.

Twenty-one panels 8x3 feet.	Two gables 9x2 feet.
Two doors 8x4 feet.	Two door frames 6 inches by 8 feet.
Four-inch batten 140 feet.	Factory floor 150 square feet.
Two collar beams 6-in. by 8 ft.	

Hardware Required.

Two press T hinges.	Three hooks and eyes.
Two press 2x2-inch steel butts.	One clasp and staple.
One gross 2-in. No. 10 screws.	Twenty pounds wire nails.

Two by Four-Inch Timber Required.

One ridge pole 16 feet.	Two sills 14 feet 8 inches.
Two plates 9 feet.	Two sills 9 feet.
Two plates 14 feet 8 inches.	Four floor beams 14 feet 8 inches.
Four corner posts 7 ft. 9 in.	
Ten studs 7 feet 9 inches.	Eight rafters 2x3 inches, 6 feet.

Two squares Ruberoid roofing.

Made-Over Barns Are Convenient, But Show Their Ancestry

As will be noted from the above, the roof was covered with a patent paper, ruberoid, of which two rolls just made the roof. To put the whole together, the owner hired an intelligent laborer, superintending the work himself. The time consumed in this was five days. The whole cost of the house finished was $35, this including lumber, hardware, labor, but not paint, nor the tools which it was necessary to buy in order to have the laborer do the work, namely, a carpenter's level, a saw, hammer, and screwdriver. All panels were put together with nails, while they were fastened to the frame with screws.

Remarkably Low Cost Puts Private Building Within Reach of All—Figures of this sort, accompanied by drawings of the building as actually built, show that the private garage or motor house for every car, or for every owner, is within the range of possibilities, for it seems highly improbable that anyone could buy an automobile and run it, who would not be able to afford at least $50 for this purpose. Consulting the figures given above, this is seen to be enough above the actual cost as to allow a comfortable margin for tools, paint and a few additional small parts. The sum of $100, on the other hand, allows a very wide latitude in the finish of a house like this, enough perhaps to permit plastering on the inside or sheeting on the outside, to make it more warm in winter.

Many owners, however, look at the frame house as dangerous, as it is impossible to keep a car in a garage and not have gasoline in there also at all times. This keeps the danger of fire

Interior of Portable Frame Garage Showing Arrangement

always present. With any kind of a frame construction, this ever-present danger is so objectionable that many people will go without their own garage until they can afford one of stone, concrete or other strictly fireproof construction.

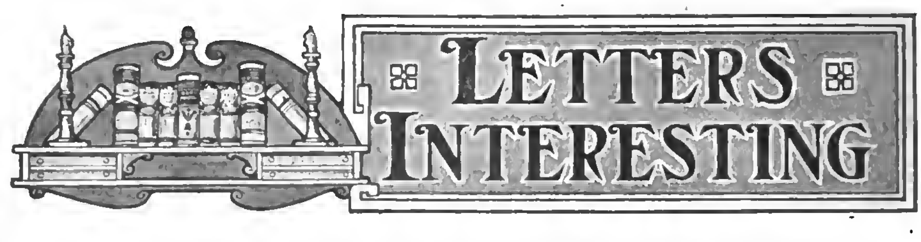
Of course, all that has been said on the subject of economy both relative to size and material, as well as to economy of construction in time and money, will not interest very much those well supplied with both. For this class, then, it will be necessary to take up the more ornate and sumptuous garage, properly designed and carefully constructed.

Between the two there is the extensive middle class, desiring a modest, yet ample structure, not entirely ugly, but not wholly given over to artistic effect. For this class, and this is the class owning the largest number of automobiles of to-day, and the largest prospective class of to-morrow, the garage must possess then a reasonable amount of appearance, a maximum of utility, and with the cost a secondary consideration.

For this class it will be well to give some few examples of larger sized garages, which should, however, be of equal interest to the little fellow, since from an inspection of the details of the more commodious places, he may glean many useful ideas to be worked out in his own garage in a less expensive manner.

(To be continued)

Front View and Exterior of Small Portable Garage Above



KICKS ON "LETTERS"

Editor THE AUTOMOBILE:

[2,073]—I have been reading your magazine for a number of years past and have tried to glean some information from the various answers you print to "Letters Answered and Discussed," as I think this feature could be made a most valuable one. I wish to be put on record in saying that you, and not only you but other magazines, fall short of just accomplishing the ideal. What excuse have you for publishing two pages of answers as your edition of October 21 did, with every name or information as to the make of car discussed eliminated or designated by "a well known make"? This elimination at once destroys the "public" interest in your letters which could be of incalculable value. Why not answer each letter personally, for, without the car's make known, how can it be of interest to owners and drivers? I could point specifically to the first two letters (2,059 and 2,060) that you have used two columns in answering.

As an old newspaper man, I can guess at your reasons for this elimination, but I don't think it "pays" in the end. Manufacturers are not hiding nowadays behind poor material or poor workmanship, and I think are not afraid of such publicity. Most of the "troubles" complained of, anyhow, are caused by want of experience and not by mechanical or material deficiencies. If you can do so, I hope you will include this letter in your above-mentioned department, and let us see if others do not feel as I do about the matter, which I hope I have not handled too roughly. JOHN W. FEW, JR.

Middletown, Pa.

If, as you say, most of the troubles complained of are caused by want of experience, and not mechanical deficiencies, it would seem as if there was nothing to be gained by giving the car name. If a man has starting trouble, for instance, what he wants to know is how to start that engine, why it won't start, and how to change or correct it so that it will start. He does not care a continental what make of car Bill Jones drives, but if Bill had starting trouble and fixed it readily, he will be interested to know what was done and how, so as to apply it to his own specific case.

Anyway, you are accusing us of something of which we are only partly to blame. As a matter of fact, few of those who ask for information under the heading of "Letters" give us the name of their car. For instance, in the issue you refer to, that of October 21, there are six letters. Of these we only had the car name of two, one-third of the total. Then, to turn back another week, in the issue of October 14, there were thirteen letters, all without car names. Of the thirteen, we had the name of just one car, one-thirteenth of the total number.

To go back to still another issue, in the October 7th issue, there were nine letters. Of these we had the car name in but one case, and that was accidentally given. More than that, we believe in all of the other cases, unless possibly the two you specifically mentioned, that the car name would be superfluous. This may be instanced thus: what good would the car name be in an inquiry for brass finish, ball-bearing applications, shipping a car to 'Frisco, making rubber cement, etc., as per the letters in October 7 issue?

In all of the letters handled for this (November 4) issue, but one gives the maker's name, and except in so far as it enables us to look up details in that maker's catalogue, which the troubled one forgot to give us, that is of no particular bearing. In short, if, like all of the others, he had forgotten to give the car name, we would have been able to answer the question just as well, and it would have been of just as much general use as it is in the shape given. Unfortunately this letter did not find its way into this issue.

ANOTHER STARTING CRANK

Editor THE AUTOMOBILE:

[2,074]—In letter 2,047 of your Oct. 14 issue was asked a question, which I hoped would be answered more fully, as I have had the same difficulty in starting engines, and in particular with a four-cylinder air-cooled engine. Precisely as this letter indicates, the engine is hard to start, but when by some accident it starts after being thoroughly cranked, then it will start on the spark nearly every time, or at any rate, at the first turn of the crank. On the other hand, when it has run an hour or so, or if it stops, it is as hard to start as at first. I cannot believe that it is in the wiring, as indicated in your reply; in fact, I am sure that is not the case with my machine, as I have had my wiring renewed once and examined a number of times, without in the least changing the result.

Vermillion, S. D. W. H. BEEDE.

In the issue following the one you mention will be found another letter on the subject of hard starting. In that case, as you will see by reading the letter in question (2,059) and our answer to the same, you will note that the suggestion is made that too much air has been used in trying to start, as the cold engine ad cold air will not vaporize much of any fuel. By putting in a large proportion of gasoline relative to the amount of air used, the engine and air, cold as they are, are still able to vaporize enough of the fuel to start. After starting, the heated cylinders, pipes and other parts help very materially in vaporization, and the second start is easily made, even, as you suggest, on the spark a number of times.

As for a recurrence of the trouble after the machine is thoroughly warmed up, that we cannot understand; in fact, from your description of the trouble we are unable to distinguish between the first case, when "she" starts on the spark, and the second, in which the motor will not start at all.

It is just possible that some of your trouble may be due to the exhaust valve being timed wrong, although on the basis of regular running (we assume this because you say nothing to the contrary) this would seem to be rather far-fetched.

If the machine is mechanically right in every respect, the trouble must be one of two things, poor or incorrect mixture, or poor or defective ignition. We suggested the latter in our answer to letter 2,047 because he stated that the fuel system appeared to be right.

TWO CYLINDERS BALK

Editor THE AUTOMOBILE:

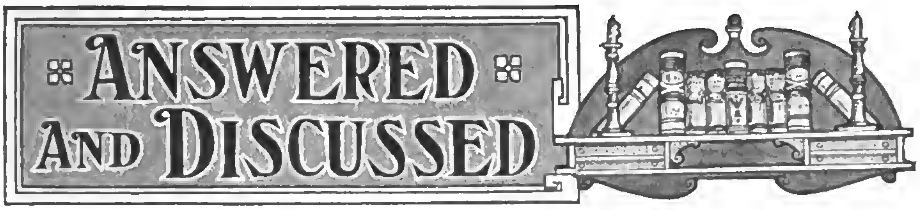
[2,075]—Will you please help me out in a peculiarly troublesome case of missing? I am using a Remy magneto on my four-cylinder car, also, five dry batteries to start the motor. When I test the dry batteries by detaching the cable from the spark plugs, trying one at a time with the engine running, I get a ½-inch spark from cable end to plug with characteristic crackling noise from each of the four. When I switch to the magneto and test in the same manner (other conditions exactly the same) I get a ½-inch crackling spark at the two outside cylinders, but little or none from the two inside cylinders. When on the road and things get warmed up a little, conditions are better, but still it is liable to happen at any and all times. What is the real trouble? Is there any A B C treatise on the magneto? GEORGE H. JEROME.

York, Neb.

If your magneto is of the old kind and worked through the coil on the dashboard, the trouble might lie in the coil, at least as you describe it. that is the first inference. On the other hand, if you have one of the newer self-contained coils of the inductor type, which do not use a separate coil, the trouble must be in the distributor. This is inside of the magneto at the front end, and may be reached by removing the hard rubber cover.

To be more specific, one of the contacts, or, rather, two of them, may be worn in an unusual manner, due to an unexpected flaw in the metal or something of that sort. These unusual flaws, or whatever they are, cause a poor contact at those points, so that the two cylinders connected up to them do not receive a full spark, due in turn to the impaired circuit.

Very few magneto books have been published dealing with that piece of mechanism exclusively. One of those is "The Magneto, Its Construction and Operation," by S. R. Bottone. Then, a number of books of a more general character treat of the magneto in some specific chapter on ignition. Some of these are well worth having. Among them are: "The Gas Engine," by F. R. Jones; and what will probably fill the bill best of all: "Automobile Catechism," in which are a series of questions and answers, all taking up the simplest parts of the automobile. In this latter you will find 20 pages on Ignition, 22 on Operation, and 17 on Troubles and Remedies, all of which contain much that will be useful to you. In the larger book, Chapter 3 contains 52 pages on Ignition, of which 12 pages deal specifically with magnetos and generators. Also, in Chapter 4, on Control, consisting of 47 pages, much of which deals with ignition troubles and remedies, you will find a great deal that will interest. All of these books may be obtained from the Class Journal Publishing Company, 231 West Thirty-ninth street, New York City.



GEAR BOX PLACING

Editor THE AUTOMOBILE:

[2,076]—Please advise me through "Letters" if the location of the sliding gear transmission on the rear axle gives satisfactory service, and is durable? Also, what about bearings, are plain the best, or roller, or are balls superior to the others?

Gordon, Neb. LOYD H. JORDAN.

To the best of our knowledge, the rear axle location for the transmission, whatever its type, is satisfactory. One might argue back to this conclusion from the fact that one of the oldest manufacturers, making the highest grade of car, adopted this location for the gear box in 1904, and is still using it. More than this, at the time it was adopted there were no others on this side of the ocean using this placing. To-day, after five years of use, this company still thinks as well of it as when first adopted. In the meantime the copyists of this location number scores, and the cars so outfitted run into the thousands.

No one can state absolutely that this or that form of bearing is best. Each one has some advantage of cost, wearing quality, lubrication, or lack of the same, adaptation to special designs, or others to fit it for some particular case. Each one of the three mentioned is in wide use on automobiles.

SOME STARTING QUESTIONS

Editor THE AUTOMOBILE:

[2,077.]—Will you kindly inform me as to the following through your excellent department of "Letters Interesting, Answered and discussed":

1. Are there any manufacturers who make at present a cranking handle which will prevent the severe blow given to the arm when a back fire occurs, due to cranking with the spark lever set in advanced position?

2. I have invented a cranking handle device, which will positively prevent any injury to persone cranking, no matter what may be the position of the spark lever. Will you kindly inform me if there is any market for such a device, and give your opinion of the extent of such a market?

3. Would it pay to take out a patent for such a device, and interest capital in the same, or do you think the average automobilist would say that he needs no such device, as he never forgets to set his lever back when he begins to crank?

4. Would the automobile manufacturers be inclined to put such a device on their machines as a regular equipment?

HENRY I. LURYE.
West New Brighton, Staten Island, N. Y.

Now, as at all times, the question of a proper and safe starting device is engaging the attention of both manufacturer and user. However, the maker of large and expensive cars wishes a starting device which may be operated without physical exertion from the seat. The maker of low priced cars, on the other hand, does not want anything very expensive, although a device such as you speak of should do very nicely, as it would give the manufacturer a strong talking point. This is a matter which has been discussed in these columns on several occasions.

As to your first question, there was a cranking device not radically different from the one spoken of, which was described in a recent issue of THE AUTOMOBILE, Sept. 23, 1909, to be exact. Aside from that, we know of nothing which answers this description.

Comment above should answer the second question, while as to the third, if you intend to make and sell these cranks, it would certainly be to your advantage to take out a patent, whereas, if you intend to sell out, it would be better to let the other party take out the patent, or else take it out yourself and sell for enough additional to more than cover the cost. This we spoke of in a recent issue, giving the Government fees as $35, with patent attorney's fees extra.

Once more, we would refer to the comments above as answering the fourth question, also.

DETAILS OF 1910 MODELS

Editor THE AUTOMOBILE:

[2,078]—Have you at hand or will you have any publication giving a complete list of the 1910 automobiles of American make, including detailed descriptions, price, and illustrations of each?

Northwood, N. D. H. H.

It is a little bit early for the publication of details of next year's models, but in this week's issue, elsewhere in the paper, you will find the first table of 1910 cars, this table being restricted to those cars which will be exhibited at the Atlanta show.

Later on, at the time of the two big New York shows, the descriptions and details of all of the cars will be given, just as was done last year. There is no publication that we know of which would give you this as soon. Both the A. L. A. M. and the A. M. C. M. A. publish handbooks, but these are not issued until long after the shows mentioned. More than this, these books do not include any non-members, so are not as complete, taken together, as are the tables printed in THE AUTOMOBILE.

TELLS HOW TO START

Editor THE AUTOMOBILE:

[2,079]—I have read with the greatest interest and benefit, for the past four years, "Letters Interesting and Instructive"; therefore let me contribute my mite for the relief of No. 2,059 and many another autoist who is not fool enough to lay up his car with the first frost. It is axiomatic that all cars start hard in cold weather, due solely to the low volatility of the fuel. The tyro gets busy with the nozzle adjustment and tries to correct by increased richness of mixture. This is wrong except very slightly in the coldest weather. Now, here is the remedy for balky motors on cold mornings or any old time. Provide a priming mixture of 50 % sulphuric ether in gasoline (equal parts mixture). In starting, first prime the carburetor in the usual manner, then moisten a silver dollar-sized spot on a piece of cloth and lay over the intake of the carbureter, open throttle well and "she" will go every time; or prime through the priming cocks in the usual manner. Explanation—ether is four times as volatile (and correspondingly explosive) as gasoline.

DR. CHARLES H. MILLER.
Chicago.

The attention of our readers is particularly called to the last sentence, in which it is stated that sulphuric ether is four times as explosive as gasoline. This should be borne in mind by all those using this scheme to start the car quickly on cold mornings.

Readers who do not possess a silver dollar might try this scheme using a smaller coin, such as a half-dollar.

COST OF GLYCERINE

Editor THE AUTOMOBILE:

[2,080]—Will you please give me the address of a first-class wholesale drug house from whom I can get glycerine for use in automobile water-cooling systems, to prevent freezing up in winter. I would be greatly pleased if you would also find out for me the price of this in quantities.

Greenville, S. C. E. F. BATES.

This inquiry was referred to Hegeman & Company, 200 Broadway, New York City, who kindly supplied the following: Glycerine is put up for quantity orders in two forms, one a 50-pound can and the other a 550-pound drum. The former costs 20 1-2 cents per pound, f. o. b. N. Y., the can being free. This makes the cost of that sized can $10.25 plus the freight charges. By taking the larger-sized drum the cost per pound is less, being only 18 cents, but a deposit of $9.00 is required on the drum. This deposit is returned upon the return of the drum. This form would tie up $99 plus the $9 deposit plus the freight charges on the full drum going and the empty drum returning. It should be borne in mind that both of these figures refer to No. 2 quality, which is suitable for the purpose mentioned, but not for all purposes where glycerine is used; being, in fact, a rather impure form, suitable for mixing with water to prevent freezing.

SUGGESTS GLIDDEN ROUTE

Editor THE AUTOMOBILE:

[2,081]—Please put the following suggestions for the 1910 Glidden tour route in "The Automobile": Start at Chicago, go to Indianapolis, French Lick Springs, the Carlsbad of America, Louisville, Abbey of Gethsemane, Lincoln Memorial Farm, which will be visited by President Taft and possibly again by ex-President Roosevelt, Mammoth Cave, which is the mecca of thousands of tourists every year, Nashville, Chattanooga, Chickamauga, National Park, Atlanta, then to New York City via the National Highway. The United States is honoring Lincoln's memory by having two presidents visit the farm, is it not fitting, and I might say, patriotic, for the A. A. A. to join in honoring the great war President's memory by having the Glidden tour pass through this section? What do you think of this route?

CLAUDE W. WILSON.
Bardstown, Ky.

There must be many others who have in mind some road or route which would be advantageous for tourists to follow this year. Such persons are invited to send it in.

NOVEL THERMO-ELECTRIC POWER INDICATOR

POWER readings of gasoline engines have hitherto been obtainable only in laboratories, at no small expense; and private owners of automobiles and motor-boats have always longed for some convenient instrument which would reliably indicate the performance of their engines. The Hopkins gasoline engine dynamometer, the invention of N. Monroe Hopkins, Ph. D., furnishes such indications, either for the complete engine or for any individual cylinder. By its use the driver can immediately determine whether his engine is developing its full power, and if it does not do so, can find which cylinder or cylinders are at fault. For determining the best carbureter adjustment, or locating troubles in the ignition circuits, the Hopkins dynamometer should prove invaluable.

The principle of the device is very simple. It has long been known that an electric current is generated by the heating of the junction of two strips of dissimilar metals, and that the magnitude of the current so generated is proportional to the temperature at the junction. The famous scientist Becquerel first suggested the use of this principle in constructing a thermometer, and such thermometers are used to-day in all places where extremely high temperatures must be measured.

Power Indicated by Thermometer—Professor Hopkins saw the possibilities of this thermometer in gasoline engine use. The gasoline engine is distinctively a heat engine. The temperature of the combustion of the mixture in its cylinders is proportional to the pressure, and consequently to the power developed. A Becquerel thermo-electric thermometer fitted in the cylinder will give an index to the performance of the cylinder. If the cylinder fails to fire, its temperature will fall off and change the reading, giving immediate indication of trouble.

The application is as simple as the principle. The two wires of suitable (different) metals are imbedded in porcelain, to insulate the electric current generated and protect them from the violence of the combustion in the cylinder, and are carried in a plug similar to a spark plug. The ends of the wires are connected to an electrical indicator, which shows the amount of the current. By a suitable switch, the indicator can be connected to any one cylinder, or to all in series. Much experimentation was necessary to develop the plugs and indicator to the point where they would withstand the high temperatures and hard usage incidental to gasoline engine work.

As the instruments must be used on widely varying engines, it is not practicable to calibrate directly in horsepower; instead, the scale is calibrated from one to 100, which may be read as per cent. of the maximum power. If the maximum power of the given engine is known, and the instrument is adjusted to read 100 when this power is being developed, then the power developed under any other conditions can be readily determined.

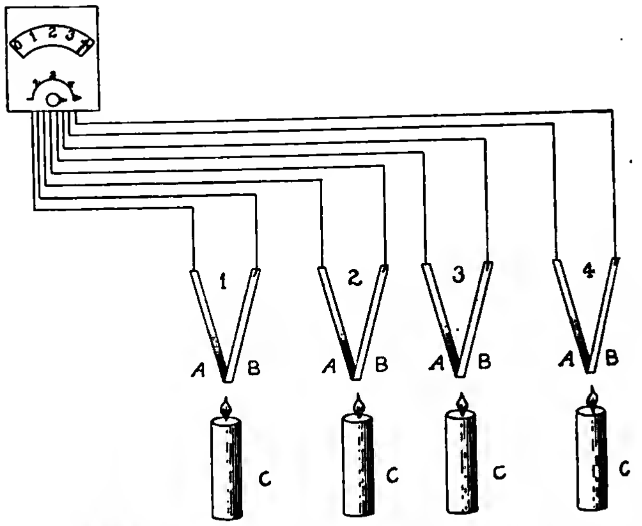
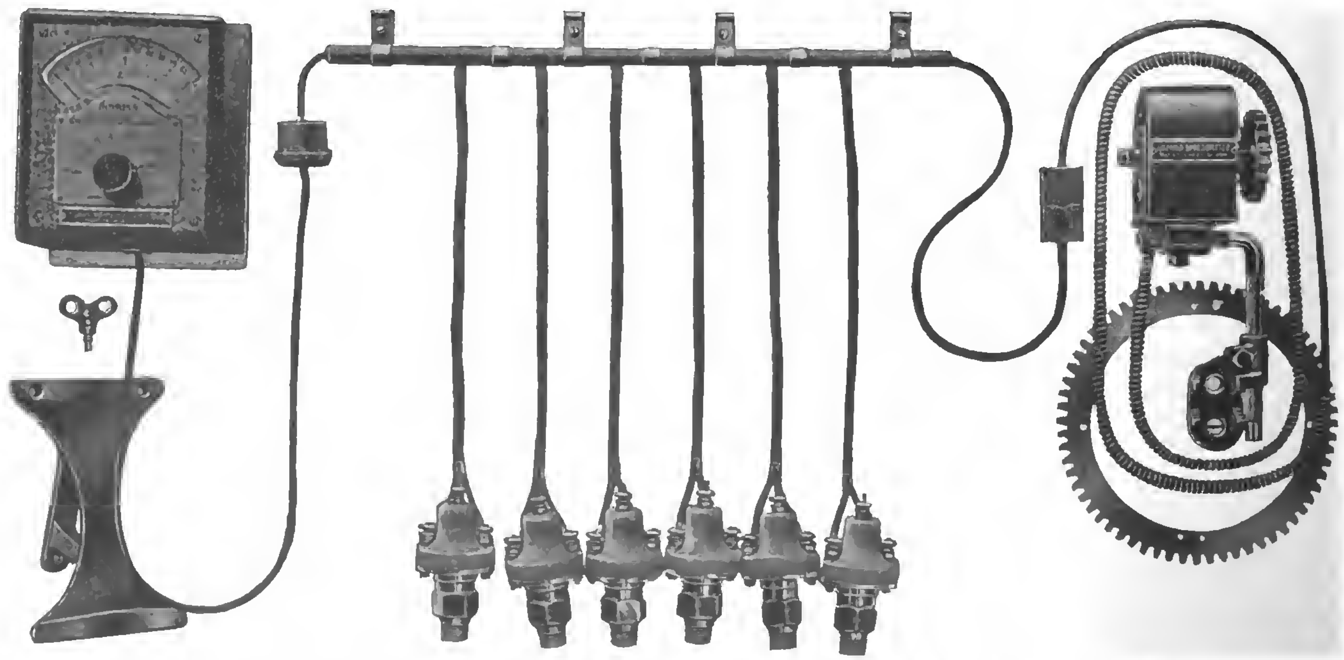


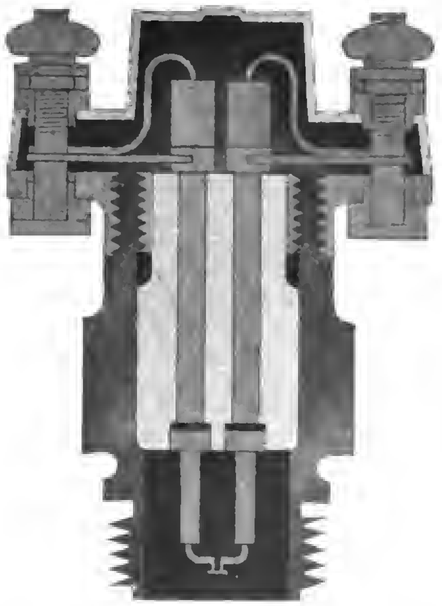
Diagram of Hopkins Thermo-Electric Indicators

A and B indicate the pairs of dissimilar metals; C the sources of heat. All four indicators are connected in series, giving their combined reading on the scale.

Application to Autos and Boats—In its commercial form, as developed for the market, the dynamometer is combined with a speedometer. The latter consists of a very small magneto, enclosed in a water and dust-proof case, which is carried on the steering knuckle and geared to the front wheel. The current generated by this magneto is in proportion to the speed at which it turns, and this current may be read on the same indicator used for the dynamometer. The switch which connects up one or all cylinders has an additional position which connects with the magneto-speedometer. This instrument accordingly has two



Hopkins Indicator Complete: Plugs for Six Cylinders, Indicator Proper, with Bracket, and Electric Speedometer



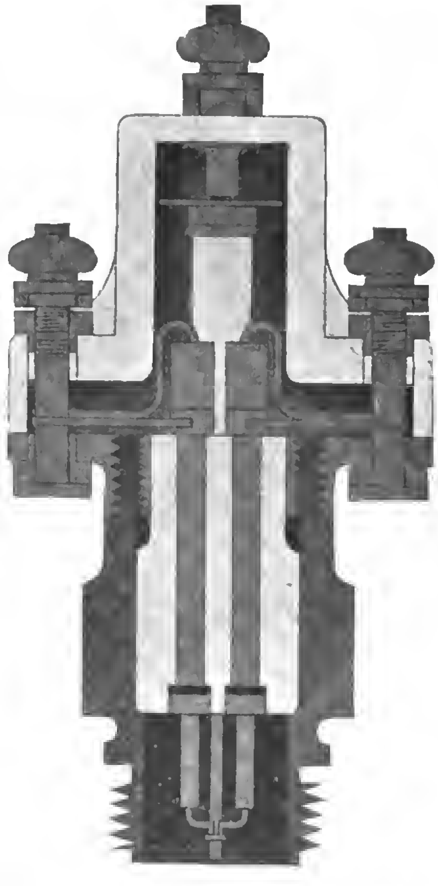
Cross-Section of Hopkins Plug

scales, one graduated in per cent. of total power, and the other in miles per hour or revolutions per minute, if for motorboat use.

The thermo-electric plugs—the little thermometers, as it were—are usually made in combination with the spark-plugs. That is, the plugs furnished with the instrument can be screwed into the cylinders instead of spark plugs, being connected to the ignition circuit on one side and to the indicator on the other. For use on engines with make-and-break ignition, or when desired from other reasons, the indicating plugs can be made separate. In this case they can be set into the cylinders through holes drilled in the valve caps.

Testing Individual Cylinders—It will be found for nearly every engine in good condition that the dynamometer indication for the maximum amount of work from a single cylinder will be about 10 on the scale—the lower of the two scales shown in the photograph of the instrument. This figure 10 for a single cylinder should be read as 100 per cent.; each single division from 1 to 10 on the scale should then be read as 10 per cent.—that is, 10 per cent. of the maximum work of which the cylinder is capable. When the engine is first started and running idle, each cylinder may show about one (10 per cent.). A well-designed gasoline engine should have its individual cylinders match up almost perfectly on the scale. If any cylinder lags behind, it is certain that that cylinder is not doing its share of the work.

Overheating of the engine, it might be supposed, would cause the plugs to give a higher reading than when the engine is running at normal temperature; but such is not the case. The plugs are insulated from the cylinder walls by thick porcelain bushings, which act as non-conductors of heat. The temperature of the cylinder walls has practically no effect whatever on the plugs; they show only variations in the temperature of the burning gases in the cylinder. The Hopkins dynamometer and speedometer is now being produced commercially by the Electric Speedometer and Dynamometer Manufacturing Co., of Washington, D. C., under the trade name of the "Dynatak."



Same, Combined with Spark Plug

RESULTS OF TESTS OF CAST-IRON BARS

MUCH interest has been aroused in the subject of cast iron and its strength in connection with a more extended use of this metal for automobile parts. The common and erroneous idea is that this is a very unreliable metal, so that its name has without reason gradually come to be used as a term of reproach. That such is far from the real situation may be deduced from a series of tests just concluded by A. F. Nagle at Bethlehem, Pa., and reported in a paper to be read before the A. S. M. E. at the annual meeting in December.

The bars tested were normally 2 inches by 1 inch by 24 inch centers for transverse tests, and the tensile bars were 1 5-8 inch by 6 inches, turned to 1 1-2 inch diameter and threaded, while the middle portion was turned down to 1.129 inch in diameter to give exactly a square inch breaking section.

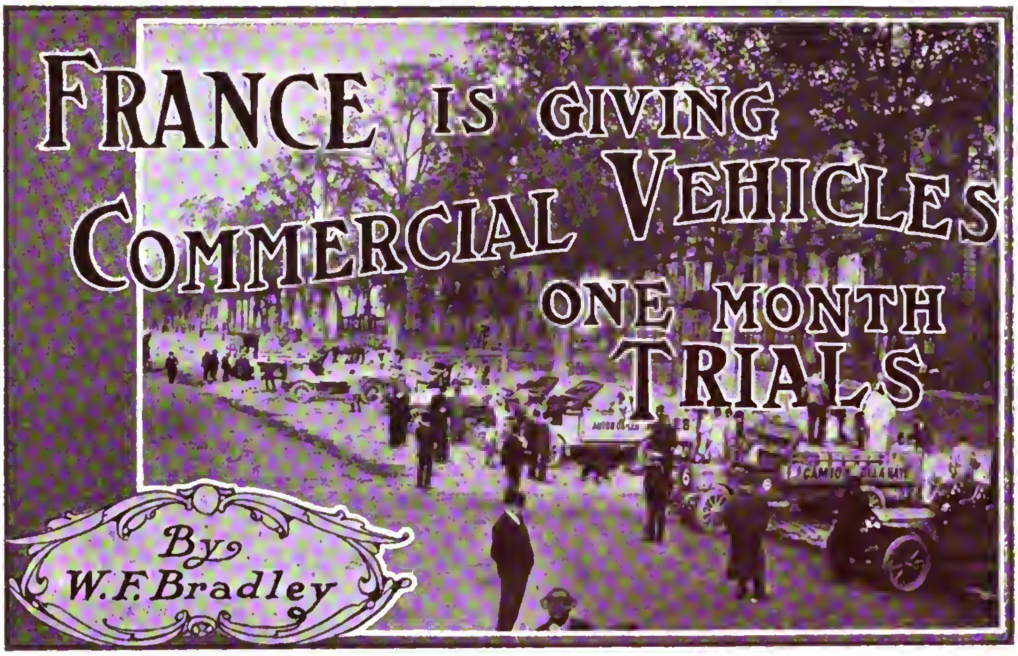
All told, some 217 pairs of test bars were tested, of which 42 are designated as abnormal, the ratio of tensile to transverse strength being either much above or greatly below the average.

No particular care was taken to have the iron or the pouring different from what might be considered as an average case, the bars being cast from two patterns in the same mold, this being inclined about 30 deg. The iron for the bars was poured from a small ladle of iron taken as near as possible from the middle of the pour for the main casting.

Throughout the table will be noticed the unusual regularity of the figures, the differences from the average of 217 pairs of test bars taken and tested over a period of nearly two years being represented by the two extremes of 13 per cent. low and 24 per cent. high, an unusually even and regular result.

COMPARISON OF CAST-IRON TEST BARS

Number of Specimens	Limit of Breaking Load of Transverse Bars	Breaking Loads Pounds Transverse	Breaking Loads Pounds Tensile	Deflection Inches	Ratio of Tensile to Transverse
29	2,000 to 2,200	2,065	21,630	0.43	10.47 to 1
36	2,200 to 2,400	2,289	22,940	0.45	10.02 to 1
51	2,400 to 2,600	2,523	24,880	0.47	9.86 to 1
43	2,600 to 2,800	2,756	26,500	0.49	9.61 to 1
16	2,800 to 3,000	2,894	28,460	0.49	9.83 to 1
175	Averages	2,383	23,732	0.45	9.96 to 1
		Above 10 to 1 ratio			
10	2,000 to 2,200	2,088	27,143	0.41	12.95 to 1
10	2,200 to 2,400	2,294	28,530	0.43	12.44 to 1
4	2,400 to 2,600	2,436	29,600	0.49	12.15 to 1
0	2,600 to 2,800				
1	2,800 to 3,000	2,890	34,000	0.45	11.76 to 1
25	Averages	2,258	28,365	0.43	12.56 to 1
		Below 10 to 1 ratio			
1	2,000 to 2,200	2,105	17,600	0.50	8.36 to 1
4	2,200 to 2,400	2,359	18,825	0.41	7.98 to 1
7	2,400 to 2,600	2,487	18,814	0.43	7.57 to 1
3	2,600 to 2,800	2,656	21,230	0.45	8.00 to 1
2	2,800 to 3,000	2,969	24,500	0.47	8.25 to 1
17	Averages	2,521	19,954	0.44	7.91 to 1
	SPECIAL—Two Sets Cast in Same Mold at Same Time				
1		2,350	23,000	0.50	9.79 to 1
1		2,100	21,470	0.45	10.21 to 1
2	Average	2,225	22,235	0.47	10.04 to 1
217	All Averages	2.380	23.970	0.45	10.07 to 1



Assembling Place in the Old Royal City of Versailles

PARIS, Oct. 25—Over fifty commercial automobiles are engaged in a trial which will last one month and calls for a regularity run of nearly three thousand miles. The event is the annual industrial and military vehicle trials of the Automobile Club of France, with the army as a backer. The army influence is considerable, for the government, desirous of obtaining automobiles for transport work, has instituted a bounty system. The vehicles complying with the regulations in this contest can be offered to the public with the advantage of a bounty of $600 the first year and $200 each of three following years, on condition that the owner agrees to present his automobile annually for inspection and to hand it over to the army in case of mobilization. For a nation trained to compulsory military service the conditions are not onerous, while the bounty is sufficiently high to be a valuable asset to the user of commercial automobiles. The outcome will certainly be a large increase in the number of commercial vehicles in France. The record number of entries is able proof that manufacturers appreciate the importance of the government aid.

Versailles, ten miles to the west of Paris, has been selected as the headquarters of the commercial contest. In one of the wide avenues of the old royal city an immense garage has been erected, with boxes down each side for the rows of competing vehicles, and a separate portion in which fuel is stored, the committee have their offices, and accommodation is provided for visitors and the press. Although the building is erected in the main street, and will have to be pulled down in a month, no expense has been spared to fit it for its purposes. The roof of the building has been made double, with a thick layer of sand between the two, while fire hydrants are placed at intervals of a few feet down the full length of the building.

The official garage is rigorously closed to all but members of the jury; in this case the closing is effective, not equipped with the usual French loopholes and exceptions. Whatever your claims, no admittance will be granted by the artilleryman on guard unless you can show proof that you are a judge. As each driver brings in his vehicle, he is only allowed to back it into its box, stop the engine, turn off the oil and gasoline and come away without a moment's hesitation. When the morning start is given, the driver can enter the garage only at the official hour for commencing the run, starting, filling tanks, oiling or washing being included in the running time.

Two sets of regulations are in force, one being drawn up by the Automobile Club of France, the other by the army authorities. Some of the vehicles are competing under the two, others have made a selection. The army insists on certain conditions which are not absolutely necessary for ordinary commercial purposes, but they do not as a rule prevent the standard type of commercial vehicle from taking part. The military authorities have a preference for metal wheels, though allowing solid rubber, and barring pneumatics. The driver must always be protected, the width, length, and axle load are all determined, and among the running requirements are the ability to travel in convoys with and without load, to use gasoline, alcohol and benzol.

Economy is the basis of the test. During the month's running three different kinds of fuel have to be employed. For the first thirteen days, gasoline is supplied to all the competitors, and on two of those days, the consumption is officially controlled. For the following week the vehicles must consume alcohol, with one day a consumption test; and during the last portion of the trials benzol will be obligatory, with one day for the official control of con-

Marquis de Dion, Gen. Brun, Minister of War and M. Millerand, Minister of Public Works sumption. As there will be not less than a week on each of the different fuels, the ability of the engine to work with gasoline, alcohol and benzol will be fully proved, while the official consumption test only taking place after several days previous run will give an opportunity to tune up the carbureter on the road to the efficiency it would have if specially prepared to use only one of these three fuels. Of course whatever adjustments or modifications have to be made to suit the changing fuels must be carried out during the running time. Lubricating oil, which is generally neglected in competitions of this nature will be fully taken into account on this occasion. The amount used will be controlled from the commencement to the end of the trials and included in the efficiency formula.

De Dion Truck Negotiating the Route Beyond Larcelles

The final classification will be made on a ton mile economy basis among the vehicles that have made all the controls on time during the entire month of the competition. The formula is

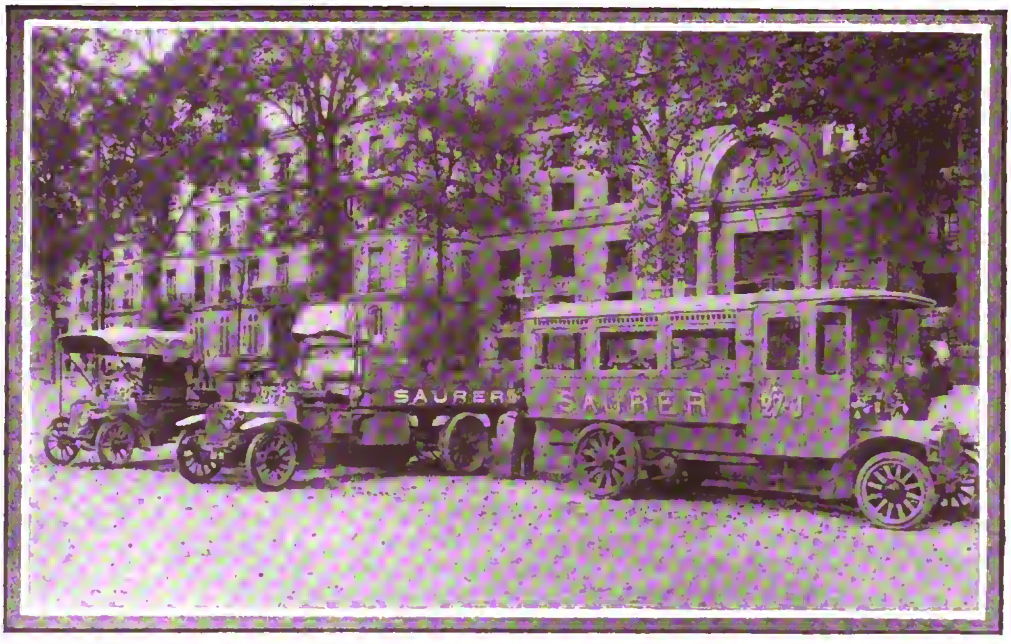
$$\frac{T}{P}\left(C + C'' + K\ P''\right)$$

in which T is the duration of the runs in minutes; C the fuel consumption per kilometer in francs; C" the consumption of lubricating oil per kilometer during the entire trials; K an estimated cost of the wear and tear of tires and wheels; P the useful load in tons, bodywork being included; P" the total weight of the vehicle in tons. No account is taken of speeds above the maximum allowed under the regulations. Thus the only advantage to be obtained from speeding would be time to make adjustments before going into the closed garage.

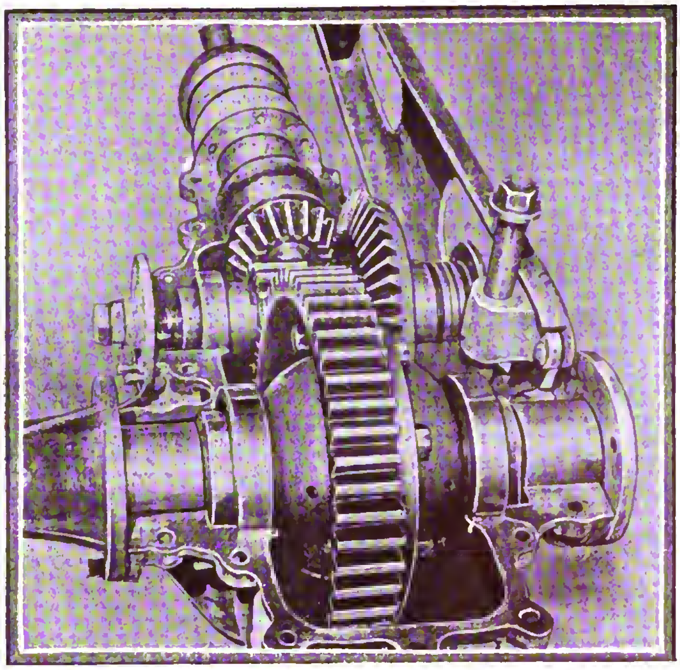
During the first days of the competition the runs were in the neigbborbood of Versailles, starting and finishing at the official garage. This was quite sufficient to test the abilities of the vehicles, for several of the hills in the neighborhood have grades of 10 to 12 per cent., with turns at tbe bottom that considerably increase the difficulty of climbing. After the first four days a run was made to Clermont-Ferrand, in the center of France, the trip being made in stages of 60 to 120 miles according to the class of vehicles. On the return, after an absence of seven days, the runs around Versailles are to be continued until November 15.

There are three distinct divisions in the competition, comprizing goods-carrying automobiles, road trains, and small omnibuses. Each of these are subdivided according to load capacity. In the smallest class, with a load capacity of 880 to 1,320 pounds, only one vehicle is entered. It is a two-cylinder Bayard-Clément identical, so far as the chassis is concerned, with the company's taxicabs in use in Paris. The bodywork is closed, suitable for such light trades as grocer, or baker. In the second class, carrying a load from 1,324 to 2,645 pounds, the entrants are De Dion-Bouton, Delaugère-Clayette and Vinot-Deguignand. All three have closed vans mounted on pneumatic tires. Delaugère-Clayette and Vinot-Deguignand use Michelin twins on the rear and singles on the front, all equipped with the latest type of Michelin dismountable rims. As a compressed air tank is carried for inflating tires, delays under this heading are not likely to occur. The outfit is such a one as would be adopted by a firm desirous of obtaining a fast delivery service with every guarantee of regularity.

It is somewhat of a surprise to find a single cylinder in a commercial vehicle class with a useful load of about one ton. It is De Dion-Bouton who have made this entry, their vehicle being one of the models used by some of the largest dry goods stores



Saurer Omnibus of Characteristic Type, and Two Trucks



Rear Axle Construction of the Vinot-Deguignand

in Paris for long distance delivery service in the suburbs of Paris noted for their steep grades. As the one lunger has satisfied its commercial users for one year under normal working conditions, there is no reason why it should not come through this severe public test with highest marks. The single cylinder is carried under a bonnet that could accommodate three other units without any difficulty whatever. It transmits through a disc clutch to a three speed sliding gear set, and has final drive, as in all De Dions, by transverse cardan shafts. There are two separate axles, a solid one carrying the load, and another one, broken by the differential, taking the drive to the rear wheels.

There is also a novel feature about the Vinot-Deguignand rear axle construction. Instead of the large bevel being on the rear axle, it is mounted on a lay shaft within the differential housing, and parallel to the rear axle. The bevel gear on the end of the propeller shaft meshes with the crown bevel on the lay shaft, while a plain gear in the center of this shaft engages with a pinion on the center of the rear axle. Incidentally this places the differential exactly in the center of the rear axle. The engine on this car is a four-cylinder type of 14-horsepower with an arrangement for sending cold air into the cylinders during runs on down grades. Only Saurer and Bayard-Clement have entered in the 2,647 to 4,400 pounds load class, the former having a four-cylinder engine in one casting with an open type of body, while the latter has a two-cylinder engine of 14-horsepower driving a stout chassis with a closed body. The vehicle is mounted on a special type of cushion tire known as the Ducasble.

In the two classes for vehicles carrying a load of 4,400 to 6,613 pounds, and those taking more than 6,613 pounds, entries are numerous, these being the types of automobile required by the army. Nearly all the leading French firms are represented, the list comprising such well known factories as Delahaye, Schneider, Aries, Panhard-Levassor, Berliet, De Dion-Bouton, and Malicet & Blin. There is a remarkable uniformity about the vehicles, although plenty of differences exist in details of construction. In every case gasoline motors are employed. Steam was represented on the entry list, but at the last moment, difficulties arose between the entrant and the committee regarding the fuel to be used. Unable to come to a settlement, the owner of the steamers withdrew from the test. It may safely be said that steam is dead in France. Last year two firms appeared, but both of these have practically gone out of existence since, and the firm that entered and withdrew is a newcomer of very little importance.

There are two cases of electric transmission, but this does not change the general rule that gasoline is all supreme in France, for the Kriegers employ a four-cylinder internal combustion motor driving a dynamo, the transmission only being electric and final drive by side chains. Another point of uniformity is in the final drive by side chains. With the exception of the De Dion-Boutons, with their special type of rear axle, side chains are found on every commercial vehicle entered in the heavy classes. Engines are invariably carried forward, and although in a few cases under a bonnet are more often placed under the driver's feet, or below his seat, in order to gain room for useful load. The only novelties in engine cooling were shown on the Malicet & Blin and Berliet vehicles. The former had a plain copper-tube coil radiator, with a belt driven fan placed directly in the center of the coil of tubes. Berliet adopted a radiator composed of plain vertical copper tubes uniting an upper and lower tank. This type of cooler has been employed on the firms taxicabs, but it is the first time it has been used on a heavy commercial vehicle. A useful addition was a steel guard across the front of the radiator to preserve it from shocks. Engine control has generally been simplified to the operation of a throttle lever or an accelerator pedal operating on the intake. The sparking point is fixed and engines are generally governor controlled to prevent racing.

Constructors have been left free in the matter of tires and wheels. While the army would prefer metal bandages, they are not made obligatory, the rule being that metal or steel can be used, and an estimate will be made of the wear and tear at the end of the test. Very few risk mounting their vehicles on metal bandages. Berliet, for instance, along with two or three others, adopts solid rubber in front and steel bands on the rear wheels, thus giving, so they claim, all the necessary protection to the mechanism, while reducing cost on the rear wheels. The great majority prefer to equip their vehicles all round with solid rubber tires. Saurer, who has the only trailer in the competition, adopts rubber for the wheels of the trailer in addition to the tractor.

Berliet, with Plain Tube Radiator, Novel Guard, and Distinctive Type of Steering Gear

What the Clubs Are Doing These Days

A. A. A. TO HAVE NATIONAL LEGISLATIVE CONVENTION

In Washington, in January next, the first national legislative convention under the auspices of the A. A. A. will take place. Announcement comes from Charles Thaddeus Terry, chairman of the association's legislative board, after consultation with the A. A. A. directors.

This will be the first legislative convention of its kind ever held. The summer meeting at Buffalo in 1908 considered both laws and good roads, though chiefly devoted to the latter proposition.

Plans are now under way to invite the Governors or their representatives from all the States in the country, and in view of the increasing interest in the subject of good roads throughout the Southern and far Western States, it is believed that the delegates from these localities will be particularly large. It has been found wherever the good roads subject becomes prominent it is at once followed by a demand for better laws regarding the use of the highways. The two chief matters that will be brought before the coming national convention will be the national registration motor law and the uniform State law. The national registration act will be reintroduced into Congress by Congressman Cocks, who had charge of the bill last year, and it is proposed to secure a hearing upon the bill before the judiciary committee during the time of the convention in Washington.

A. A. A. HAS THIRTY-ONE STATE ASSOCIATIONS

Thirty-one State associations are now included in the membership of the American Automobile Association, though one of these is the Hawaiian association.

According to figures provided by Secretary F. H. Elliott, in preparation for the annual meeting the latter part of the month, the New York State Association leads with 4,518 members, the Pennsylvania Motor Federation coming next with 3,113, and the Associated Automobile Clubs of New Jersey, third, with 2,156. Six organizations have a membership of over one thousand: Minnesota, Ohio, Southern California, Illinois, Massachusetts and Connecticut. Among the large number of clubs affiliated with the national body the latest statistics show that 40 have a membership of over 100. The Automobile Club of Buffalo heads the list with 1,827 members, followed by the New Jersey Automobile and Motor Club with 1,800, while the Automobile Club of Philadelphia is just short of 1,000. The Automobile Clubs of Chicago, Minneapolis, Cleveland, Long Island and Rochester each have over 500.

PHILADELPHIANS PLAN TO SAVE TOLL

Philadelphia, Nov. 1—The Automobile Club of Philadelphia continues its good roads work despite the near approach of winter. It has just issued an appeal to automobilists generally, asking subscriptions to a fund for macadamizing a stretch of road running from the second toll-gate on the Live Lexington pike to Sellersville. When completed, this bit of good going will enable automobilists to avoid a particularly bad stretch of road on the Hilltown-Sellersville pike, and incidentally save 30 cents toll.

PITTSBURG DEALERS' ASSOCIATION ELECTS MURRAY

Pittsburg, Oct. 25—The Automobile Dealers' Association of Pittsburg has again chosen W. N. Murray, of the Standard Automobile Company, as its president. The other officers are G. P. Moore, treasurer, and J. K. McKeogh, secretary and vice-president. The association is already making plans for the 1910 show, to be held in Duquesne Garden.

QUAKERS PROTEST AGAINST WILD-CAT MEETS

Philadelphia, Oct. 26—The Quaker City Motor Club does not purpose to allow future invasions of its particular bailiwick by outside promoters. A few weeks ago a combination aeroplane-automobile speed-fest was held at Point Breeze track, which, owing to a variety of causes, proved frosty, and the 6,000 spectators were decidedly sore when they filed out of the gate at sundown, having witnessed nothing more than a few mediocre match races, the aeroplane end of the meet having been abandoned owing to the high wind. At a meeting of the club's board of governors the following self-explanatory resolution, introduced by Richard Sellers, was unanimously adopted:

"We hereby enter a protest against the American Automobile Association granting sanctions to any individual or individuals to carry on a race meet such as took place on Saturday, October 16 last, at Point Breeze track, Philadelphia, for the reason that all such race meets are detrimental to the sport of automobiling, as they bring discredit to allied clubs and place the national organization in a compromising position before a patronizing public."

At the same meeting the contest committee took up the matter of Chairman Hower's recent edict compelling promoting clubs to make announcements on or before November 1 of their programs for the coming year or suffer the penalty of having their chosen dates considered of "secondary importance." As a result, it was decided to announce the following program, and put in bids for the dates specified: January 1-2, midwinter endurance run, subject to change, as the 2d falls on Sunday; April 30-May 1-2, roadability run; June 4, spring track meet; August 6, midsummer track meet; October 8, Fairmount Park race.

ENJOYABLE RUN OF BLUE-GRASS AUTOISTS

Louisville, Ky., Oct. 23—Members of the Louisville Automobile Club participated in an enjoyable sociability run recently. Starting from Third Avenue and Chestnut Street 15 cars went humming off to Fisherville over the Taylorsville pike. Dinner was served at the Blue Rock Hotel, Fishersville, and the return trip was made over good roadways via Frey's Hill and the West Point pike, arriving home at 6 o'clock. The route covered some of the most picturesque territory in Jefferson County. It is planned to inaugurate a series of such trips during the winter.

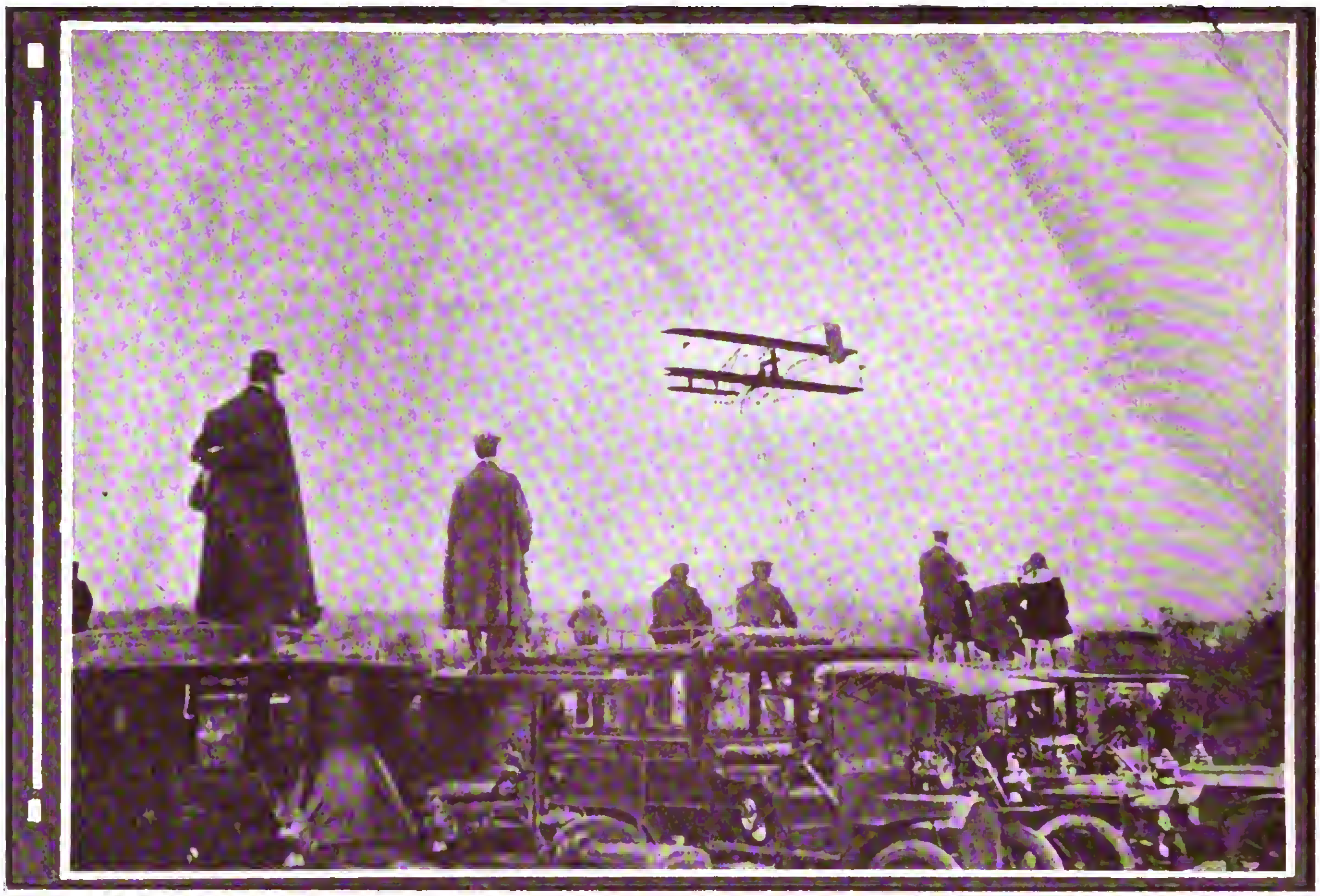
A vigorous campaign to increase the membership of the local club is under way. The membership is now 250, and it is hoped to increase the figure to 400. If this is successful the club will probably vacate its suite in the Louisville Hotel and build a home of its own.

SUCCESSFUL RACE MEET IN OKLAHOMA CITY

Oklahoma City, Okla., Oct. 25—The first race meet of the Automobile Association was a decided success, and most encouraging to the promoters. There were nine races, all match events between two cars except one, which was a five-cornered pursuit race. The most interesting was between a Hupmobile and a Ford, won by the latter in two out of three heats. The pursuit race was won by an E.-M.-F.. which also won two match races.

BALTIMORE CLUB LEARNS ALL ABOUT STEAMERS

Baltimore, Nov. 1—The last Tuesday evening of each month has been set aside by the members of the Automobile Club of Maryland as lecture night. The speakers will be prominent authorities on automobiles. At the first of these meetings Dr. H. M. Rowe, former president, discussed the White Steamer, during which he gave the club members some interesting and important technical points regarding the car.



Comte de Lambert, in His Wright Biplane, Rising from the Plain of Juvisy for His Journey Over Paris

LAMBERT'S FLIGHT WHICH STARTLED AVIATION WORLD

PARIS, Oct. 18—Paris was engrossed in its business and pleasure when the cry went up "an aeroplane." Instantly duties and pleasures were forgotten, every neck was craned, every eye was directed skywards towards the unknown aviator who had dared to fly over the most crowded city in the world. Advancing from the south, at a height of over one thousand feet, the identity of the aviator was at first unknown, and for some time the make of the machine was indiscernible. As it approached, advancing so steadily that it did not appear to move, but merely to grow larger, it was seen that it was a Wright biplane. But who could be its pilot? It was a nerve-racking exploit such as a Lefebvre would have loved to make. But Lefebvre is no more, and Comte de Lambert, the only other Wright pilot in the neighborhood of Paris, would never attempt such a supremely daring flight.

But it was Comte de Lambert. Less than half an hour before he had risen from the aerodrome at Juvisy in the presence of several thousand spectators, evidently for the purpose of making his usual mediocre flight in their presence. But, unknown to any one on the ground, Comte de Lambert had resolved to escape from the narrow limits of this flying ground hidden in a hollow. Fifteen miles away, in the center of Paris, Paul Rousseau was perched on the top of the Eiffel Tower waiting for the American biplane and the Russo-French pilot. He was the only man in the secret.

The wait was not in vain. After a couple of rounds of the field Comte de Lambert had risen to such a height that he was able to pass over the tops of the surrounding hills, had escaped to the vast plateau beyond, and was making a bee line for the Eiffel Tower, clearly visible in the center of invisible Paris. At the aerodrome, the spectators looked at the surprise written on one another's faces. They waited fifteen minutes, then half an hour, finally dismissing the subject with the reflection that the aviator had gone beyond the limits of the field and had been obliged to descend. Even Orville Wright, who had arrived on the field at the moment Comte de Lambert shot into the air, had no idea where the aeroplane had gone to.

Meanwhile a straight course was being made for Paris. The aeroplane passed over the flat, uninteresting country devoted to intense market gardening. It approached the crowded suburbs, causing the street traffic to stop and the factories to empty.

Gasoline Into Paris Without Duty

Now it had passed over the fortifications, while the octroi officials looked on helpless at the man who was taking gasoline into the city for the first time without paying duty. Now it was over the working class district on the south side of the River Seine. Thirteen hundred feet high it towered above the Pantheon, Les Invalides, even the Eiffel Tower, the highest monument in the world, the point of which had never previously been passed by other than spherical balloons. Paris gazed in amazement, too surprised to cheer the human being who was perched high up on those wood and canvas frames hovering over the city.

The tower was reached, the aeroplane passing over the point with a margin of about three hundred feet to spare. Then it appeared to turn westward, as if about to descend on the Issy-les-Moulineaux plain, where Henry Farman first flew a circular kilometer. Now it was heading east, now it was off due south. Evidently Comte de Lambert had been seeking his bearings, which he had lost while rounding the summit of the tower, and was now bound to his shed at Juvisy, fifteen miles away.

Comte de Lambert Circling the Eiffel Tower in Paris, in His Epoch-Making Flight in a Wright Machine

Again over the working-class portion of the city, over the fortifications, over the open country, parallel with the long, straight, pave-lined road becoming busy with automobiles returning to Paris, the artificial bird winged its way to Juvisy. As it left Paris its height increased until it was a mere speck in the sky with a large, gray cloud as a background. The tower is practically one thousand feet high. Comte de Lambert had cleared this by 300 feet. As he had risen still higher, it is safe to estimate that he was 1,600 feet from the ground. Formerly experts had quarreled as to whether Rougier or Orville Wright had risen 600 feet from the ground. Now a man had beaten all official records hollow.

As quietly as he had gone away, Comte de Lambert settled down on the aerodrome after encircling the ground twice in order to decrease his height gradually. He had been away exactly 50 minutes, during which time he had covered 30 miles, and performed the most astounding feat ever witnessed in aerial navigation.

Machine Was Standard Type Wright Biplane

The machine with which the flight was made is the standard type of Wright biplane, built for the French Company at the Astra workshops. It was the first flight of importance it had made, for this particular machine had only been delivered at the aerodrome a few days before to be tested by Comte de Lambert before being handed over to its owner, a Russian sportsman. The owner must have been satisfied with the trial flight. The motor employed was also the standard type built at the Barriquand & Marre factory from Wilbur Wright's own designs. It was the same type of motor as the one with which Wright made all his early flights in France, with a few minor improvements and rather better workmanship than the Wright brothers had been able to furnish with their limited resources. The first motor, built in America, perished in October, 1908, when a connecting rod broke and went through the bottom of the crankcase. The Barriquand & Marre company had already been at work and were able the next day to supply the same type of motor built in their shops. Since then this motor has been used on all French-built Wright machines. It is of the four-cylinder type, cylinders cast separately, and cooled by force feed water circulation. There is no carbureter, the gasoline being injected into a collector and aspired from there into each cylinder. Ignition is by high-tension Eisemann magneto, this being one of the changes made since the engine came into France, the original one having low tension ignition. Valves are in the head, the inlets being automatic.

BISHOP RE-ELECTED AERO CLUB PRESIDENT

With a vote of 205 to 13, Cortlandt Field Bishop was Monday night last re-elected to the presidency of the Aero Club of America, at the meeting held in the clubrooms on East Forty-second street. The somewhat limited quarters were crowded to suffocation, which elicited the oft-repeated statement that now and then a contest is a good thing in the life of any club. These were the directors elected: Cortlandt Field Bishop, Charles Jerome Edwards, A. Holland Forbes, J. C. McCoy, and Samuel H. Valentine. The selection of these five means the naming of Mr. Bishop as president, Mr. Forbes as first vice-president, Mr. McCoy as second vice-president, and Mr. Edwards as treasurer.

The opposition failed to obtain the strength anticipated, for the belief was general that Mr. Bishop's excellent services abroad this year deserved a continuance in office in 1910, when the two big aeronautic events of the world will take place in America and under the auspices of the Aero Club of America.

Strange Italian Dirigible Accident—When the Italian military dirigible Uno Bis landed near Rome after a successful voyage from Naples, Lieutenant Rovetti, in keeping the crowd back, stepped too near the whirling propeller, which struck and killed him.

LATEST FROM GENERAL MOTORS

Detroit, Nov. 2—Michigan holders of General Motors common stock have been notified of the action of that company in declaring a dividend of 150 per cent., payable in common stock November 15. Present common stock of the General Motors Company amounts to $5,500,000. With the dividend just declared the outstanding common stock will be increased to $13,750,000, still leaving more than $26,000,000 of the $40,000,000 common stock authorized by the stockholders some time ago in reserve.

Cause for rejoicing on the part of stockholders is not alone dependent on the dividend just announced, the showing in other directions during the first year of the General Motors Company's existence being decidedly favorable.

According to W. C. Durant, president of General Motors Company, at the close of business September 30, marking the end of the year, there was a surplus in excess of $7,000,000. Charging off all depreciation, patents and doubtful accounts, there still remained a surplus of $1,040,000, a decidedly comfortable showing for so short a period.

During the year just closed constituent companies making up General Motors produced an aggregate of 28,550 automobiles, the volume of business represented being $34,000,000. Forecasts for the coming year are even more favorable, Mr. Durant stating that orders have been secured for 68,000 cars, representing a sale value of $60,000,000.

Rumors are rife regarding further additions that are to be made to the long string of automobile manufactories throughout Michigan comprising the General Motors Company. Every time news gets dull it is safe to speculate on what Mr. Durant and his associates are about to do. So far as the local field is concerned there appears to be little opportunity for further enlargement, unless it might be through absorbing some of the newer concerns. Furthermore, the General Motors Company now is in a position in its own plants to manufacture any and every size of car on the market, thereby eliminating one reason for further extensions that existed even a few months ago. However, with its past record still fresh in mind, it is not safe to predict absolutely what will happen. The Elmore Manufacturing Company is the latest reported addition to the General Motors list. but this has not been confirmed by official announcement.

FOR AUTOMOBILE INSURANCE ONLY

Indianapolis, Nov. 2—With private wealth estimated at $50,000,000 behind it, and with an authorized capitalization of $1,000,000, the Automobile Insurance Company of America has been organized in this city. The general offices will be located in Indianapolis, while branch offices will be located in all of the principal cities in the United States.

It is believed that the company is the first to be organized exclusively for automobile risks. The officers are: President, D. M. Parry, of the Parry Automobile Company, Indianapolis; vice-president, L. N. Littauer, a millionaire glove manufacturer of New York City and former Congressman; secretary, Ernest B. Thomas, of Rushville, and treasurer, John W. McCardle, of this city. a member of the State Board of Tax Commissioners.

REGAL WILL HAVE CANADIAN BRANCH

Detroit, Nov. 1—Another forward step has been taken in the foreign invasion planned by Detroit automobile manufacturers, the Regal Motor Car Company having decided to establish a Canadian branch in Windsor, just across the border from this city. A new company is being formed, including the officials of the present concern and E. N. Richards, of Windsor, who will be manager of the Canadian factory. For the purpose of supplying the Canadian trade a $100,000 plant will be established, with a capacity of five cars a day, the output to be increased as conditions warrant. A new factory will be built as soon as a suitable location can be found.

MASSACHUSETTS AUTO TRAFFIC 33 1/3%

Boston, Nov. 1—The results of the road census taken by the Massachusetts Highway Commission, the week beginning Oct. 10, which are being compiled at the offices of the board in this city, indicate that under normal traffic conditions on the State roads, automobile travel is not as heavy as in mid-summer, when there is much touring. At the census taken in August the tabulations and calculations showed that 42 per cent. of all the traffic was motor-driven, but from the results that have been calculated in the October census it is apparent that the motor-driven traffic is about 33 1-3 per cent. of the total. The October census was taken at 237 stations scattered all over the State, their locations being the same as in the case of the August census.

The point of heaviest motor-vehicle traffic revealed by the October census was the Saugus River bridge connecting the Lynn State road with the Metropolitan boulevard along Revere Beach. There the enumerators counted an average of 715 vehicles a day and 90 per cent. of them were automobiles. The point of least motor-vehicle traffic was in Nantucket. As this place has a special automobile exclusion law, the traffic registered 100 per cent. horse drawn. Along the Cape there were several points where above 80 per cent. of the traffic was horse drawn. and in not a few places in the vicinity of Boston the automobile traffic was from 50 to 70 per cent. or more.

The heaviest traveled point in the State according to the October census was in Beverly, where an average of 1,475 vehicles were counted each day, 58 per cent. horse drawn and 42 per cent. motor driven. In the August census the heaviest traveled point was in Lawrence, where the average daily traffic was 2,440 vehicles, 66.39 per cent. horse drawn and 33.61 per cent. automobiles. In the October census this point showed an average of 1,222 vehicles.

PHILADELPHIA SHOW IN INSTALMENTS

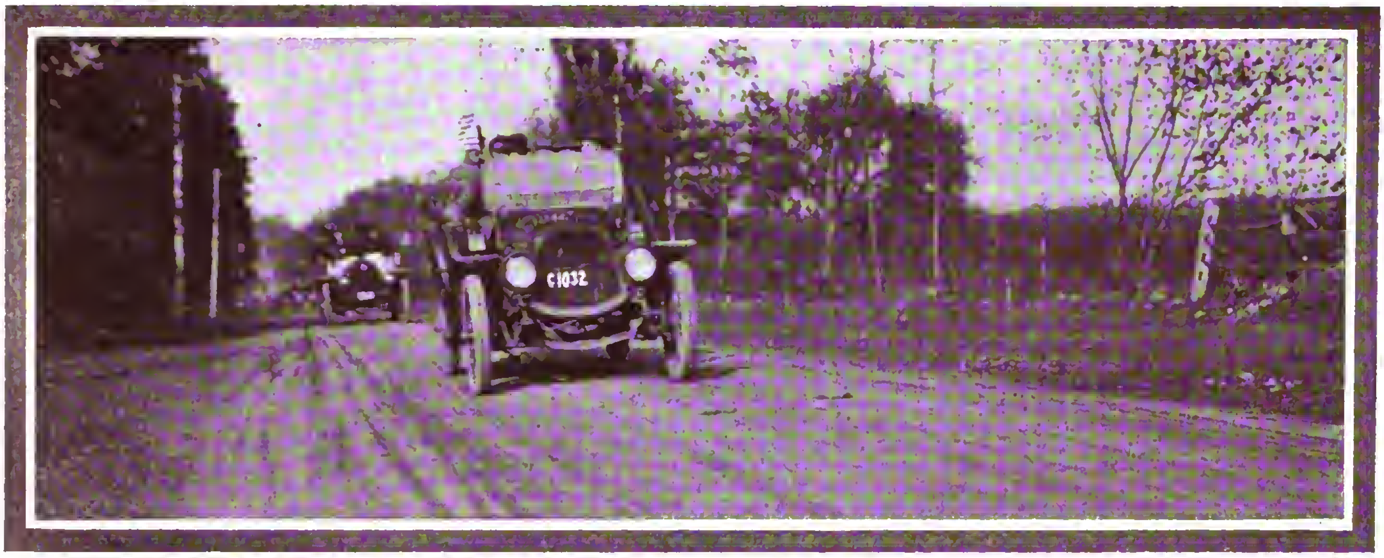
Philadelphia, Nov. 1—Blocked in their desire to get the use of the Second Regiment Armory for the annual exhibition, the show committee of the Automobile Trade Association of Philadelphia made arrangements last week for holding that affair in the Third Regiment Armory, at Broad and Wharton streets. A trifle smaller than the Second Regiment building, the downtown structure is half a mile nearer the center of the city. The inadequacy of the building to the purpose will be partially overcome by the decision of the show committee to erect on an adjoining lot a temporary structure, 40 x 200 feet in dimensions. And even with this addition, the amount of space at the disposal of the committee will fall so far short of the requirements that it has been decided to run the show two weeks—January 15 to 29—instead of one, as originally intended.

At the end of the first week the exhibitors will be rooted out, bag and baggage, to make room for the second instalment of the show. It was the only solution of a problem which, with each succeeding year, has become more difficult.

A movement is now afoot to provide Philadelphia with a suitable building, and it is the hope of the committee, Messrs. J. A. Wister, W. J. Foss and J. L. Gibney, that the 1911 exhibition will hold forth therein. Secretary J. H. Beck has established offices at 216 Odd Fellows' Building.

DATE SET FOR WASHINGTON SHOW

Washington, D. C., Oct. 30—A meeting of the local automobile dealers was held to-night and it was decided to hold an automobile show at Convention Hall during the week beginning January 24, which is the week following the close of the Philadelphia show. B. C. Washington, Jr., who has managed the last three shows, has again been placed in charge and is rapidly getting his plans in shape. The fact that more than sixty-four different makes of cars are handled in this city would seem to insure the success of the show. Decorations will be uniform.



State Highway Commissioner MacDonald Leading the Procession at Opening of Berlin Turnpike

EXTRA ENTHUSIASM OVER NEW ROAD

HARTFORD, CONN., Nov. 1—"Obey the law," is the edict of the Hartford police, who have been very active of late in nabbing offenders on the new Berlin turnpike which was opened recently. A few days ago a New London chauffeur came through town without a front license tag. He said that he did not know that one was required. A special session of the police court was held for his benefit, as he wished to leave in the morning, and he was fined $7 and costs. George A. Pickett, a prominent New Haven automobilist, was arrested in Maple Avenue, the Hartford end of the Berlin turnpike. He was fined $15 and costs, and took an appeal to a higher court. The commission intends to stop those who are trying to make the seven-mile stretch a race course.

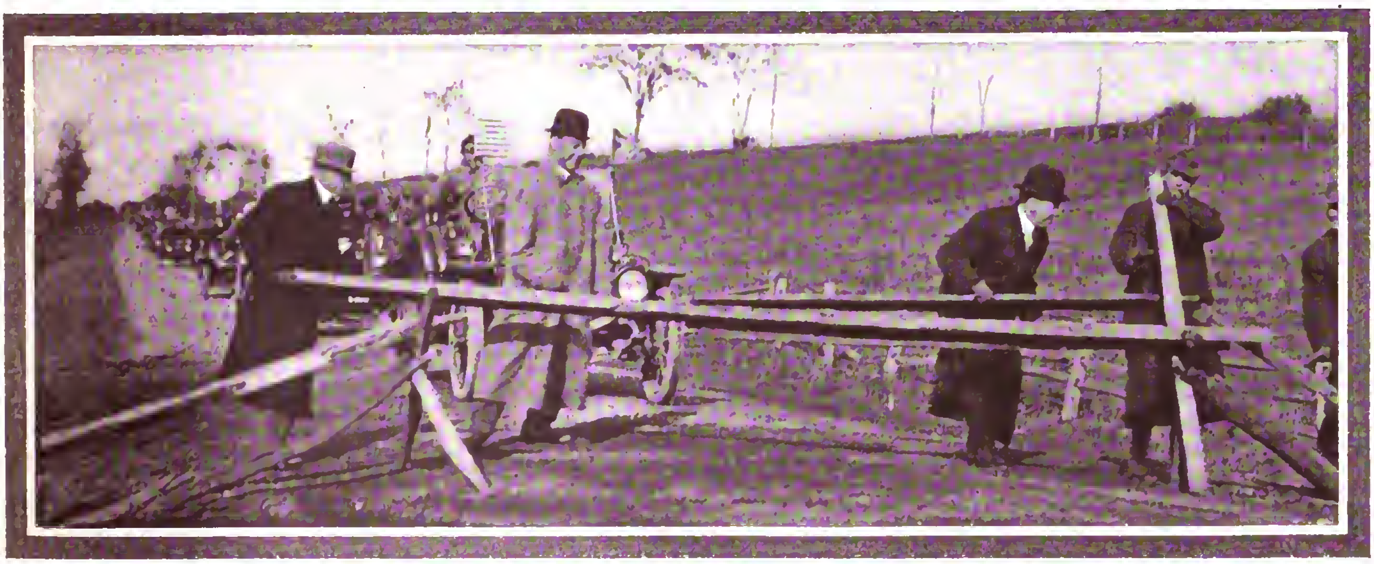
PLANNING FOR 1910 CONNECTICUT RUN

HARTFORD, CONN., Nov. 1—The all-Connecticut endurance run is the latest topic in the contest committee of the Automobile Club of Hartford. At a meeting held Friday evening the committee discussed a run to last four days, in the itinerary of which nearly every city in the State would figure. The meeting was called at the request of the American Automobile Association, which wished to know just what the Hartford club had on the board for 1910. The idea of a long endurance run seems to meet with popular favor, and it is believed that such a run could be successfully promoted, with a possibility of over 100 entrants. The distance would be divided into day's runs, radiating from Hartford as central control, the cars returning there every night. Connecticut offers all sorts of going; level country with good roads, steep hills and an occasional mountain ascent. The total distance would in all probability be 500 miles or more, and the club would offer a trophy valued at $300 to $500.

DETROIT'S VICINITY MAY HAVE ROADS

DETROIT, Nov. 1—That the good roads movement is to be given impetus in this vicinity the coming summer is manifest from the fact that a committee including representatives from various automobile manufactories and retail establishments has perfected arrangements for the building of several miles of good roads in Wayne County. The Michigan State Automobile Association has also interested itself in the matter, and tangible results of a decidedly welcome nature are promised.

The rumor that Detroit is to have a speedway solely for automobiles, built along the lines of the one in Indianapolis, is strengthened by the resignation of E. A. Moross, manager of the Indianapolis Motor Speedway, for the avowed purpose of returning to Detroit to become associated with a company that is to build a speedway here. Moross has for several years been a prominent figure in automobile racing circles.



Highway Commissioner MacDonald Breaking Down the Fence, Berlin Turnpike Opening

In the Woods of Washington State with a Franklin

This photograph, taken near Pomeroy, shows W. W. Richardson and party in their Franklin touring car. Mr. Richardson is the owner of a large grain ranch, and in June, 1908, he drove his car from the H. H. Franklin factory in Syracuse, N. Y., to his Washington home.

More about Bumper Patents—The temporary injunction obtained by the Turner Brass Company against the Vanguard Mfg. Co., restraining the latter from manufacturing bumpers infringing on a certain patent, has brought from the Vanguard Company an authoritative statement of its position in the matter. According to this statement, the Vanguard Company has long since discontinued the manufacture of the style of bumper claimed to be an infringement, for the reason, it is said, that this style was found unsatisfactory in service. Nevertheless, the injunction will be contested in court, in order to establish the fact that the Vanguard Company is not and has not been infringing on any patents whatsoever.

Baldwin Buys Auto Truck—The Baldwin Locomotive Works has joined the users of auto trucks. The first machine bought by this company is a Saurer, which is to be used between the company's works in Philadelphia and one of the foundries and branch works some thirteen miles distant. It is expected that the truck will be able to make three round trips a day, when necessary. The features of the truck include a compressed air system, which operates one set of brakes and also a self-starter for the engine. It has a four-speed gear, the highest gear giving fifteen miles an hour.

New Kline-Kar Scores—Two Kline-Kars took part in the sociability run of the Harrisburg, Pa., Motor Club from Harrisburg to Cornwall and return, and both acquitted themselves creditably in the gymkhana contests which were held at Cornwall. Robert Morton, the manager of the Keystone Motor Car Company, won the vibration contest with his six-cylinder, 40-horsepower Kline-Kar, and J. A. Kline, general manager of the B. C. K. Motor Car Company, which makes the Kline-Kar, won the potato race with his 6-40 roadster.

White Concentrates in Cleveland—On November 1 the advertising office of the White Company will be moved from its present location, 1402 Broadway, New York City, to the White factory in Cleveland. R. H. Johnston, who for the past six years has been in charge of the advertising of the company, will continue his duties at the new address. Mr. Johnston will change his place of residence from the Engineers' Club, New York, to the Hollenden Hotel, Cleveland.

IN AND ABOUT THE AGENCIES

American Simplex, Boston—New salesrooms in the Hub City have just been opened at 261 Dartmouth street, one of the best locations in the city. This branch will be in charge of W. Mason Turner, as manager. The recent victory of this car in the Munsey tour has done much to advance the sales in this part of the country, and the new branch was opened to take care of the increased business resulting from that victory. This company has done much explaining to counteract the impression that it was its car which won at Lowell.

Miller Supplies, Atlanta, Ga.—Chas. E. Miller, manufacturer and jobber of automobile supplies and accessories, opened a branch house in Atlanta November 1, at 66 Edgewood avenue. It is expected to carry on hand a large stock of supplies to meet the Southern demand. Prices will be the same f.o.b. Atlanta as at the other branches, in this way saving customers the freight and express charges, as well as several days' time.

Cadillac, Pittsburgh—The McAlister Motor Car Company has succeeded the Imperial Motor Company as agent for the Cadillac. The firm is composed of R. P. and William J. McAlister, and will retain the location at 5906 Penn avenue.

Mitchell, Grand Forks, Mich.—A. O. Anderson and M. L. Strong have formed an automobile company to handle the Mitchell, and have been assigned ten counties in northeastern Michigan.

Marmon, Chicago—W. G. Tennant, of Tennant Motors, Ltd., has taken the agency for the Marmon line in Chicago and northern Illinois, and has contracted for 75 cars.

Croxton-Keeton Agencies—Contracts for the sale of Croxton-Keeton cars have been made with the Sanford Automobile Company, of Denver, and the Rooklidge-Gilmer Company, of Salt Lake City.

Moon, Pittsburgh—The Agency for the Moon Motor Car Company in this city has been secured by L. A. Randal, who already handles the Hupmobile.

Overland, Detroit — The Overland Sales Company has ben organized to represent the Overland in Detroit, with a salesroom at 295 Jefferson avenue.

PERSONAL TRADE MENTION

L. Isenberg, junior member of the Roman Automobile Company of Philadelphia, has gone to Washington, D. C., to take charge of the branch house which the concern recently opened there.

"Tom" **Berger,** the noted Philadelphia driver, has signed with the sales force of the Motor Company, agents for the Premier car.

RECENT INCORPORATONS

Rambler Automobile Company of New York, New York City—Incorporated with a capital stock of $25,000 by T. H. Beardsley, G. Tiernan and F. H. Purcells, to manufacture and sell automobiles.

Midland New York Company, New York City—Incorporated with a capital stock of $50,000 by M. Boyle, A. F. Britton and E. M. Boyle, to manufacture and sell automobiles.

RECENT TRADE PUBLICATIONS

Peerless Motor Car Company, Cleveland—The last word in the development of automobile catalogs as works of art must be granted the Peerless. Many delightful country scenes form the head and tail pieces, and these are printed in colors, giving the effect of water-color paintings. Even the mechanical illustrations are tinted to emphasize the points. There are 36 pages, 8 by 10 inches in size, of which a third are occupied by full-page illustrations. The covers are double, of stiff, heavy paper in terra cotta, with an ornamental design in shades of brown and gold. In pardonable enthusiasm over the artistic side of the catalog the mechanical side might well escape notice, yet this has not been neglected. The reading matter is straightforward exposition, and is all devoted to the car, without the high-flown verbiage which is so often allowed to obscure the points which the reader really wishes to have made clear.

The Rambler Magazine—The "Dealers' Number" of this product of Thos. B. Jeffery & Company seems rather above the average of house publications. Its 60 pages, of fine glazed stock, contain descriptions of the 1910 Rambler models, a story of the five thousand-mile test runs of the first two of the new series cars, and an exposition of the selling system of the company. Illustrations are good and unusual in number, including photographs of many of the machines and processes in use in the Rambler factory, pictures of garages and agencies, cars in various contests, etc. A signed photograph of Thomas B. Jeffery forms the frontispiece.

The Locomobile Company of America, Bridgeport, Conn.—The 1910 catalog of this well-known maker is a splendid example of commercial literature, being modest in size and design and at the same time attractive in its neatness and simplicity. It is bound in a double cover of brown linen, the front of which bears the title "Locomobile—1910" in red. The type is small but distinct, and set off by red side-heads. The illustrations, although not numerous, are well chosen and clearly printed, always emphasizing the right point. Specifications are complete and conveniently arranged.

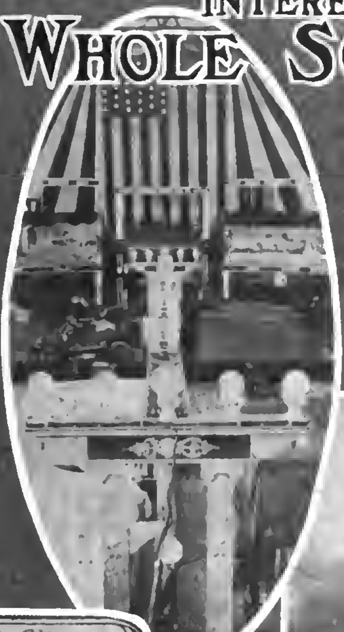
Gilbert Mfg. Co., New Haven, Conn.—The advance catalog for the season of 1910 contains an extraordinarily varied line of supplies, all of which are manufactured by this firm. Tire cases are a specialty, as well as irons for holding spare tires; but also included are inner tube cases, spark plug cases, tire sleeves, starting crank holders, storm aprons, tool kits, waterproof magneto covers, fan or oiler belts of coiled wire, joint and steering connection boots, lamp covers, robe rail boots, racing helmets, and spare tire locks. The Bowers carbureter is also listed.

VOL. XXI NEW YORK—THURSDAY, NOVEMBER 11, 1909—CHICAGO No. 20

THE AUTOMOBILE

ATLANTA'S NATIONAL SHOW INTERESTS THE WHOLE SOUTH

Mayor Maddox, Asa S. Candler, Clark Howell and other Members of the Chamber of Commerce, who Officially Opened the Show



A Glimpse at the Inside

Exterior View of the Auditorium Armory Where Show Is Being Held

ATLANTA, GA., Nov. 8—This wideawake city is undoubtedly the busiest place in the whole South, and the coming of automobiles explains the whyfore. In giving the "Gate City" a National Show the N. A. A. M. acted wisely, for the event has involved the pride of the municipality, which is exceedingly great, and involves the inhabitants as a whole, besides all officialdom and a thoroughly surcharged press. Such universal enthusiasm is a revelation to the follower of the show circuit whose experiences began with that exhibition in New York's big amphitheater when the bicycle grudgingly gave not much more than a corner to the rival who soon gained the center of the stage in prodigious bounds.

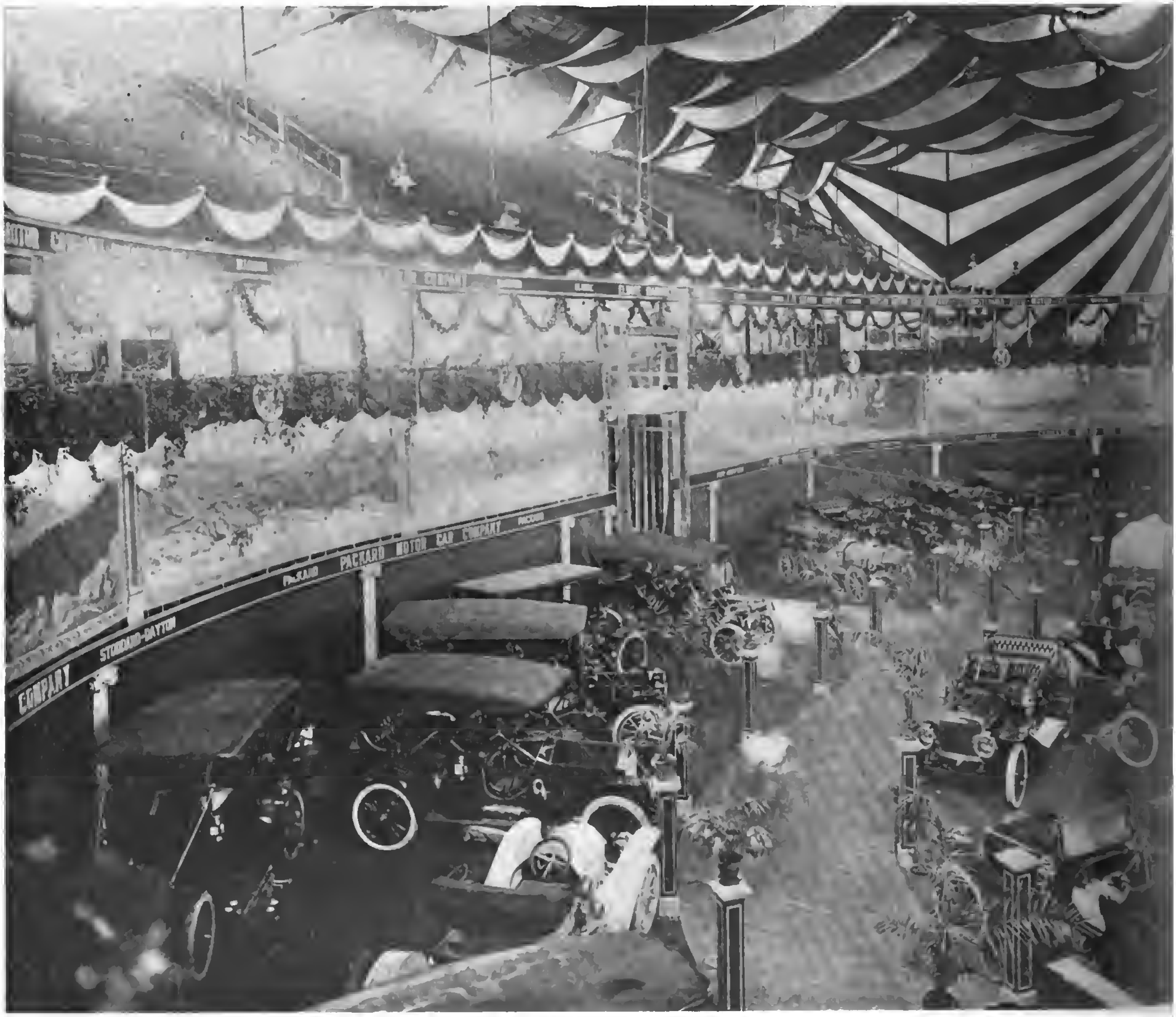
When the new Auditorium-Armory opened its doors on Saturday afternoon last and invited the public to have its first look at the segregation of 1910 models, the persistent efforts of Managers Miles and Reeves had netted the installing of all exhibits but three, with decorations complete and artistic. The prevailing colors are red and white, and a plenteous use of American flags, the effect being pleasing and enlivening, and further embellished in the main hall with paintings depicting the automobile in varied settings.

Of course, all could not have spaces in the heart of the building, and considerable ingenuity had to be employed to take full advantage of all the opportunities scattered about the structure, which, however, is being explored to its most inaccessible parts by seekers for automobile information and instruction, for please keep it in mind that this is the first National Show ever held in the South, and the aforesaid South is filling Atlanta's hotels and rooming houses to full capacity.

Down here, coincident with the resultful cry for good roads, is the buying of autos to travel over the highways before they are built. Again, while it is true that the cotton crop is only a two-thirds one, the Georgia yield is in excess and the deficiency is in Texas, and with the price hovering around 15 cents there is going to be some sixty million dollars ahead of previous years. The deduction is that there will be some dollars with which to buy autos; and the large attendance is an indication that the prophesy stands an excellent chance of fulfillment. Before the show was a day old there came the usual reports of sales, and, discounting the zeal of the salesmen, there remains enough fact to prove the wisdom of those who argued in favor of a Southern display of up-to-date models.

In the opening of the show on Saturday afternoon there were some introductory festivities such as are dear to the heart of the Southron, which means that speeches figured therein with musical accompaniment. Mayor Maddox contributed the words of welcome in language befitting the occasion, followed by Asa G. Candler, president of the Chamber of Commerce, who was flanked by prominent members of that body. These included a notable contingent of the leading business men of the city, prominent among them being Clark Howell, editor of the Atlanta *Constitution*, and one whose efforts did much toward bringing a National Show to Atlanta.

Asa Candler is an Atlantian who has hewed his way to success and fortune, and now he is ever ready to do big things for his home city, though the story of his life tells of Georgia "Cracker" antecedents. But now he is rated by many as Atlanta's best asset from a business standpoint, and his belief in the place is indicated by his enormous real estate holdings. In the course of his speech opening the show Mr. Candler said:



In the Vast Amphitheatre of the Atlanta Auditorium-Armory, Where This Week Is

"Atlanta's automobile exposition marks an era in the development of the wealth and in the quickening of the progress of the Southeastern States. When the matter was proposed we undertook to make it an exposition such as no city of equal size in the world has ever had. We are here assembled to formally open this exposition in the fulfillment of that purpose. This exposition is setting forth in motion forces which will do more for the construction of good roads than has hitherto been accomplished. To increase interest in the exposition two great newspapers undertook to locate a great national highway, over which a successful contest tour has taken place from New York City to Atlanta. Another great paper of this city has aroused marked enthusiasm in roads building by inaugurating a series of tours from every part of the State to the capital. In furtherance of the same great end, and moved by an impulse characteristic of Atlanta's great public-spirited citizens, a company has constructed a speedway unsurpassed, if indeed we may not say unequalled, by any similar track in the world.

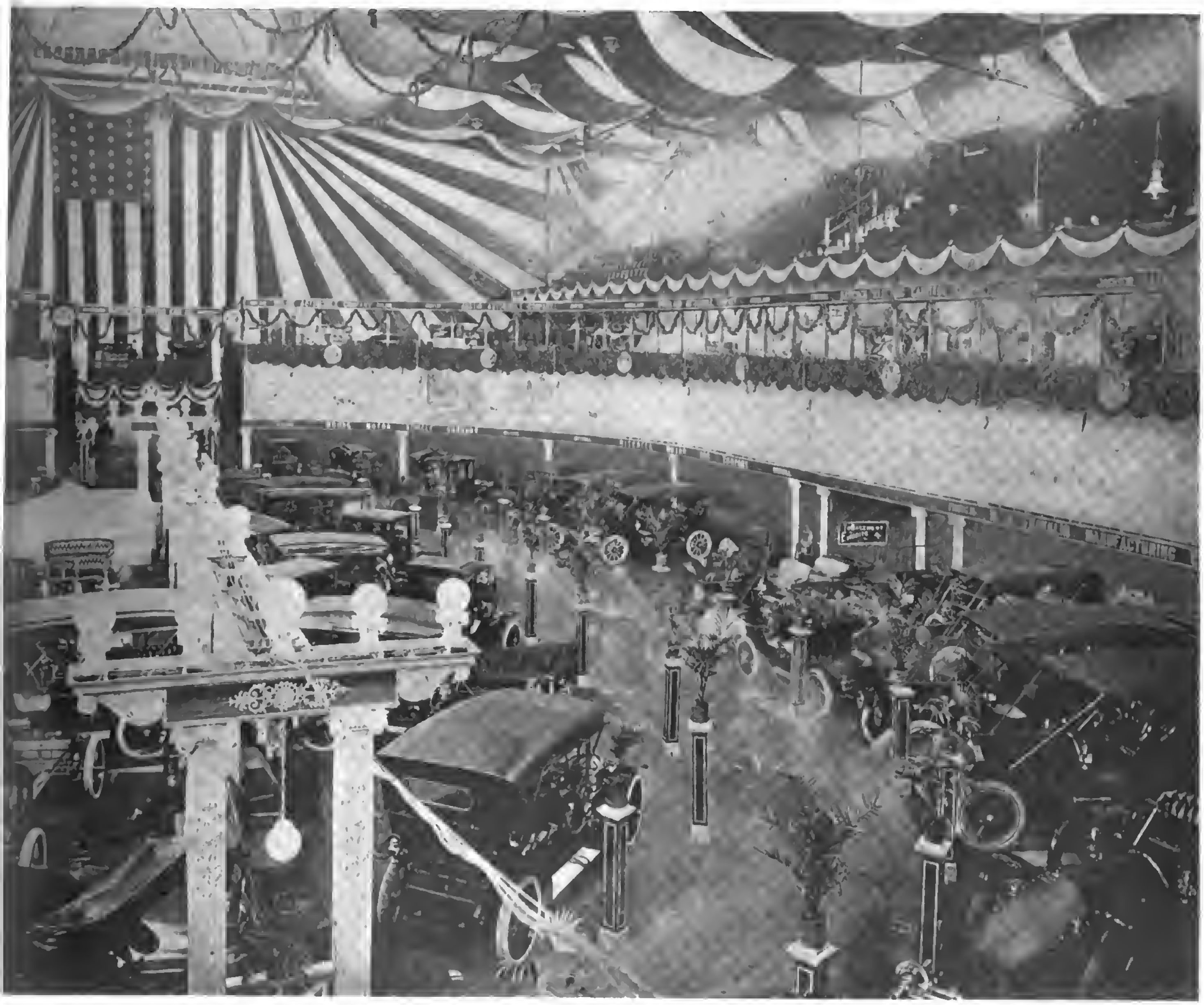
"If time permitted it would not be difficult to show that influences flowing from this exposition will promote more general and intimate association and a better understanding among the people. Distance divides, and that which sets distance aside begets acquaintance, which in the end ripens into friendship. Antipathy between town and country is removed when a method is found, and has come into common use, which brings the people from the country to the town quickly and safely, and sends the townsmen into the country with equal speed and facility. It was but yesterday when it was scarcely safe to operate an automobile in some parts of the country, so great was the prejudice against the horseless carriage. This prejudice is rapidly passing; in fact, is about gone. The people are coming to see that the automobile is an admirable and efficient instrument for promoting both the happiness and usefulness of their families. Besides the contribution which the automobile may thus make to the improvement of family and social life, it will do more to increase the wealth of the country. Man can never be in two places at the same time, nor command the sun to stand still; but by this invention he can cover more ground between suns and thereby bring more things to pass before dark."

Following the speechmaking the Fifth Regiment band played in succession "America," the "Star-Spangled Banner" and "Dixie," the latter selection, of course, evoking the real thing in the way of the old Rebel yell. Then the show was in full swing.

All this happened in the afternoon with a full house, which was renewed in the evening with an even larger attendance, though in connection therewith it was to be noted that the Atlantians are early seekers of their beds, for by shortly after 10 o'clock the crowd had thinned out most perceptibly.

In the main hall the luckiest drawers of spaces were Peerless, Oldsmobile, Ford, Premier, Pierce and Winton, which makes occupy the center. Around the outer circle are Cadillac, Pope-Hartford, Packard, Stoddard-Dayton, Maxwell, Stevens-Duryea, Franklin, Mitchell and Woods, while under the tiers of seats are Ohio, Studebaker, Selden, McIntyre, Standard, Columbus, Cartercar, Moon, Metz, Rauch & Lang, Renault, Hupmobile and Speedwell. In Taft hall there is a comfortable arrangement of Glide, Rambler, Reo, White, Locomobile and Mora.

Attracting immediate attention as one enters the building in the main lobby are Marion, Knox and Lambert. Down in the basement are the ones who rate themselves unfortunate, but there is light and room. This contingent includes Petrel, Wav-



yed the Choicest Products of America and Europe's Leading Automobile Manufacturers

Looking Down the Aisle in One Section of the Mezzanine Floor Where Many Prominent Exhibitors Had Space

erly, Streator, Sultan, F-A-L car, Cole, Inter-State, Great Western, Randolph, Autocar, Black and Rapid.

The mezzanine floor occupants in the main hall are happy in looking down upon the others, and to their elevation it is an easy climb. These include Matheson, Brush, Pennsylvania, Hudson, Stearns, Elmore, Marmon, Chalmers-Detroit, Pullman, Apperson, National, Baker, Jackson, Babcock, Overland, Austin and Moline. The entire list makes clear that the show is a representative one of the industry, and the South is not having a look at a skimpy lot of cars, for scarcely a name of note is among the missing.

In the accessory division it was not to be expected that the list would be complete, though leaders in each line are to be seen. But the patrons of the show are to be observed spending a goodly amount of time at the accessory booths which are scattered here and there to fill in any advantageous opening left over after the car allotments had been attended to.

Commenting upon the show now in progress, Manager S. A. Miles had this to say:

"The manufacturers are looking forward to a satisfactory business during this first National show in Atlanta, and it is fair to assume that if the event is as successful as they anticipate, the industry will be called upon to support three instead of two annual National events—New York for the East, Atlanta for the South, and Chicago for the West."

Telling of the preparations for the show here, Alfred Reeves, who has shared the management jointly with Mr. Miles, gives facts and figures that compare with the other National exhibitions. "Handling an automobile show simply adds to the old story of perfect organization, made a bit more difficult by the fact that plans for these affairs are somewhat of a temporary sort, hastily devised and carried out by men trained quickly for their work, somewhat as artists are trained for a big stage production put on after a short rehearsal. Since the adoption of uniform decorations the work of preparation has been greatly reduced, and the beauty of the exhibition as a whole has been increased most perceptibly. This show is effectively neat and artistic."

HOW ATLANTA ENTERTAINS HER AUTOMOBILE GUESTS

ABILITY to meet unusual conditions has always distinguished Atlanta and her people, but no better instance of their readiness can be recalled than the preparations that have been made for the guests of automobile week. The Chamber of Commerce was the rallying center, but President Asa G. Candler called a meeting of business men irrespective of membership. Committees were appointed on information and public comfort, public safety, and entertainment, and liberal appropriations were made for their use.

The committee on information assumed the duty of finding lodgings for the visitors. Local newspapers contributed space for announcements urging those willing to take boarders to send in their names. These notices, however, brought replies offering accommodations for but one thousand people. Then canvassers were sent out. They visited every reputable residence portion of the city within two blocks of a car line. Each canvasser was armed with blanks, which he filled out at the dictation of the householder. The particulars recorded were the family name, street number, nearest car line and cross street at which the visitor should alight, whether or not meals would be furnished, and the price of lodging or the price of meals and lodging. Those who could offer storage for one or more automobiles were also listed.

The canvassers visited about 3,500 homes, and with rare exceptions met with interested listeners. The result of their efforts is that more than 2,800 homes, besides regular boarding houses, were opened to visitors, and quarters for more than 10,000 people have been provided outside of the hotels. The information was tabulated in such a way that it was but the work of a few seconds to refer an applicant to half a dozen names in any desired neighborhood and at any price. In the hands of Chairman S. C. Dobbs and Secretary G. M. Chapin this information bureau has given invaluable service.

The public safety committee has had in charge the protection both of the citizens and of their guests from the professional pickpockets and criminals who are always attracted to such gatherings. Naturally, the work of this committee cannot be made public, but its efficiency has already been made plain. This committee consists of John E. Murphy, chairman; Carlos Mason, J. L. Barnes and John J. Woodside.

SOME RANDOM OBSERVATIONS OF ATLANTA'S SHOW

NOT AS RADICAL as many of the more conservative expected is the 1910 crop of new models. Of the cars on exhibition in the Auditorium there is not one case of a maker who exhibited a year ago having made such startling alterations that one cannot recognize his product at a glance. In some cases a new type of motor has been fitted, with the transmission system left unaltered; in others the motor has not been disturbed, but an improved axle has been added; and again, in not a few cases, the lubrication of the motor has been changed or a new carbureter added.

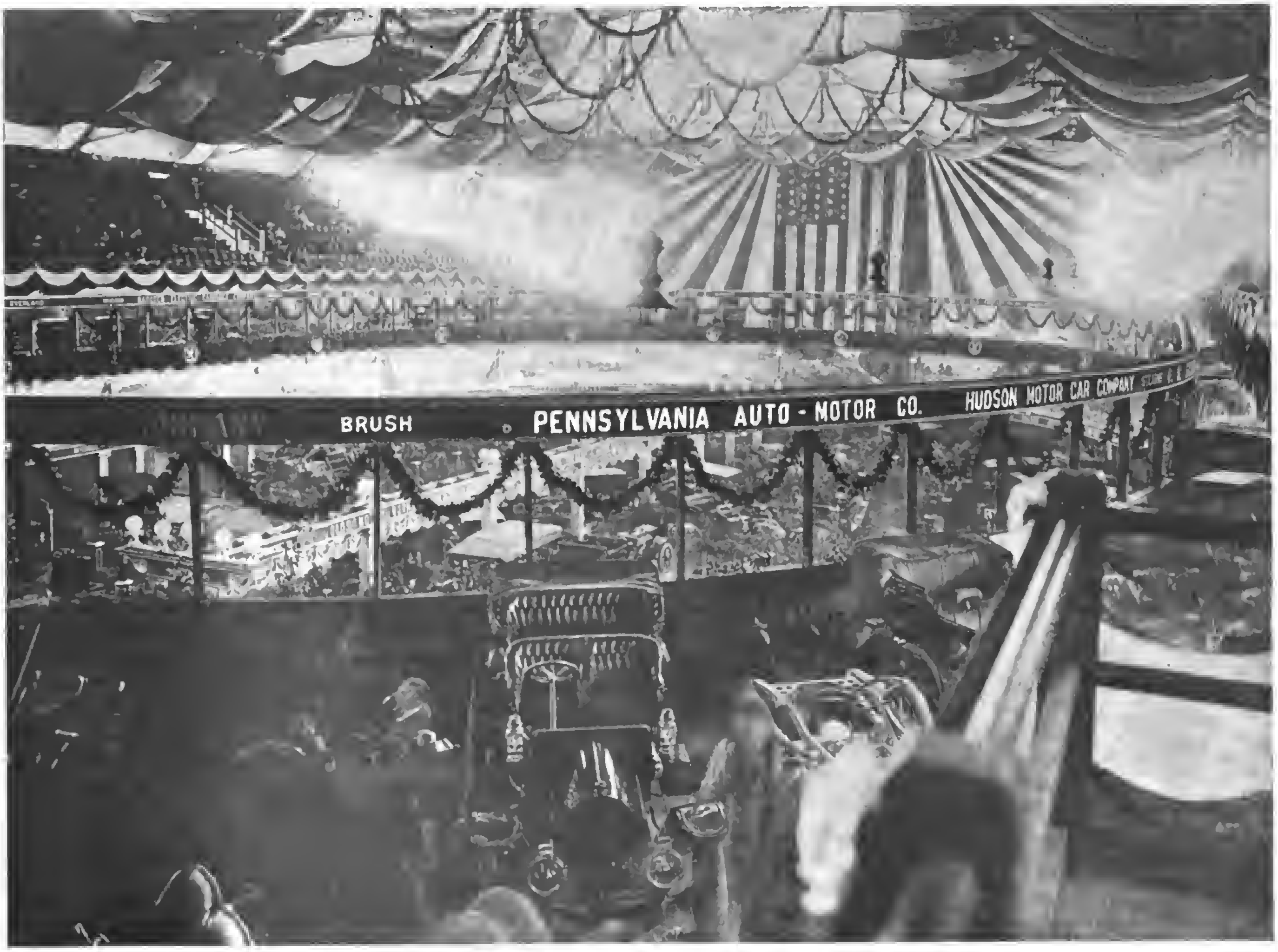
There is very little of the upsetting of old lines and the launching of new ones that was so common a few seasons ago. At that time it was imperative for many makers to turn completely about in order to remain on the market. The trouble with not a few of them was that previously their cars were the conceptions of one individual who refused to change until the salesmen began to resign in despair.

A maker two or three seasons ago deemed it necessary to have something different in order to sell; but to-day a designer or sales manager does not show even the semblance of a blush in acknowledging: "We have not tried to make anything freakish; we have aimed to take what other makers have proved reliable and better it in detail." This is a good indication, for it shows that the makers have confidence in one another, and are willing to admit that the other factory, too, can build cars.

Trustworthy Inferences Possible—In a general résumé of the tendencies as revealed in this show it is well to bear in mind that conclusions from them can be regarded as fairly correct, because nearly all of the old-time makers are on hand. There are 153 cars on exhibition, with three or four exhibits not yet installed. Besides this number of cars with varied types of bodies, two dozen polished chassis are in place. Not so many chassis are shown as will be on hand at Chicago and New York, as such firms as Packard, Pierce, Peerless, Stevens-Duryea and Mitchell are not exhibiting them here, although they have conscientiously displayed them at other national shows. On the other hand, Locomobile shows a highly finished chassis of the shaft-driven model, obtaining a beautiful effect through the combination of polished, painted and brass-finished surfaces. Other spaces showing chassis are those of Stearns, Chalmers-Detroit, Marmon, Winton, Elmore, White, Rambler, Mora, Premier, Oldsmobile, Inter-State, Lambert, Reo, Speedwell, Selden, Standard, Studebaker, Pennsylvania, Hudson, Cole, Carter, Hupmobile and Rapid trucks.

Toy Tonneaus Find Favor—The percentages of bodies favor the present type of five-passenger touring car, but the miniature or toy tonneaus are as prominent now as the roadster types were two years ago. The three-passenger roadster or speed car is not much in evidence, not a dozen of them being shown. This would indicate that the uncomfortable rumble seat has at last fallen from favor. On the other hand, the toy tonneau has progressed and the close-coupled body is growing stronger.

In visiting the many booths it is difficult to name the different types of bodies to suit the several salesmen. In some cases a certain design is designated a close-coupled in one stand and a



From the Mezzanine Floor the View Was Inspiring, a Grand Circle of Signs Encompassing the Whole Auditorium toy tonneau in the next; whereas, a glance shows the tonneau accommodation in each to be two and the rear seat's relation to the rear axle is identical in each. A type of body that is gaining in favor is the four-passenger surrey, this being but a tonneau without doors and with a lower back and sides.

This makes a light type of car, with good seating space.

Tops are generally shown, more than heretofore, and windshields are being made a standard part of the equipment more than heretofore. Not a few makers are adding their own type of windshield, and others have arranged with a windshield maker to build a special type for them best suited to the car's design.

The equipment story might be carried to the lamp, horn, and gas tank realm, all of which are now stock on many cars which heretofore charged extra for them. The double gas headlights are being added in many cases. Stearns is attracting attention because it fits as stock Continental demountable rims. This marks a new epoch in equipment, although some cars, notably the Knox, have been equipping Fisk demountables this year as

"Atlanta at the Wheel This Week!"
—From the "Atlanta Constitution."

stock. Shock absorbers are being furnished on many of the highest prices machines, and one maker, Winton, has added an absorber of home design and make. This action suggests a new angle in the line of equipment.

Improvements in Running Gears—In analyzing the chassis, the running gears naturally present themselves first. For next year frames are invariably heavier; by this is meant that the channel steel side members are made with a greater vertical depth, the channel lips are wider, and not infrequently the stock is 1-32 heavier. A commendable change is the increase in the size of gusset plates at the angle where cross pieces unite with the side members of the frame. These gusset braces are generally stamped integrally with the cross piece and are large, offering real strength.

The dropped frame is now general. Three years ago when Peerless showed this type of frame little imitation was indulged in, but last year it got good assistance and this year has witnessed a veritable landslide to it; so great in fact, that now the cheapest price model has it, and any new car must perforce adopt it. The drop is invariably in advance of the rear axle and varies from two to three inches. Chalmers and the Stearns 15-30 have adopted the double drop, the Stearns having brought out this with the advent of the small car a year ago.

Hand in hand with the drop frame is the three-quarter elliptic rear spring. This type is taking the place of the semi-elliptic type in rear, but it is very noticeable that those makers who have used the platform type for several years are slow in changing, so that the prestige of the platform is equally as strong as it was a year ago. Peerless, Stevens-Duryea on its six-cylinder model, Mitchel also on its six, Mora, Ohio, Standard, Studebaker-Garford, and the National six are a few examples of the use of the platform spring.

Compared with these, however, is a long line of three-quarter devotees, including Pierce, Stoddard, Oldsmobile, Premier, Reo, Inter-State, Pennsylvania, Hudson, Stearns, Elmore, Chalmers, National four, Matheson, Overland, -F-A-L- Car, Mitchel fours, Maxwell model E, and Stevens-Duryea XX. The Oldsmobile has changed from full elliptic to the three-quarters; Stoddard has changed from the semi-elliptic, and, in fact, the majority of the three-quarter converts move from the semi-elliptic class. Jackson continues to use full elliptics in front and rear, as does the Franklin and Maxwell, Cole, Lambert, Black-Crew, Marion, Reo two-cylinder types, Marmon, Overland, and E.M.F. are examples of the full elliptic type. On the Ford the tranverse spring in front and rear is continued. The Ramblers are fitted with triple action springs in the rear, and the Brush runabout uses the four vertical coal springs, one at each corner, acting as they do in conjunction with shock absorbers.

An Era of Big Wheels—The Oldsmobile "Limited" sets the pace for big wheels, this six-cylinder car carrying 42 by 4½-inch tires in front and rear. Next comes the Pierce 6-66 with 37 by 5-inch tires in front and 38 by 5½-inch in rear. On the 6-48 Pierce 37 by 5-inch sizes are used in rear with the standard 36-inch in front. These constitute the only examples of big tires, but there are scores of examples of other machines that have promoted themselves from the 32 to the 34-inch class; and others advancing from the 34-inch ranks to the 36. This has been a year of large tires, and next year gives promise of eclipsing it.

The motor situation is changing very slowly. In the $2,000 to $3,000 class there has been not a little increasing of the bore and lengthening of the stroke. It is questionable what has prompted this, and it may be that the present classifications of cars for contests by cylinder volume, as decided upon by the Manufacturers' Contest Association, has had not a little to do with this. At least it may be designated a coincidence that so many of the new sizes come closer to this classification limit, but few if any cases are on record where the increase of motor size has promoted the car into a higher class.

Prominence of the Long Stroke—The long stroke is gaining in favor. The new White gasoline car has set the pace in this respect, with its bore of 3 3-4 inches and a 5 1-8-inch stroke. This is in direct accord with European dictates at the present time. Not a few other makers have altered their motors to bring them into the long-stroke category. One example is the Premier, in which the stroke has jumped from 4 1-2 to 5 1-4 inches, with the bore remaining at 4 1-2 inches. In a rather graphic way this has resulted in giving a car which with the longer stroke gives as good service on a 3 1-2 to 1 gear ratio as it used to give on a 4 to 1.

One of the most pronounced motor trends is that toward forming four cylinders in one casting, *en bloc* as the Frenchman calls it. Ford led off with this construction, but now there are seven makers showing it, with a total of 22 cars on exhibition. These include, in addition to the Ford, such names as Chalmers 30, Stearns 15-30, White, Hudson, Lambert, and Black-Crow. All motors of this design bear a striking similarity to one another, because of the lack of intake, exhaust, and water piping. All of them are of the L-type, having both sets of valves on one side, excepting the Chalmers, which has the intakes located in the cylinder heads and opened by a rocker-arm action. The new White encloses both the intake and exhaust manifolds, so that only a single pipe connects from the muffler to the cylinders and but one inlet pipe is seen. Nearly all of these motors use forced water circulation.

Next to the *en bloc* comes the six-cylinder type. It cannot


BAKER MOTOR VEHICLE CO.
MAXWELL-BRISCOE
NORA MOTOR COMPANY
OLDSMOBILE
OLDS MOTOR WORKS
WHITE
WHITE COMPANY
LOCOMOBILE
LOCOMOBILE COMPANY OF AMERICA

be argued that the six is losing ground, although its progress is very slow. It has some new supporters this year, although a few of its old-time exponents are not exhibiting their sixes. The Mitchell is a new one, so is the Knox, and to these can be added the Standard. Pierce remains in the six-cylinder field only, building nothing else; Winton is in the same boat with two six types; Stevens-Duryea, one of the "six" pioneers, shows two sixes, one being model AA with 4 1-4 by 4 3-4-inch cylinders. Franklin continues its six-cylinder model, as does Oldsmobile, Premier, Matheson, National, and Pennsylvania. All told, there are 24 six-cylinder models on exhibition, representing 13 different factories.

There have been very few additions to the valve-in-the-head army of builders during the past year. The new Standard six is one example, however, and to this might be added the Mora 20. The new four-cylinder Reo with intake valves in the head and exhaust valves in offset ports must not be overlooked. The valve-in-the-head ranks now include such names as Pope-Hartford, Stoddard-Dayton, Franklin, Chalmers 30, Mitchell, Pennsylvania, Matheson, Great Western, Moon, Jackson and Knox. Of this number but one, the Moon, uses the one rocker arm for the intake and exhaust valve of each cylinder. The Stoddard used to do this, but now has a rocker arm for each intake and also for each exhaust. The Moon and Jackson are examples of carrying the camshaft over the cylinder heads, all of the others locating this shaft within the crankcase.

Unit Construction Now a Question—Closely associated with motor design comes the problem of unit construction, by this being meant either locating the motor and gear box together as one, or a similar arrangement of the gearbox and rear axle. Many builders have concluded that it is best to have but two units in the power and transmission systems. The Stevens-Duryea and Maxwell have been originators in this construction, as well as in three-point support. A count shows that there are 58 cars on the stand employing unit construction of either of these types.

Thermo-syphon cooling of the motors has not progressed as many enthusiasts had reason to expect that it would. It is appropriate that at the first National show in the South the father of thermo-syphon cooling should be on hand, namely, Renault. It is also interesting to see shown for practically the first time the Mora 20, which is a low-priced runabout carrying the same general lines as the Renault and using thermo-syphon water circulation. This new star in the motoring firmament uses a Renault type of hood, and has the radiator located where the dash ordinarily is placed. The two and four-cylinder Maxwell cars all remain firm with thermo-syphoning cooling, as do the Overland, the Jackson and Moline, and one model of Cartercar.

In the field of positive circulation by either a gear or centrifugal pump the latter is claiming more and more attention at the hands of the makers. In some cases this is due to the fact that it is quieter, and in others owing to the lack of gears and the consequent avoiding of gear stripping.

Magnetos Are Universal—The magneto equipment may now be considered practically general, even the $800 car not being complete without it. The dual ignition system is gaining rapidly in popularity, by dual being meant that system with one set of plugs and two current sources, a magneto for general use and a dry or storage battery for starting and emergency purposes. This system is simpler than the complete double outfits.

The ranks of make-and-break ignition have not suffered a change for the better or worse during the year. Locomobile and Premier are the two exponents of this class, although in the Studebaker-Garford the make-and-break spark is created in the magnetic spark plug. This will be the second season for this plug on the Studebaker-Garford.

The Franklin is one example of the single ignition system, these motors having the magneto only, and no storage or dry cells for starting purposes. The Ford flywheel magneto is still in use. A few examples of special systems are the Atwater-Kent, fitted on the Elmore and other cars, and the Delco system shown on the Stoddard and Cadillac. The Delco, generally speaking, resembles the master vibrator system in that for a four-cylinder motor there are four non-vibrating coils with a master vibrator electromagnetically operated. On both the Stoddard and Cadillac the coils with vibrator parts are carried on one of the cylinder castings.

Carburetion for next year is much where it was this year. The automatic carbureter is very general. In the Schebler and Stromberg spring-controlled auxiliary air valves perform this function; in the Kingston, Planhard and others, bell valves are used. The water-jacketing of the mixing chamber has come in for general adoption. Many of the cars fix their own makes of carbureters, notable in this class being Pierce, Peerless, Packard, Pope-Hartford, Locomobile, Studebaker-Garford,

One of the Finely Lighted Galleries Where the Parts and Supply Makers Displayed Their Various Products

Franklin, Stearns, Reo, and others. Pressure feed of gasoline to the carbureter has gained, in a few instances, all of the Stoddard models now carrying the gasoline tank under the rear of the chassis. Nearly all high-priced cars, and many of the cheaper models, have fuel tanks designed to contain a reserve supply of three or five gallons, which can only be drawn upon by turning a special valve.

Circulating Lubrication is Prominent—A review of the new motors would be incomplete without at least passing mention of the lubrication systems. In a word, it is the crankcase contained circulation system which is forging to the front, and now the mechanical oiler mounted on a leg of the crankcase is comparatively rare. The big Stearns has come into line with the circulating system; the Pope-Hartford has installed a combination of this and mechanical system, and so have some others. The oiler on the dash, where it overflowed to the floor boards, is now obsolete. For next year the only indication on the dash of a lubrication system is a bank of two or three sight feeds, and in not a few cases only one. The custom of carrying reserve oil tanks on the chassis is growing. A pump to inject it into the crankcase is used.

Considerable activity has been displayed in the matter of clutches for next season. A notable departure in this line is the introduction of dry disk clutches by the Packard and Stearns companies, the later only in its 30-60 cars. The Stevens-Duryea was the pioneer in the dry disk clutch field, bringing out the multiple disk clutch with leather facing five years ago. The Stevens has continued to use the dry clutch ever since, although the leather has been replaced by thermoid, raybestos, and other wire-asbestos combinations. In the new Packard a comparatively small number of disks is used, and these are faced with wire-asbestos. On the Stearns one set is faced on each side with this material.

The selective gearset has increased in favor during the year. As yet the three-speed set is in the majority, but there is a big array of sets giving four forward variations. In this category are noted Pierce, Peerless, Winton, Locomobile, and some Apperson models. The Maxwell model Q and Hudson are examples of the three-speed selective set entering into the make-up of cars selling at below the $1,000 mark. The planetary is still used on the one and two-cylinder Reos, Ford, Brush, Buick 10's, etc.

There are four or five examples of friction transmission, these including the Lambert, Cartercar, Petrel, Metz, and a part chassis shown by the Acorn Motor Works. The aluminum disk on a continuation of the crankshaft and the fiber-faced wheel on the crosshaft continue to be the conventional friction system.

In final transmission of power to the rear axle the shaft is in the supremacy, There are a few examples of chain, these being the Locomobile 40, some of the Apperson models, Brush runabout, Cartercar, Lambert, Petrel, Metz, and one and two-cylinder Reos. The floating rear axle is also firmly established.

FRENCH CONSTRUCTORS SEE MONEY IN THE AIR

PARIS, Nov. 2—The fact is indisputable that the manufacture of aeroplanes has now become a real industry. Six firms are actively engaged, each one turning out flying machines in regular series. Since he made his flight across the English Channel, Louis Blériot has booked orders for 150 small, one-man aeroplanes and for 12 passenger-carrying machines. By the end of the year he will have sold 200 aeroplanes. At the present moment six completed machines are being turned out per week, and contracts have been booked or are about to be booked which will absorb the output for several months ahead.

Voisin, who has been in the business longer than anybody else, has sold 40 machines during the past year, his total production being about sixty. Henry Farman has sold, or has orders in hand for 40 machines, and Antoinette declares that it has produced or has under construction 60 monoplanes. Bayard-Clément, the well-known automobile constructor, has made arrangements for producing one thousand aeroplanes similar to the one with which Santos-Dumont made his cross-country flights, but equipped with Clément engines. Santos-Dumont will personally supervise the construction. It is not known how many of these machines have been secured by private users and agents, but two hundred will probably be a safe estimate.

The Wright Brothers, who are represented in France by the Société Générale de Navigation Aerienne, do not figure largely on the sales list. As the aeroplane with which Comte de Lambert made his cross-Paris flight is the twelfth of the regular series, the total number given to customers cannot exceed a score. The smallness of the number is not occasioned by lack of orders, but by the initial difficulty in obtaining just the right quality of raw material from America. As this difficulty has now been overcome, construction in large series will commence at once. In view of the flight recently made by Comte de Lambert, it would not be surprising if an important announcement were made shortly regarding the use of Wright machines for military purposes.

French aeroplane builders, like the early automobile manufacturers, have had to make arrangements for training their pupils. Blériot has secured a large stretch of open moorland within three miles of Bordeaux, on which he will establish an aeroplane school before the end of the year. Purchasers of the large machine, selling at $5,200, will be trained free; those securing the small machine at $2,200 can be taught to fly, without being made to pay for smashes, at an inclusive fee of $200.

Antoinette, Farman and Voisin have each established aeronautical schools at Mourmelon, near Rheims, the ground being a magnificent plain, with a surface like an English lawn, loaned to them by the army authorities. Sheds have been erected along the edge of the ground, each one being very completely fitted with power-driven tools, comprising everything necessary for repairing the most serious smash. Henry Farman, unlike the others, has erected his main works on the edge of the aerodrome.

The Société Générale at present trains Wright pupils at Port Aviation, the Juvisy aerodrome to the south of Paris. A larger and more suitable ground exists, however, at Pau, and will be used by Comte de Lambert and Paul Tissandier next year. Bayard-Clément appears to have made no arrangements yet for training clients, but as the first series will not be ready until March there is really no hurry.

In addition to aeroplanes, French constructors are convinced that there is money to be made in aeronautical engines. Thus, with very few exceptions, the automobile firms have devoted themselves to the construction of special light-weight engines. It would be much easier to give the names of those that have not produced an aeronautical engine than to state those that have. The list is sufficient to prove that French constructors are convinced that there is money to be made in the air at no very distant date.

Santos-Dumont's Demoiselle—The October 30 issue of *Omnia* contains detailed drawings of Santos-Dumont's small aeroplane, from which the following figures are taken: width, 18 feet 3-4 inch; length, 20 feet; depth of wings, 6 feet 6 3-4 inches; wings cut out in front 7 feet 4 inches across and 11 3-4 inches deep to give room for propeller; wing tips are 4 feet 6 3-8 inches above ground; wings in middle are 3 feet 11 5-8 inches above ground; supporting surface 108 square feet; motor has two cylinders, horizontal opposed, 5 1-2 inch bore by 4.73 inch stroke, weighing 114.4 pounds complete.

Atlanta's New Track Auspiciously Opened

Grand Stand and Homestretch of the Famous Motordrome Which Was Opened Tuesday With 20,000 People in Attendance

ATLANTA, GA., Nov. 9—Speed in abundance, no serious accidents, and an attendance conservatively estimated at 20,000 made the opening meet of the great two-mile speedway at Hapeville an immense success. Although the 200-mile race was the real event of the day, the spectators took the keenest interest in the mile trials and the two-mile open, in which Strang and his recently imported racing Fiat twice outran Oldfield and the Benz once handled by Hémery. Strang drove his 175-horsepower car around the track at a rate that exceeded 95 miles an hour, and he could not conceal his elation at romping away from the older campaigner.

Christie had some of his usual hard luck. Robertson, who was to have appeared in two events with his 60-horsepower Fiat, broke an oil pipe coming to the start, and was out for the day.

It looked like a runaway for Chevrolet in the 200-mile race; after he once took the lead he held it to the finish. Once Dingley's Chalmers-Detroit did the best pursuing, and then Stillman's Marmon moved up. Unfortunately a dip in the track caused the latter to throw a rim and tire on the 166th mile. His car went into the ditch on the backstretch and turned turtle, but neither he nor his mechanic was hurt. Chevrolet completed the double century in 2:46:48, which is a new record for the distance in competition.

Great interest centered in the mile trials which opened the speedfest. Here the honors went to Strang, driving the Fiat which on Brooklands, with Nazzaro at its wheel, unofficially covered a 2 1-2-mile lap at better than 121 miles an hour. Strang made the mile in 37.71, according to the timing machine, which now works out hundredths of a second. This displaces Oldfield's record on the Indianapolis track of 43.6. Strang's speed in miles per hour figures out at 95.5. Next best was the Benz of Oldfield, covering the distance in 40.13, with a skate to the top of the upper turn banking that made the spectators start apprehensively.

Christie's front-drive monster may have been the fastest craft engaged, but it made a slow performance of only 48.82. Its builder and driver, who had been working on it most of the night, said that a pinion gave way. John Rutherford's 30-60 Stearns was the only stock contender, and its mile in 50.85 was good traveling.

Again in the two-mile free-for-all Strang triumphed, his trip being accomplished in 1:31:63, with Oldfield six seconds in the rear. Aitken with a National six outstripped Christie, who had had trouble in getting away, and his team-mate, Kincaid.

In the stock chassis event of the largest class, two Nationals, in charge of Aitken and Kincaid, ran one-two, with an Apperson in the third place. In the smaller stock class Joe Matson appropriated the honors with a Chalmers-Detroit, with another Chalmers the closest kind of a runner-up and Joe Nelson's Buick a near third. The proverbial blanket could almost have been thrown over the three cars at the finish.

The handicappers were too liberal with the two Marmons in the ten-mile handicap. They made a runaway of the first two places, with Aitken's National third, coming from scratch with an actual time of 9:12:41, a new competition record.

The most spectacular event of the day occurred in the 200-mile, when Chevrolet's Buick caught fire on its eighteenth lap. Harding, the Apperson driver, who was in the press stand, was the first to detect the flames, and shouted a warning. Chevrolet did not hear, and completed another mile before the smoke blew into his face. In the brief stop while extinguishing the blaze Dingley regained the lap which he had lost and took the lead. His triumph was short-lived, however, for Chevrolet started again with more speed than ever, and after passing the Chalmers driver was never headed.

The track, as may be judged by the times made, was in good condition, and showed no sign of the haste with which it has been rushed to completion in the last few months.

ONE-MILE TIME TRIALS—FREE-FOR-ALL

Pos.	Car	H.P.	Driver	Time
1	Fiat	120	Louis Strang	37.71
2	Benz	120	Barney Oldfield	40.13
3	Christie	130	Walter Christie	48.82
4	Stearns	30-60	J. M. Rutherford	50.85

TEN-MILE STOCK CHASSIS (451 to 600 Cubic Inches)

1	National	40	John Aitken	8:27.22
2	National	40	Tom Kincaid	8:27.71
3	Apperson	50	Hugh Harding	8:50.65
4	Renault	45	Charles Basle	Did not
5	Stearns	30-60	John Rutherford	finish
6	Fiat	60	Louis Strang	Dropped out

TEN-MILE STOCK CHASSIS (161 to 230 Cubic Inches)

1	Chalmers-Detroit	30	Joe Matson	9:49.46
2	Chalmers-Detroit	30	William Knipper	9:49.84
3	Buick	18	Joe Nelson	9:50.18
4	White	20	James Rodger	Did not
5	Fuller	22	Louis Schroltzer	finish

TEN-MILE FREE-FOR-ALL—HANDICAP

1	Marmon	35	Harry Stillman..(60 Sec.)	8:54.96
2	Marmon	32	Ray Harroun ...(70 Sec.)	9:05.67
3	National	60	John Aitken....(scratch)	9:12.41
4	National	40	Tom Kincaid ...(25 Sec.)	9:18.25

TWO-MILE FREE-FOR-ALL

1	Fiat	120	Louis Strang	1:31.63
2	Benz	120	Barney Oldfield	1:37.18
3	National	60	John Aitken	1:43.72
4	Christie	130	Walter Christie	1:51.40

TWO-HUNDRED-MILE STOCK CHASSIS (301 to 450 Cubic Inches)

For Coca-Cola Trophy and $600 to Winner; $300 to Second; $150 to Third

1	Buick	30	Louis Chevrolet	2:46:48.47
2	Chalmers-Detroit	30	Bert Dingley	2:53:33.92
3	Chalmers-Detroit	30	L. B. Lorimer	2:55:15.62
4	Renault	45	Charles Basle	3:05:10.31

Note:—Timing of seconds involves hundredths.

Strang the Star on the Second Day

Atlanta, Ga., Nov. 10—Interest to-day centered in the special match race involving Strang, Oldfield and Christie. The big Fiat again defeated the Benz. Strang covered the 10 miles in 7:21.94, which is another competition record, displacing Oldfield's figures of yesterday. Oldfield gradually fell behind as the laps were reeled off, his time being 7:27.71. Even this, however, was better than his record of the day before.

The 10-mile stock chassis brought out George Robertson for the first time during the meet, with his 60-horsepower Fiat, and Strang apeared with its twin brother. Marquis was at the wheel of a 30-60 Stearns and Harding drove an Apperson "Jack Rabbit." Strang led at first, but on the third lap his engine required attention. The other cars quickly passed him, Harding in the lead. Strang finally withdrew, followed by Robertson, and Harding won handily from Marquis by a full minute.

The closest finish of the day took place in the 10-mile amateur free-for-all. John M. Rutherford with a Stearns, William E. Oldknow with a Buick and Calvin Travis with a Chalmers-Detroit were the starters. Rutherford took the lead at the start, closely followed by Oldknow. They set a hot pace, and Travis was soon distanced. Then followed the prettiest race of the meet. Rutherford held the lead until the last lap. Coming down the home stretch Oldknow drew up even with him, and to the spectators it looked like a dead heat. The electrical timing instrument showed that Oldknow was 1-100 of a second, amounting to 17 inches, ahead. For the final event, the four-mile, Strang brought out his big Fiat and again trimmed Christie.

The 100-mile stock chassis race was the hottest kind of a fight between Knipper's Chalmers and Nelson's Buick, until the latter ran out of oil and had to slow down.

TEN-MILE SPECIAL

Pos.	Car	H.P.	Driver	Time
1	Fiat	120	Louis Strang	7:21.94
2	Benz	120	Barney Oldfield	7:27.71
3	Christie	130	Walter Christie	Dropped out

Note:—Strang's time is a new record; average speed per hour 81.46 miles.

TEN-MILE STOCK CHASSIS

1	Apperson	50	Hugh Harding	8:30.68
2	Stearns	60	Louis Marquis	9:30.67
3	Fiat	60	Louis Strang	Dropped out
4	Fiat	60	George Robertson	Dropped out

TEN-MILE FREE-FOR-ALL—AMATEURS

1	Buick	30	William E. Oldknow	8:52.56
2	Stearns	30	John Rutherford	8:52.57
3	Chalmers-Detroit	30	Calvin Travis	10:02.75

FOUR-MILE FREE-FOR-ALL

1	Fiat	120	Louis Strang	2:47.03
2	Christie	130	Walter Christie	3:10.41

100-MILE STOCK CHASSIS—161-230 IN.

1	Chalmers-Detroit	30	William Knipper	1:40:46.82
2	Chalmers-Detroit	30	Joseph Matson	1:41:52
3	Buick	18	Joe Nelson	1:43:10

SUCCESSFUL RADIAL TOURS TO ATLANTA

Atlanta, Ga., Nov. 9—One hundred and sixty-two cars took part in the five good roads tours which centered in Atlanta today. The starts of the tour were made from Albany, Fitzgerald, Dublin and Savannah on Monday, and from Augusta on Tuesday. The cars from the first-named three cities spent the night at Macon, and picking up additions to their number, pushed on to-day to their destination. The Savannah tourists made their night stop at Milledgeville, where they, too, gained new recruits.

There was much fast driving in the tour, and the highway was marked by disabled cars at more than one point. No serious accidents were reported, however. The survivors checked in at an early hour. In each run there are prizes to be awarded according to Glidden tour rules, and the technical committee still has much work to do before the winners are decided. The prizes total close to $5,000, so competition is keen.

THE AUTOMOBILE CALENDAR

AMERICAN

Shows, Meetings, Etc.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Jan. 17-22........Philadelphia, Second Regiment Armory, Automobile Show. J. H Beck, Secretary, 216 Odd Fellows Building.

Jan. 24-29........Detroit, Wayne Hotel Gardens, Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19........Buffalo, N. Y., Broadway Arsenal, Eighth Annual Autuomobile Show, Automobile Club of Buffalo. Dai H. Lewis, Manager, 760 Main Street.

Feb. 19-26........Newark, N. J., Essex Troop Armory, Automobile Show, New Jersey Exhibition Company.

Feb. 21-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 22-26........Kansas City, Mo., Convention Hall, Fourth Annual Automobile Show.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

March 19-26......Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show. D. H. Lewis, Manager.

FOREIGN

Nov. 12-20........London, Olympia, Eighth Annual International Automobile Show, Society of Motor Manufacturers and Traders.

AMERICAN

Races, Hill Climbs, Etc.

Nov. 14-17........San Antonio, Tex., Four-Day Track Meet, San Antonio Automobile Club.

Nov. 19-25........Redlands, Cal., Hill Climb, Mile High Hill Climb Association.

Nov. 20-21........New Orleans. Annual Fall Meet, New Orleans Automobile Club. Homer C. George, Secretary.

Nov. 22...........Denver, Col., Start of "Flag to Flag" Reliability Run. G. A. Wahlgreen, Manager.

Dec. 22-30........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

Feb. 4-6..........New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.

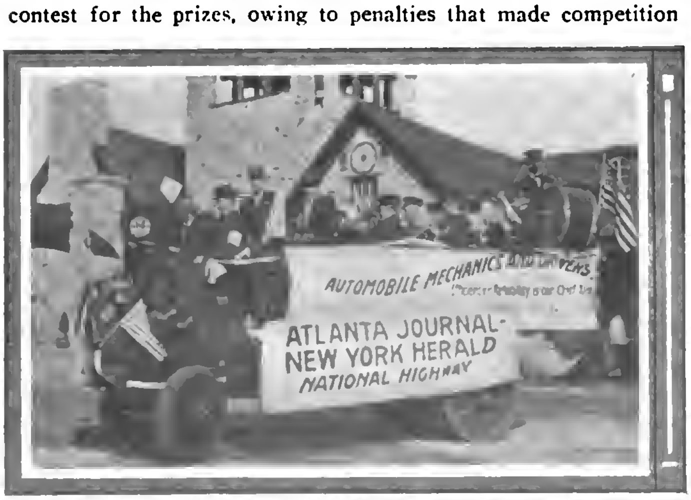
When the Tourists Reached Atlanta a Warm Southern Welcome Awaited Them On All Sides

NEW YORK-ATLANTA TOUR COMES TO TRIUMPHANT END

ATLANTA, GA., Nov. 4—After nine days' running the participants in the New York *Herald*-Atlanta *Journal* good roads tour reached the Gate City of the South, triumphantly ending the marking out of a new national highway. Their course has stretched through nine States, covering 1,063 miles, over roads of every degree, good, bad and indifferent.

The tourists in their progress have rubbed elbows with city and country folk alike, bearing to all their gospel of good roads. Through commercial and industrial centers, over mountain trails and across broad tobacco and cotton fields their way has been a demonstration as well of the necessity of highways as of their possibilities when completed.

Of the 28 clean-score contesting cars which left Commerce, Ga., yesterday morning, 26 finished with their records untouched; of the 38 which left Herald Square a week ago last Monday, 35 reached the final haven. Seven had formally withdrawn from the contest for the prizes, owing to penalties that made competition useless, but their continuance with the tour showed the stuff they were made of. Their passengers won the esteem of all fellow-tourists by their goodfellowship and sportsmanlike behavior in the face of breakdowns and hardships.



The Band That Led the Procession Into the Gate City

Two Eleventh-Hour Delinquents—Jacques Futrelle, who had been handling the steering wheel of his Jackson only two months before he left Boston to participate in the tour, was one of the unfortunates. He bent an axle Tuesday, and after repairing it was forced to send the machine full tilt into the ditch at a sharp turn to avoid ramming a team driven by a dreaming negro. The Maxwell, which had withdrawn from Class 4 several days before, pulled the Jackson out, but in the act broke its own differential. After righting his car, many parts of which were bent and disordered, Mr. Futrelle took the Maxwell in tow as far as Anderson, S. C. Then by an all-night drive he succeeded in reaching Commerce at 5:15 yesterday morning in time for the start for Atlanta.

The two cars withdrawn on the last day's run were the White Star, the only representative of Atlanta's automobile building industry, and the Knox, entered and driven by W. A. Kelly, of New York City, which was reported to have broken its steering gear.

List of Perfect Score Cars—The cars which finished the entire run with perfect scores are as follows:

CLASS 1—Cars Costing $4,001 and Over

Thomas, John J. Woodside, Atlanta, Ga.
Thomas, J. L. Barnes, Atlanta, Ga.
Thomas, C. I. Ryan, Atlanta, Ga.
Renault, Renault Selling Agency, New York City.
Matheson, Matheson Automobile Company, New York City.
Benz, Chamber of Commerce, Atlanta, Ga.
Apperson, Official Automobile Blue Book Publishing Company, New York City.

CLASS 2—Cars Costing $3,001 to $4,000

Franklin, W. C. Cleveland, Greenville, S. C.
White Steamer, W. C. White, New York City.

CLASS 3—Cars Costing $2,001 to $3,000

Premier, City of Charlotte, Charlotte, N. C.
Pennsylvania, Pennsylvania Sales Agency, Atlanta, Ga.
Oldsmobile, E. B. Douglas, Miami, Fla.
Corbin, Chamber of Commerce, Roanoke, Va.
Selden, Evelyn Harris, Atlanta, Ga.

CLASS 4—Cars Costing $1,251 to $2,000

White, Board of Trade, Commerce, Ga.
White, Board of Trade, Moultrie, Ga.
White, Chamber of Commerce, Anderson, S. C.
Buick, Chamber of Commerce, Spartansburg, S. C.
Buick, William Oldknow, Atlanta, Ga.
Maxwell, Maxwell-Briscoe Motor Company, Tarrytown, N. Y.
Chalmers-Detroit, Read Holliday, New York City.

CLASS 5—Cars Costing $851 to $1,250

Maxwell, Automobile and Commercial Association, Charlotte, N.C.
Studebaker, W. J. Stoddard, Atlanta, Ga.
Reo, R. M. Owen & Company, New York City.
Regal, E. D. Crane & Company, Atlanta, Ga.

CLASS 6—Cars Costing $850 or Under

Maxwell, Maxwell-Briscoe Company, Tarrytown, N. Y.

Others who finished the run, although under penalty, were the Studebaker, entered by the Board of Trade of Winston-Salem, N. C., which was delayed two days ago by a broken axle, and the Oldsmobile, driven by Henry J. Lamar, Jr., of Macon, Ga., which was penalized on tbe first day out for delays due to three tire blowouts and a bold-up by a freight train on a grade crossing back in New Jersey.

Story of the Final Day's Run—At Winder, Ga., after a 24-mile run from Commerce, the caravan was held up bodily by the town police force, and compelled to choose between the alternatives of partaking of sandwiches and coffee in the public square or going to the calaboose. Naturally enough, all of the tourists chose the former, although they saw in prospect many other such lunches during the day. Let it not be thought that their detention was on account of breaking the speed limit, for a banner crossing Winder's main street bore the inscription:

"Welcome! Reduce Speed to Sixty-nine Miles per Hour!"

Tbis announcement set the horns to honking and the sirens to screaming, but the invitation was not accepted.

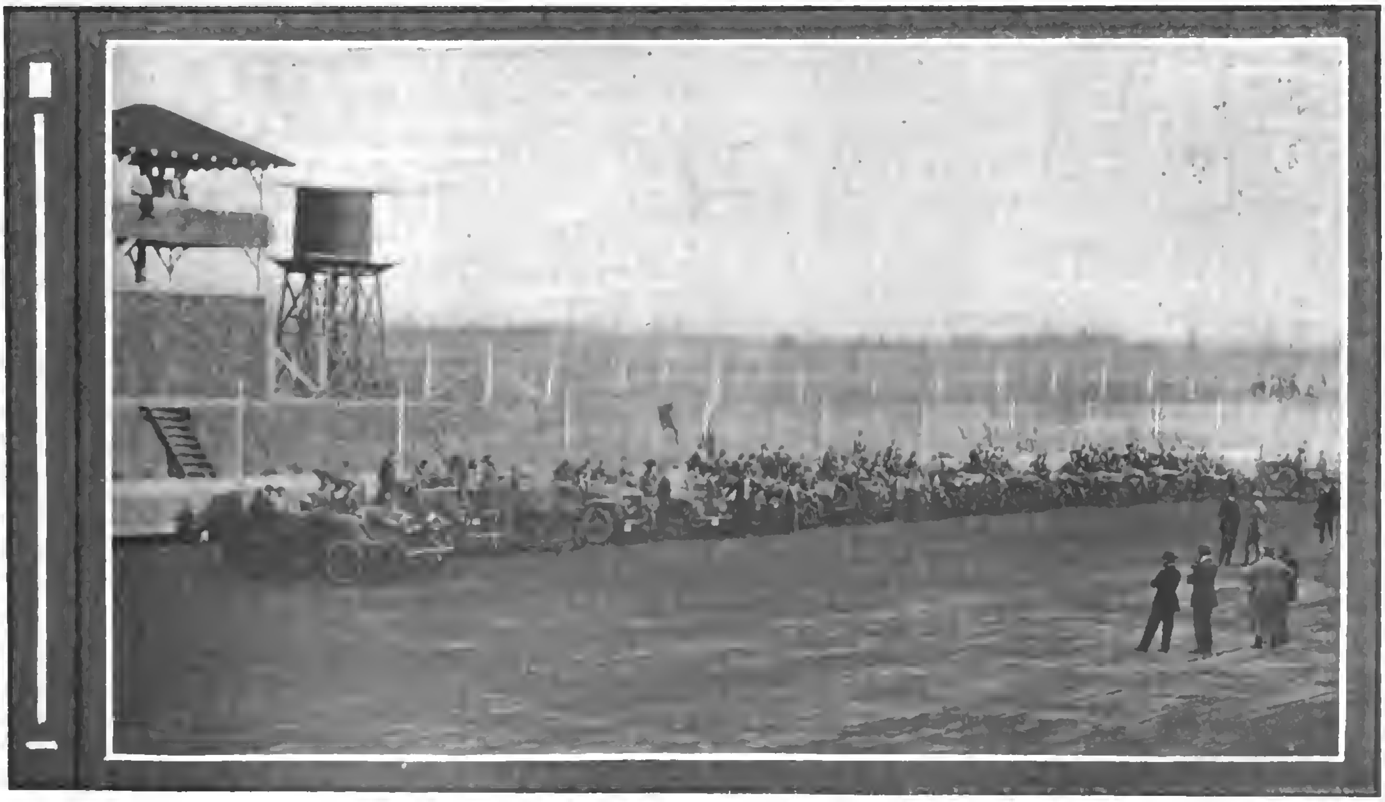
Luncheon at the Club House of the New Motordrome

Near the village of Snellville, 55 miles from Commerce, roadside enthusiasts had menageries of 'possums arranged along the roadside, with welcoming banners and more sandwiches.

All along the line the tourists were bombarded with garlands of flowers and fleecy bolls of cotton, until they looked like so many Santa Clauses. And that, too, with cotton selling at 15 cents a pound!

Near Snellville the Benz car, driven by Ernest Stoecker, who had handled its wheel in races, broke a front spring. It took just 25 minutes for Stoecker and Count W. von Gienauth, his passengers to replace the fractured part, and they rejoined the procession before it reached Decatur, 20 miles away. The Stearns official car snapped one of its rear springs, but with the assistance of a village blacksmith mended it by the insertion of a wooden block.

Mrs. F. D. Hughes, of New York City, suffered the only accident which has occurred to any member of the tour. While cranking her Chalmers-Detroit near Stone Mountain the motor back-fired and broke ber right forearm. Mrs. Hughes was carried to Decatur, 10 miles away, in the tonneau, and had the

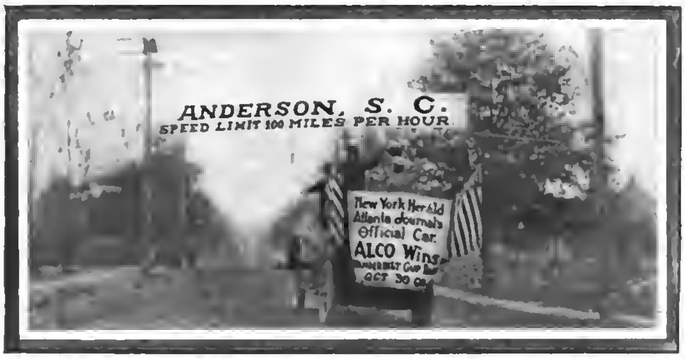


Good Roads Tourists Lined Up On the Broad Expanse of the Homestretch of Atlanta's New Motordrome

School Children at Commerce, Ga., Greet the Cavalcade

bone set. It was an unfortunate ending to the plucky struggle of the Hughes party, which after being put out of the running by the illness of Mr. Hughes a few days ago, still managed to catch up.

Mayor R. F. Maddox, of Atlanta, together with nearly every vehicle in the Southern capital propelled by gasoline power, met the caravan at Decatur. The tourists and their escort formed a procession about five miles long, and swept into the city like a Roman triumph. A hundred thousand persons lined the streets in the business district, overflowing the sidewalks and leaving only a narrow lane, through which the dust-coated tourists passed at a snail's pace. Finally the column was headed for the Piedmont Driving Club, where luncheon was served on the terraces flanking the clubhouse. When the parties returned to their hotels the New York-Atlanta tour had passed into history.



There Was Practically No Speed Limit in This City

PRIZES FOR 26 WINNERS IN TOUR

ATLANTA, GA., Nov. 5—The awards of trophies for the Good Roads Tour over the new national highway from New York to Atlanta were finally decided at a meeting of the judges held this morning in the Piedmont Hotel. Twenty-six cups were awarded to those who finished with perfect scores. The prize fund amounted to $1,700, and was divided as follows:

Class 1—Seven perfect scores; $301 to the class, $43 to each perfect score.

Class 2—Two perfect scores; $300 to the class, $150 to each perfect score.

Class 3—Five perfect scores; $300 to the class, $60 to each perfect score.

Class 4—Seven perfect scores; $301 to the class, $43 to each perfect score.

Class 5—Four perfect scores; $300 to the class, $75 to each perfect score.

Class 6—One perfect score, $198.

Confederate Veterans Welcome Tourists at Decatur

The fortunate ones were those enumerated above as having finished with perfect scores, for Referee Scarritt did not inflict any of the conditional penalties which he has held over the heads of a few drivers whose conduct was not always as considerate as it might have been. The awards, ranging from $43 to $198, in the case of the little $850 Maxwell, will be made in the form of souvenir cups or trophies.

The festivities reached their climax in the banquet to the good roads pilgrims given last night by the Atlanta Reception Committee in the ballroom of the Capital City Club. Two loving cups were presented by the city of Atlanta to the two newspapers which promoted the run, the New York *Herald* and the Atlanta *Journal*. Mayor Robert E. Maddox presented the cup to the Southern member of the newspaper alliance, and it was accepted by James R. Gray, editor and manager of the paper. Ex-Governor Hoke Smith presented the *Herald* cup, which was accepted in behalf of the paper by Hamilton Peltz. Toasts were drunk by all, amid the cheers of the guests, while the band played "Dixie" and the "Star-Spangled Banner."

"Official Blue Book" Car a Clean Score Survivor

PRECISION IN PARTS PRODUCTION

By Thos. J. Fay

ELKHART, IND., Nov. 8—History, as it relates to the building of automobiles, holds in its maw many half-baked attempts, some flat failures, and much of success. When a car indicates that it is not going to make good history, and it happens to have a few parts (from some outside shop) in its make-up, the parts are condemned as beeing the faulty members, and parts makers are ladened with the odium.

Perhaps the maker of the parts followed directions, made them agreeably to the drawings and of the materials indicated in the various clauses of the automobile maker's specifications. If so, who is to blame? Certainly, the designer should take all the responsibility of failure if the parts made and furnished are as per drawing and up to the requirements as respects materials. There is still another phase of the problem, entirely besides the story of who should shoulder the odium when failure is the reward of lack of quality of material or due to a surfeit of poor designing. If, when parts makers are requested to bid on work, they find that it is a cheap and incompetent product that is wanted, and the skill of the same parts makers is interjected so that the work is moved up to a higher plane, it is assured that the end will be far more satisfactory and the business will grow and prosper. It may take a little tact to successfully interject a discussion of quality, especially when the work is to be done for inexperienced, but ambitious (possibly), makers of automobiles, who may think that anything is good enough to serve the purpose. If tact fails, and it will betimes, is it not then time to respectfully decline to participate in what is sure to be a flat failure?

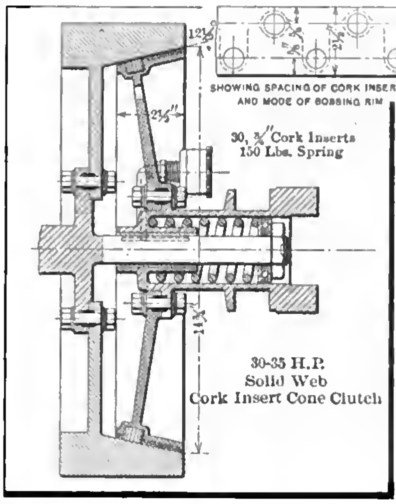


Fig. 1—Cork insert clutch with leather facing, aluminum drum and ball thrust bearing behind spring

Wise Parts Makers Decline to Make Poor Units—The makers of parts are fast learning the futility of doing inferior work, and many of them flatly decline to deviate from what they have learned by sad experience to be a safe course. It is all very well for some company to say (in advertising): "We are building 1,000,000 automobiles of the $5,000 class to sell at $300." If it can be done, the sooner some clever concern accomplishes the task the better for the ultimate consumer. If it cannot be done, then the question is, will it pay parts makers to reduce quality below the point of safety to help "put over" a projeect which is deceptive?

The class of parts makers who expect to survive say no, absolutely no!

In all fairness, it is difficult to discover any experienced concern at the present time which will lend itself to any such undertaking, and it is now the settled policy of the parts makers of acumen to keep well away from the class of work the nature of which will not survive a critical inspection and a road test.

Concrete Illustrations Will Tell the Story Best—Let us sojourn into a shop, examine the product, and learn in so far as experience and a close examination will serve the end, what is a reasonable expectation; for the purpose the product of the General Manufacturing Company, at Elkhart, Ind., will be illustrated and deescribed. This concern makes transmissions, clutches, and such other parts as would seem to be in strong demand, having for customers companies who assemble cars.

Cone Clutches Are in Brisk Demand—Despite the wide variety of multiple disc and other forms of clutches which found favor in automobile designing in recent times, there is still a vast liking for the more simple form of cone clutch, especially in view of the utility of cork, in "insert" form, in conjunction with leather, for the facing. Fig. 3 is of this type of clutch as produced by the General Manufacturing Company, under license from the National Brake and Clutch Company. This clutch is rated at 50 horsepower, and the line comprises sizes from 20 horsepower up. It is claimed for this type of clutch that it will not slip, even if oiled, and will not act "fierce" in starting. Then, it is of great advantage to know that the leather facing will not heat and char, which the cork prevents.

In the absence of the cork inserts it is necessary to place springs behind the leather facing, which is done in the manner as shown in Fig. 4, there being six of these springs evenly disposed around the periphery of the clutch. Among the mechanical features of note, the double universal joint J J, with a slip-member, S, between, offers a means of eliminating the ills of road inequalities to a marked degree. The clutch spring S1 is under and concentric with a shell, and the pressure is sustained by a thrust ball bearing, B.

The spider is of aluminum of a suitable grade, taking into account the character of the work, which included centrifugal forces as well as thrusts, compression and angular distortions. In machining, it is appreciated that the clutching members must engage with precision, and care is exercised to have them meet fair, hold to concentric relations and assemble to a nicety.

Mechanical Differences Are Manifold—Without attempting to depict within the confined limits of this article even a small measure of the deviations in mechanical details which attend the designing of clutches, it may be advantageous to show something of the possibilities. Fig. 5, for illustration, represents an important difference, since the pressure on the spring S may be increased or reduced by screwing up on the cap screw C, which is threaded into the shank of the shaft S1, and the ball thrust B served

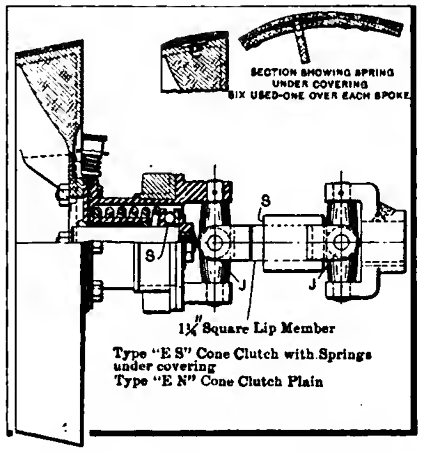


Fig. 2—Cone clutch using springs under the leather facing to assure contact, and defeat fierceness and charring of the leather

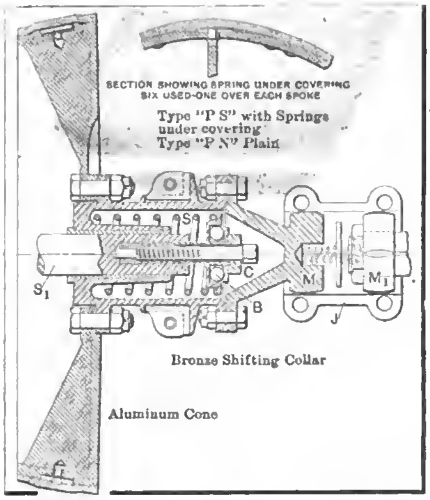


Fig. 3—Leather-faced clutch with means for adjusting the pressure of the spring at will

to sustain the reactive pressure.

The universal joint J, back of the clutch, consists of a housing with a broached (square) hole, and the male members, M and M1, engaging. The spring S2 serves to keep the members M and M1 separated, and in assembling the power plant into the chassis the joint, so made, offers sufficient end-play to enable the units to be lifted out.

The clutch as shown, including all its detail, represents stability, and the cost of the finished product is well within range, even considering cars which sport a modest price tag. What the situation portrays is that it is not necessary to reduce quality below a certain deserving level, and a little ingenuity, properly enlarged upon will generally suffice for the purpose.

As an illustration of the class of work done, referring specifically to transmission gears, reference may be had to Fig. 1, of the Model M system, giving three speeds and reverse, selective. Attention is directed to the short, large diameter main and lay shafts, rolling on Hess-Bright ball bearings of the annular type, in housings of bronze, with closures, thus eliminating the silt of the road and rendering lubrication as a normal expectation.

In this transmission the high speed is "direct," and a roller bearing, R, is placed at the telescope joint of the main shaft and its extension. In going into direct on the high gear, engagement of a pinion, P, with an internal gear. It has the virtue of rendering the shift easy and noiseless, while the work falls on many teeth, instead of (in some examples) four jaws. The extension shaft rolls on two sets of ball bearings, B B, so far apart that displacement is quite out of the question, and the universal joints, when they are to be adjusted into place, may be forced up on the taper ends of the shaft at T and the extension at T1.

The mountings of the bearings, while they are anything but costly, conform to accepted practice, in that the inner race is locked and the outer race is free to slide in the axial plane, being a "sucking fit," however. As an example of this, refer to the two bearings on the extension shaft, and observe that a sleeve, S, serves as a spacer between them, and pressure induced by a threaded member, N, is assured, due to reaction of the shoulder S1.

The selective means is so contrived as to manipulate the racks R2 and R3, and they, being of good diameter, sliding in liberally proportoned phosphor bronze bearings, stand up to the work, sliding freely because they do not deform. The case is of aluminum of suitable thickness, noise considered, and is machined so accurately that it is grease-tight, while ribs are placed at points service, pinch the bearings, and render the case leaky. Careful design makes highly practical the use of this material.

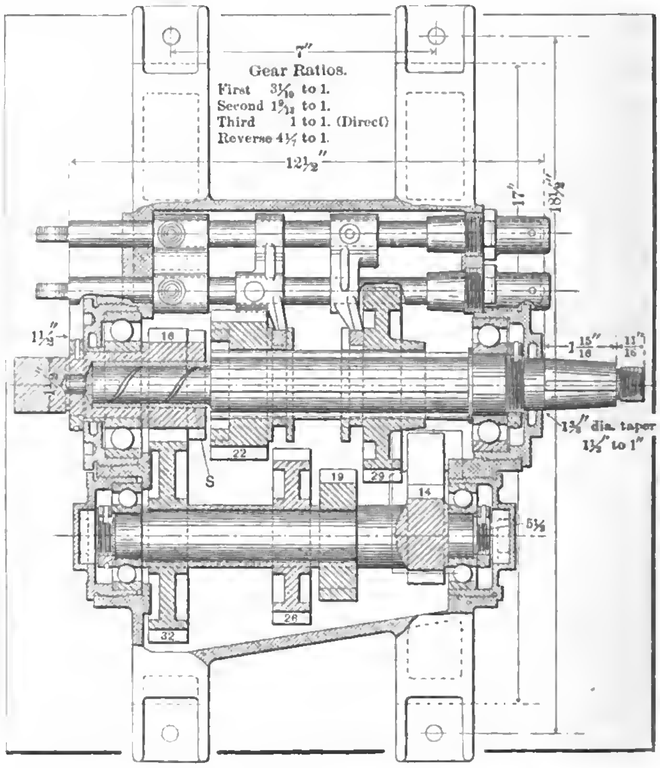


Fig. 5—A modification of the Model M idea, differing in details, among which is the telescope joint bearing

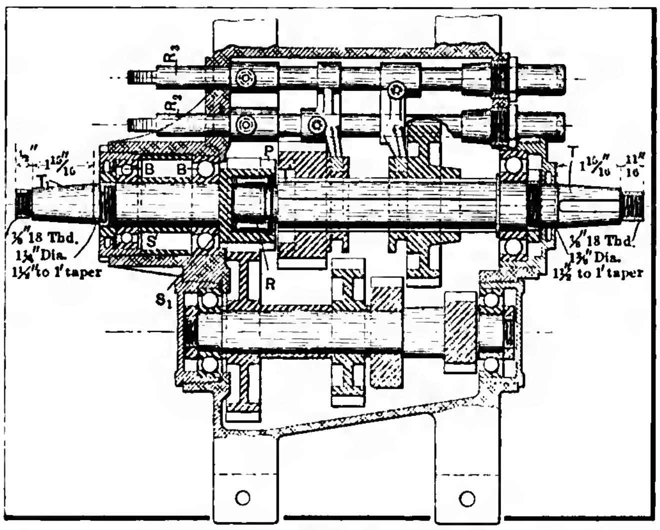


Fig. 4—Model M three speed selective transmission gear with silico-manganese gears and shafts

In this type of gear the ratios of reductions of speeds are as follows:

Direct on high	1 : 1
Hill climbing	1 9-13 : 1
Low	3 1-10 : 1
Reverse	4 1-7 : 1

When Cost Must Be Reduced—With a view to showing how cost can be reduced without eliminating quality, Fig. 2 is offered, and in this example the materials used are the same in every particular, excepting that the roller bearing at the telescope joint is displaced and a bronze sleeve, S, is substituted. The sleeve is long, made of a fine grade of bearing bronze, and is properly fitted into place. This telescope joint is used on many cars of proven quality, and some makers prefer it to ball or roller bearings for this duty. It is less expensive to make, works very well indeed, and in the absence of any diminution in quality of material or workmanship, a difference of opinion is legitimate.

In this example the gear ratios are the same as in Fig. 1, and experience has shown that it is a good disposition of this important phase of the problem. The gears in this, as well as in the example Fig. 1, are of heat-treated silico-manganese steel, and, besides great hardness, kinetic ability is a marked quality. It has been proven, time after time, that teeth of gears made of this material, if they are properly hardened, are not only "file hard," but they may be deformed by exerting great pressure in a testing machine without showing signs of fracture. The "test" fracture is that of a fine grade of material, of great reliability under shock conditions, and shafts of the same material seem to complete the undertaking from a quality point of view.

In the plant of the General Manufacturing Company, pyrometers, annealing equipment, methods of cementing and means for quenching are available, and uniformity is one of the necessities that the company recognizes. In the process of manufacture, hobbing machines, gear-cutters and other equipment of the latest and most available form are used, and additions are being made as rapidly as the situation would seem to warrant. Testing equipment and metbods of inspection are all that good practice demands, it having been found that when the work is well executed, filing and fitting are eliminated and cost is reduced in proportion, so that costly machines which induce interchangeability soon pay for the excess initial cost.

CAUSE OF EXPLOSIONS IN GAS GENERATORS

By CHAS. B. HAYWARD

ACETYLENE gas generators, to give tbe service which may normally be expected from them, must constantly be maintained in good condition. Private owners, as well as professional drivers, have a habit of permitting the generator to go unattended for several days after it has been used. Then, when the generator is opened, it is found to be more or less obstructed with the residue of carbide that bas become caked to the copper, and is accordingly difficult to remove. The first thought of the average man is to take the nearest piece of metal, a file, or a scraper, and set to work to remove the deposit. It is not generally realized that such a proceeding may lead to a serious accident.

The residuum left by the carbide after the generation of acetylene gas attacks tbe copper of the receiver and chemically combines with it, forming a new substance known as acetylid of copper. This is a highly explosive product, which does not require much excitation to set it in action. Several instances are known where simply bending the copper tubing employed to conduct the acetylene gas from the generator to the lamps gave rise to a series of explosions of a startling nature. The whole interior of the tubing was coated with a light, hard film of copper acetylid, and a report was heard every time the tubing was bent.

In tbe case of a generator, striking the deposits with a tool or piece of metal of any kind is apt to explode this deposit, particularly as the residue frequently contains silicious impurities that are hard, and will either spark or generate considerable heat when struck. The violence of the explosion will naturally vary; the worst penalty of carelessness will probably be burnt hands or face. The best protection against this danger is naturally to clean the generator at a sufficiently short interval after using to avoid the hardening of the deposit on tbe copper surface; but when this has already taken place the cleaning sbould either be done with a metal tool under water or a piece of wood.

VENTURI TESTS SHOW WIDE VARIANCE

So many carbureter makers and experimenters bave taken up with the Venturi tube shape for the vaporization chamber, that it will undoubtedly make many sit up and take notice when it is stated that the Venturi tube, *per se,* does not show constancy, its efficiency for hot water measurements (its original use was measuring purposes solely) differing widely with its efficiency on cold water. More than that, the efficiency is a variable quantity, differing for various degrees of heat.

Thus, in a series of tests made at Worcester Polytechnic Institute, and presented in a paper to be given at the annual meeting of the A. S. M. E. in December, this point is brought out very prominently. In the tests, the following test temperatures were used, and from the results obtained at those temperatures a curve of efficiencies was plotted which includes all temperatures possible with water as a medium: 80 deg., 120 deg., 140 deg., and 180 deg.

These figures were approximately .942, .949, .952, and .959, respectively. Although actually the efficiency of the Venturi tube at those temperatures, the writer of the paper in question, Prof. C. M. Allen, designated these quantities as Venturi coefficient. Plotting these, a curve was obtained which was a straight line starting from .927 efficiency at zero degrees and running to .962 at 200 deg.

FRENCH LEADER TURNS TO STEEL

Tbe discussion of some years ago as to the suitability of steel for automobile engine pistons will doubtless be renewed with the announcement that the French leader in small-car construction, Sizaire-Naudin, has adopted this material for all pistons. This use in small cars of modest price is epochal, for if there is any place wbere reliability is desirable, it surely is in the small car. This piston, too, carries but two rings, and has the piston pin fixed by means of a taper wedge driven into the split end of the pin itself. The top of the piston is made concave to secure better combustion effects.

NEW ALUMINUM SOLDER CONTAINS TIN

It is stated in a French contemporary that the best soldering medium for aluminum is an alloy of that metal and tin. The proportions vary according to the extent to which the soldered articles are intended to be worked; 45 parts of tin and 15 of aluminum forming a good solder for such as are to be shaped afterward. A harder solder, but less easily applied with the soldering iron, is prepared by melting 4½ parts of red copper, to which are then added 3½ parts of zinc and 4½ of tin, the heating being continued until a bomogeneous alloy is obtained.

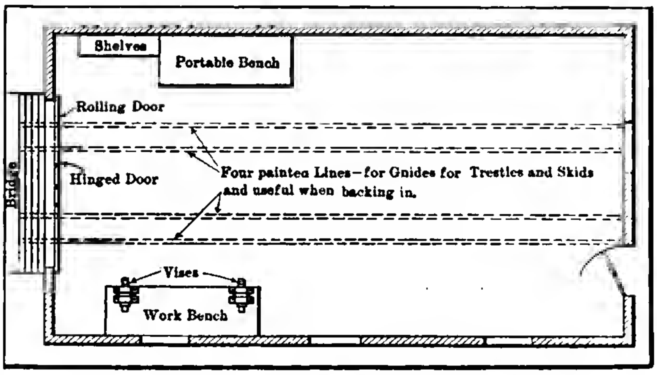
In *The Metal Industry* it is stated that the surface of all aluminum is covered with a thin, invisible coating of aluminum oxide, and that this coating forms instantly after the surface is cleaned; it is very refractory, and is soluble only in hydrofluoric acid. It is necessary, therefore, to remove this coating of oxide simultaneously with the soldering operation, and this is best accomplished mechanically by abrading tbe surface with a steel or brass scratch brush while the solder on the surface is still molten.

FEATURES OF NEW WIRE WHEELS

For the season of 1910, the well-known English firm of wire-wheel builders, Rudge-Whitworth, will produce more wire wbeels than ever before, these having gained much in popularity in the past year, both through excellent service in touring use, and more through tbe stand-up qualities displayed in the races, which have been held. The latest wheels will have a triple row of spokes, the third being set on a long diagonal out to the extreme outer end, so as to lend additional strength to resist the severe side strains. Not that the previous wheels, which will still be continued, lacked in this particular, but that the public doubts on this score, and must be reassured. So wide spread has been this demand, that the makers are now forced to make no less than nine different models, to fit the various car designs, and differing bearings used. The new triple spoke lends itself well to more advanced steering-gear design.

Two Examples of Stone Construction, One, Rubble Stone Laid in Concrete, the Other, Field Stone Laid as Broken Ashlar

NOT once, but several times, has the matter of individuality been commented upon in the course of this story. An example will be given to show to what an extent this enters into the final form of the motor house. The house to be described was built by a man who was something of a mechanic, in that he worked on his car early and late, not because it was necessary, but from preference.



Floor Plan of Garage Possessing an Unusual Pit Idea

This mechanical inclination caused him to plan and build his garage with that idea very prominently in view. So that, although, as described, it sounds like a very funny arrangement, it nevertheless is a very handy one for this particular man. The garage, as shown in the floor plant, is rather large for a single car; in fact, it is plenty large enough to house four cars without crowding. The shape is rectangular, with the door at one end. This is a double door, with a third additional hinged part.

The other end carries a small door for personal use, this being near the house. Besides this, there is a large window. The two sides each carry three good-sized windows, so that the interior is well supplied with light. Near the front end, where most of the work is done, there are: a large work bench, carrying two vises; a portable bench, which may be used to hold parts when taking the car apart and a set of shelves. These are conveniently placed on the two slides, so as to make the most of the available space, the stationary bench and vises being on the left.

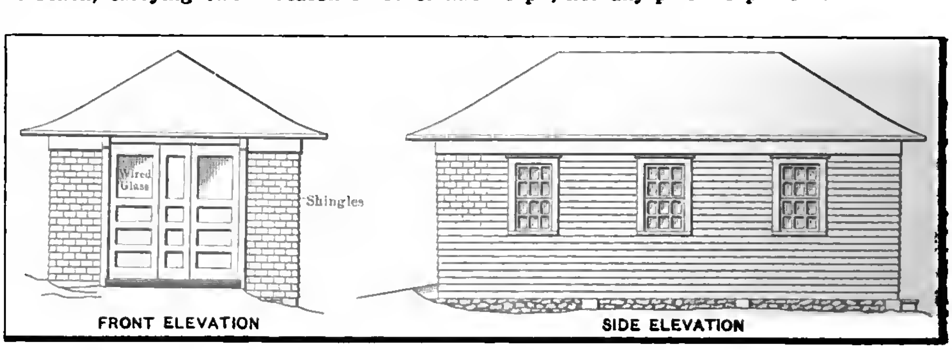
By far the funniest part of it, in matter of fact, the only out-of-the-way part is that of the pit arrangement. The house as built did not have a cement floor, but being located some distance from a city, a pit was an absolute necessity, the latter being realized more particularly after the house had been built. So, a pair of comparatively small and light horses were built, or more correctly, a pair of trestles. These were 31 inches high and built strongly enough to support a car, the length being just sufficient to care for the whole length of the car.

Some Details of Automobile Trestle—Of course this was flat on top so that the car would stand on it of itself. So some method of getting the car up onto the top was necessary. For this purpose another short, inclined pair of trestles were built. Then to get the car onto the "pit," the two sets of flat topped trestles were dragged out into the center of the floor. Next the two inclined members were set into place in the front, and the car could be driven up onto it.

In this position, it was just high enough to allow one to work under it, but since this meant much stooping and looking upward, one of which was hard on the back and the other tiresome to the eyes and neck, the owner built a sort of reclining chair. This he used as a seat, pulling it under the part of the car upon which he wanted to do some work, or removing it when there was no necessity for it. The back of this was adjustable for any inclination, which was very handy at times, and being simple, could be altered very quickly, to suit the needs of the occasion. It is shown in detail on the next page.

When there was no work to be done upon the car the four trestles and the seat were set aside in a corner or elsewhere, the size of the house allowing lots of room for it. In this way the whole floor was kept solid, without any holes to be avoided and counted upon at all times. In addition, it left the whole floor for maneuvering space, and cost very little. Being practically indestructible, the whole outfit could be carried outside if at any time it was desirable or advisable to use the whole interior for cars, as in the case of several visiting cars.

Thus a single instance suffices to show that the man of ingenuity is never stumped. This method would be applicable to a made-over barn or other similar structure, which for some reason or other had no pit, nor any place to put one.

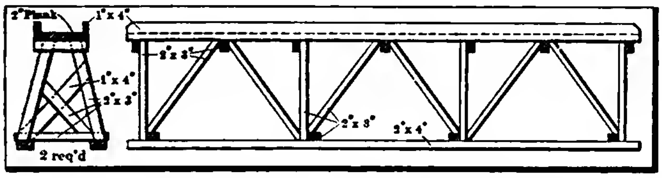


End and Side Elevations of the Same Garage, a Home-Built Affair

In an earlier number of this story the various divisions of the materials of construction were given as:

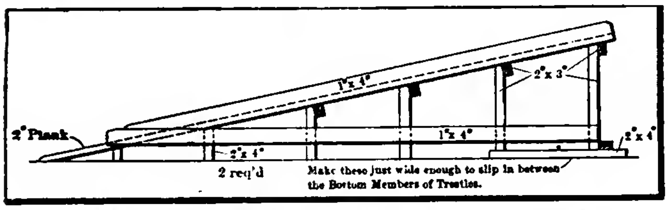
1. Wood.
2. Wood and steel in combination.
3. Steel alone.
4. Concrete.
5. Hollow tile.
6. Other forms of fireproof construction.
7. Concrete in combination with any or all of the others.
8. Brick or stone.

Of these the first has been rather well covered thus far, with the possible exception of the portable garage. This may assume many forms, but the more usual one is that shown in two views at the conclusion of the last chapter, namely, an all-wood structure built either on the panel system, or "knocked down."



Trestle with Flat Top Which Served as a Pit

The more usual is the latter, although the former has much to commend it, being just as cheap to the manufacturers and of much easier erection to the buyer, who usually is a man of very little skill, at least in that particular line.

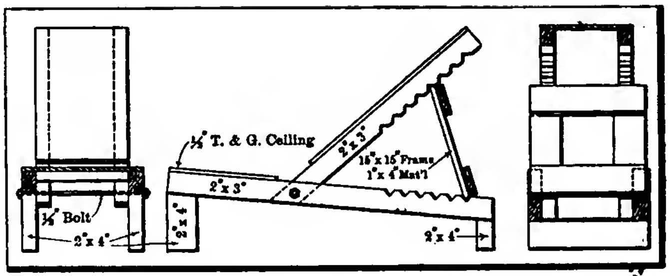


Sloping Trestle Used to Get the Car Up Off Floor

Features of the Portable Form—Elsewhere on this page will be found several views of one of the portable garages now on the market. The plan shows that it is about 13 feet wide by 19 feet long inside. Of this, however, not all is available, some room being taken up by a large workbench, a cupboard and other conveniences. These cut the available floor space to about 12 feet by 16 feet, which is very close to the size arrived at in the previous consideration of the least size that would accommodate a single car with any kind of comfort.

There is a double door at the front, measuring 8 feet in width by 8 feet 6 inches in height. The latter is made large to allow of the car entering with the top up, as it is a very disagreeable feature to have to get out in the rain to fold the top back in order to be able to drive the car in. In addition, there is a small narrow side door for the owner's personal use.

Two windows on each side, with two smaller ones at the back furnish plenty of light, the back windows being grouped over the work bench. The foundation is more in the nature of a suggestion than a necessity. This is not furnished by the makers of the garage, the plan being given to enable the prospective buyer to provide a concrete or stone foundation if he so de-



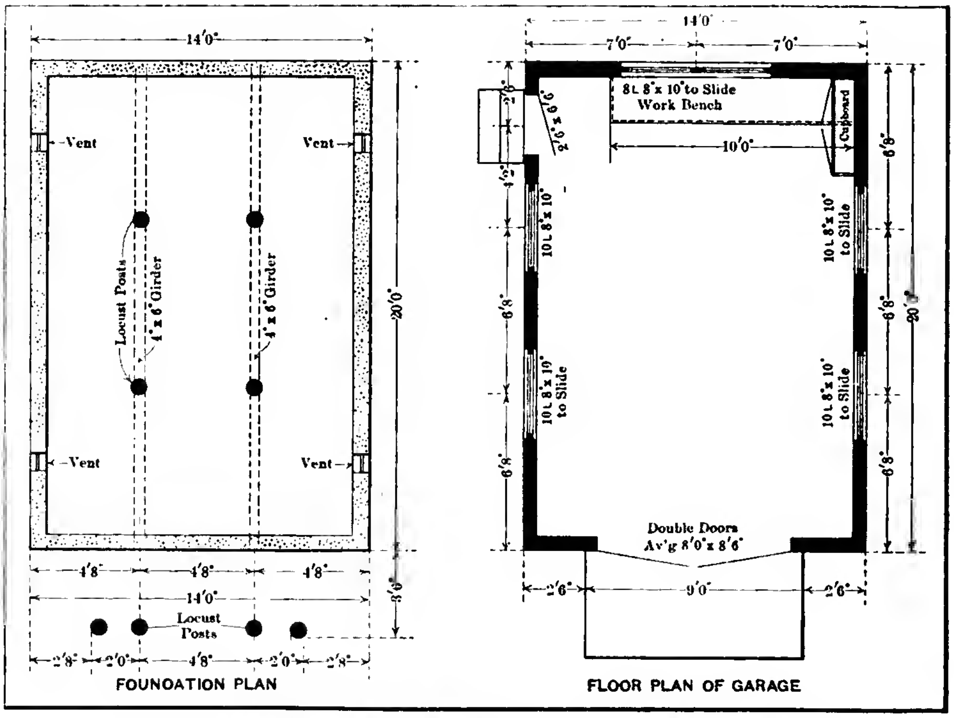
Home-Made Morris Chair to Eliminate Backaches

sires. The locust posts, indicated by the round black spots, are furnished, these being 3 feet 6 inches long. Four of these are in front, and are for the support of the inclined platform or runway to be built there. The other four located in the middle are real foundation posts, in addition to which there are two more to form a foundation for a platform leading to the side door, these not being shown.

When foundations are laid a single width of brick, that is 8 inches, is recommended, or this same width in cement or concrete. A description of some of the other features may be of sufficient interest to warrant the space, so will be given.

Portable Building Details—The structure is designed with two lines of girders, giving a double support directly under the car. All exposed framing material is dressed lumber, while the walls and roof framing are well braced. The roof is sheeted over with a sheating of surfaced boards laid tight. Over this shingles are laid, making a simple but good roof sure to be waterproof. Slate, tin, steel, or any roof composition may be had if desired, but not being regular, cost more. The cost of this house, as shown in the two plans, elevations, and exterior and interior views of last week, is roughly between $175 and $185 at the manufacturer's factory. This with the freight and charges for erection bring the whole cost up to about $225, which makes a very serviceable garage at low cost.

Another illustration shows a frame garage in process of construction. This as may readily be seen is just large enough for one car, has a single door at the front, this being of the double hinged type. Then there are two windows on each side and one at the rear end. The door size is 8 feet wide by 8 feet 6 inches high. The actual inside space in the clear is 12 feet by 17 feet 6 inches.



Floor and Foundation Plans of Small One-Car Wooden Portable Garage

One-Car Frame Garage in Process of Construction

It was built on contract, just as shown, on the outskirts of Yonkers, just beyond the city line of New York, by a carpenter for $350 finished. Considering the geographic location the contract price seems very modest.

Besides the features just described, the floor is of Southern yellow pine, while the roof, contrary to the usual custom, is covered with steel. The picture would seem to show that this was shingled, but that is the shape in which the steel came, that is, in imitation of shingles.

An inspection will show that the owner missed an excellent opportunity to have a first-class pit made very cheaply, as the condition of the ground upon which it is built (the side and top of a hill) make a natural pit. That is, by making a middle section of the floor hinged or loose and laying a second floor on the surface of the ground, a pit would be complete. To use this it would only be necessary to lift up the floor boards then walk around outside and down the hill, laying down on the false floor there, or if the character of the work permitted it, standing up there.

Not Very Much Steel Used—Very little steel is used for garage construction, the usual use of this being restricted to the roofs as above, to the steel framework of concrete and cement places and other similar uses. There is, however, a firm now making and selling a small garage of the so-called portable type, which is entirely of steel. The meritorious feature of this construction is that the structure may be very close to the car size, since the walls are very thin, and secondary, or rather primarily, it is fireproof.

As far as erection is concerned the house comes to the buyer in about the same condition as does the all-frame building, that is, partly but not wholly "knocked down." In the case of the former—the steel garage—the erection needs no tools, since the wrenches from the car's tool kit are about all that could be used. The corners are formed of very light-section structural iron, angles being used. To these walls of sheet iron are bolted. The roof construction is the same, while a sheet-iron door swings from an angle iron frame work. The roof "boards" are also sheet iron. With a concrete floor, which every garage should have anywhere, this building erected is as near fireproof as it is possible to make it.

Since small angles are not expensive, and sheet iron is cheap, this form has many things to commend about it. With an exterior gasoline tank—the only proper form—the whole outfit would be so secure from the possible inroads of fire that the owner of one of these would be foolish to carry any insurance, at least he would if he kept the car in his own garage.

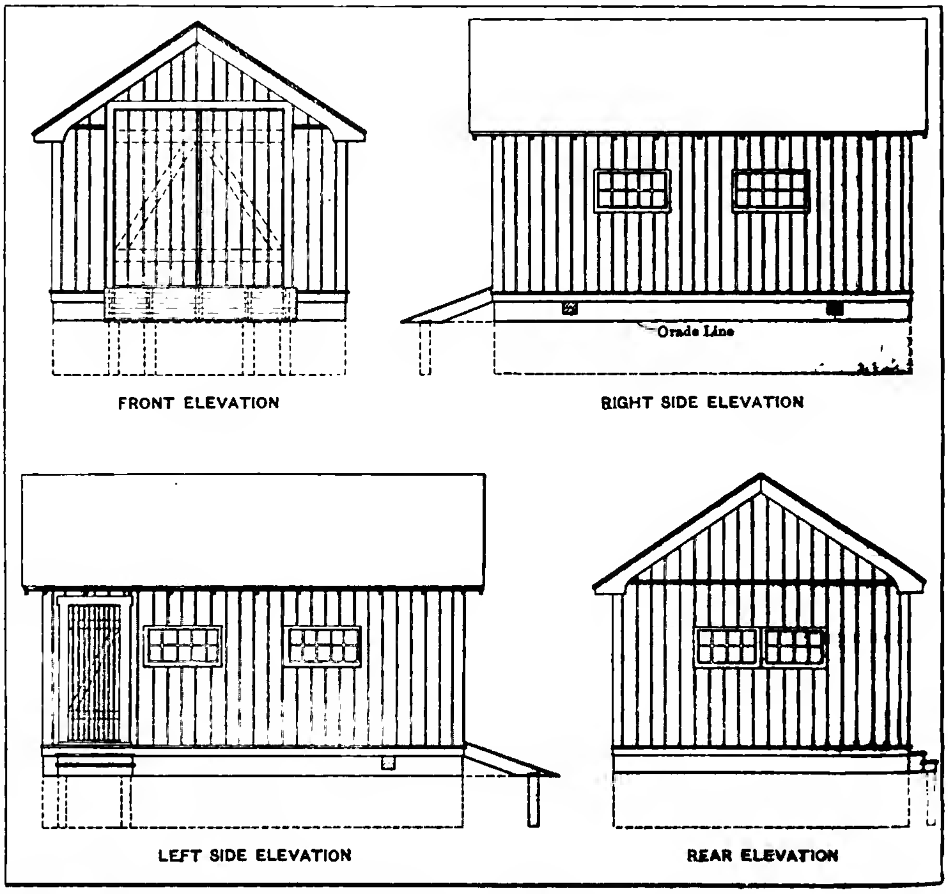
In the all-concrete garage much steel is used, first for the added strength which it gives and second for wearing parts. The latter may at times be adapted to other forms of construction than concrete and should be used wherever possible. Thus for doors sills, particularly the main door through which the car or cars enter, this is very good. In this position it may set down low so as not to make a ridge or bump for the car to travel over when coming in or going out. Thus located it will wear for years.

Other Things Which Must Be Considered—The material alone is not all that must have intelligent consideration. Among other things there is the matter of paint. A frame house with a good filler and a good coat of paint to start with, as well as another every two years would be all right. But this treatment would not do at all for the steel house, or even for the steel roof to the frame garage. Steel by exposure to the mosture in the atmosphere oxidizes or rots away and to prevent this it must be well covered with paint of weather-resisting qualities.

Not only must it be well covered in the first instance, but it must be kept covered at all times, for while the garage might not work all the day, nor all the year round, the atmosphere is always "on the job" and to prevent its serious inroads the steel should be painted every year at the outside, and in places near the seashore or some large body of water twice a year if possible, or if within the owner's means.

Next in order the small concrete garage will be taken up, discussed and many of the best small types illustrated.

(To be continued)



Four Elevations of Portable Garage Shown on Preceding Page, and Illustrated Last Week

New English Ideas In Automobile Construction

WHILE no patriotic American likes to concede that there is anything in the oft-repeated remark "they do things better over there," meaning on the other side of the ocean, it is a fact, nevertheless, that more new devices are brought out and given an intelligent trial on the other side than in our own country, considered very progressive.

As bearing directly upon this subject and perhaps proving or disproving the same contention, a number of recent new ideas in automobile and kindred construction will be shown and discussed. Some of these possess the merit of much trial and experimentation, while others have not yet suffered a severe test, and are more in the nature of untried inventions, which appear to possess more than average merit. The parts to be discussed are mostly engines, but a few new carbureter ideas are included. All of the devices to be described are of English origin.

Novel Expanding Carbureter—The first to be described is a carbureter called by its inventor, Alexander G. Ionides, the Polyrhoe Expanding Carbureter. This device, shown below and in more detail on the next page, differs from the ordinary fuel vaporizer in that the usual small jet orifices are lacking. In addition to this, the throttle valve, so-called, is automatic in its action, which not only governs the inflow of air, but regulates with absolute certainty the flow of gasoline as well.

To describe it more in detail, there is a float chamber, circular in section, containing a float of the conventional type, but working directly upon the needle valve seat through its lightness, and consequent position in the fluid only. That is to say, there are no levers or springs in the needle valve arrangement.

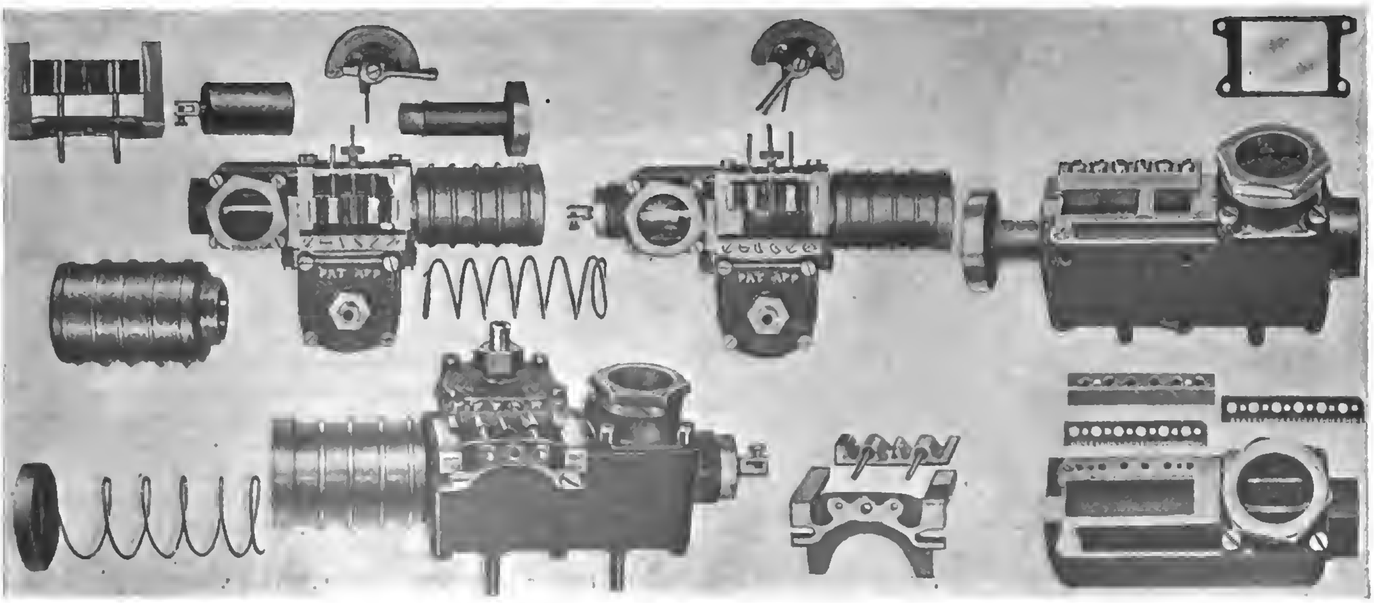
Leading from the float chamber to the jet plates—for plates are used instead of needles—there is a long and very narrow slot, which replaces the usual round hole. This slot extends upward to the jet plates. The latter are five in number, held in place by means of bolts. In each one of these plates one edge carries a series of square key-hole slots, between each two of which is located a rectangular slot. When set in place the key-hole slot in the first plate is directly below a rectangular slot in the second. This, in turn, is surmounted by the key-hole slot in the third, the rectangular hole in the fourth, and the key-hole slot in the fifth. The width of the slots, that is, along the edge where the gasoline flows through them into the vaporizing chamber, is .016 inch on the smallest size made, and .018 inch on the largest size which has yet been put out.

In this manner, as the enlarged section through the jet plates shows, every other plate has openings which are connected on the inside to the gasoline supply, and on the outside to the vaporizing chamber. More than this, the openings into the latter vary in each row of plates, one set or series being of the first, third and fifth plates, and midway between these are another set or series of slots in the second and fourth plates. These being very small, and, consequently, very close together, what is the equivalent of five very flat and very thin sheets of gasoline are sprayed into the vaporizing chamber.

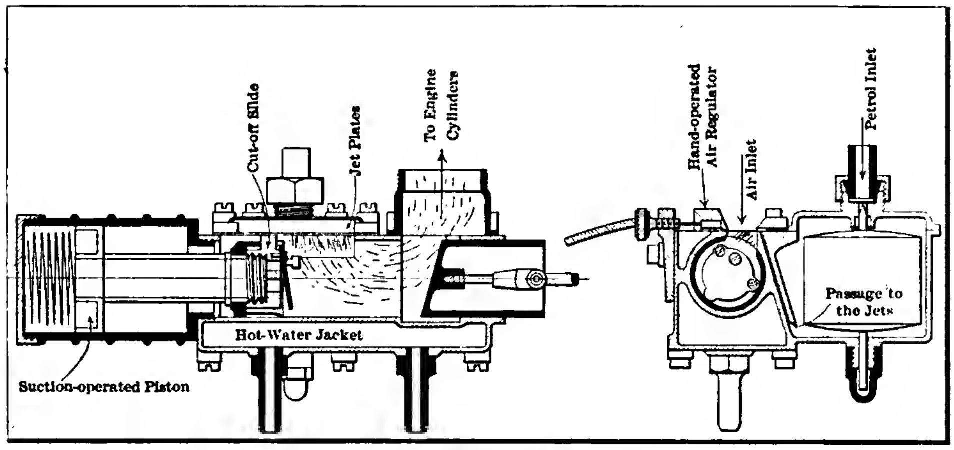
Throttle, Too, Acts Differently—This action just described would be the case, but for the fact that the throttle, of the piston type and working automatically, covers part of these slots. That is, according to the demands of the motor, it either uncovers or covers enough so that the mixture is right. This acts to uncover more and more of the slots through the inductive action of the mixture or the suction of the engine. Opposed to this action is a large diameter coil spring, made of small sized wire, and comparatively weak. Between the motor suction and the strength of the spring there is a constant adaption to the engine requirements. Since the air to vaporize the fuel enters from above the sheet of fuel, the action of the automatic throttle also cuts off the air, at the time it cuts off the gas.

The passage through which the air enters, however, is U-shaped, and may be varied at the will of the driver by means of a sliding member. This is actuated by means of a bowden wire mechanism, the slack being taken up at all times by contrary-acting springs.

In the cut below the large piece in the lower central part is the assembled carbureter. Directly to the left and right, respectively, are the automatic throttle spring and piston, and the air slide. This slide is shown in plain view in the upper left-hand corner, below which is the cover for the piston, or the chamber in which it acts. In the lower right-hand corner is to be seen the body casting, viewed from above, and directly over this a few of the jet plates in actual size compared to the rest of the



Assembled and Partly Disassembled Parts of the Polyrhoe Carbureter, a New English Invention Which Has Proved Its Worth

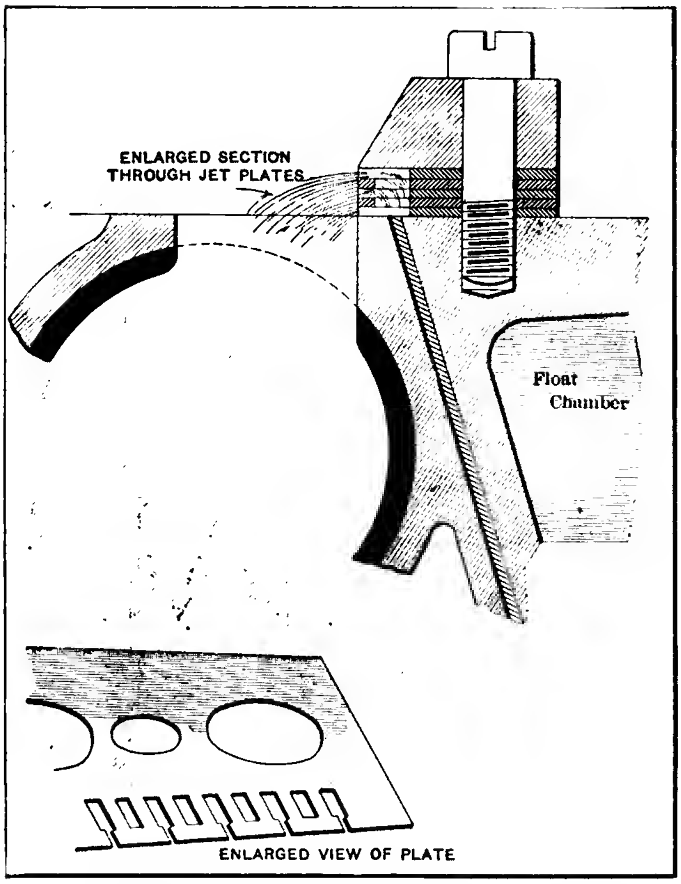


Section Through English Carbureter and End Elevation of Float Chamber

parts. In the upper right-hand corner is the gasoline strainer. The rest of the parts are self explanatory, but it should be remarked right here that several of the parts are shown more than once to make the whole construction clear. As shown this would appear to have many parts, which is just the opposite of the actual case, the parts being few in umber.

The actual throttle, operated by the driver of the car, is also of the piston type, this being set into the other end of the vaporizing chamber, so as to slide across the bottom of the vertical outlet to the engine. The absence of jets of the usual type eliminates the usual accompaniment, flooding. This is particularly noticeable when, running at high speed, the engine is cut off suddenly. This severe test always floods the ordinary carbureter, but this one, never.

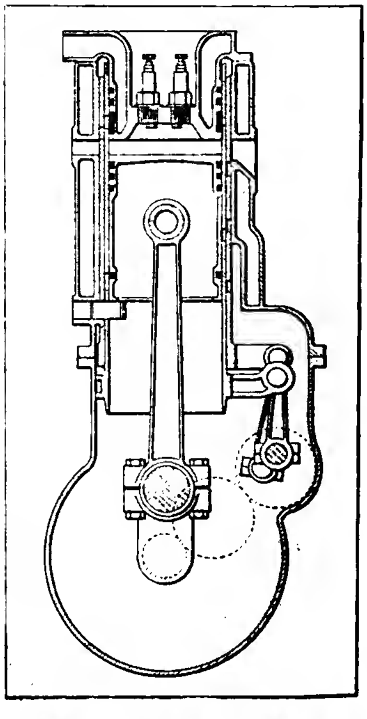
Among other tests to which the new device has been put—for it has been thoroughly tried out—may be mentioned the following: Ten horsepower, two-cylinder Panhard, weighing 2,100, with two passengers and 150 pounds of baggage, averaged 30 miles per gallon; 10 horsepower, one-cylinder Adams averaged 37 miles per gallon; a 10 horsepower, four-cylinder Humber, with two passengers, a top, wind shield, and some baggage, averaged 35 miles per gallon; and an 18 horsepower, two-cylinder Wolseley-Siddeley car with two passengers averaged 26.8 miles per gallon. In addition to these tests, a six-year-old Panhard machine with four cylinders, 80 mm. by 120 mm., was run for a very long time at the exceedingly low speed of 160 to 180 revolutions per minute. This latter was done, too, on a normal, and not a special, adjustment of the carbureter.



Enlarged Section Through Jet Plates and One Plate

Over and above any possible claims, the above actual tests show that the device possesses much merit. This is not to say that no claims are made for it, because the inventor claims that over the whole range of engine speed and power the mixture remains constant and perfect. More than this, he agrees to sell the carbureter on a basis of 19 miles per hour guaranteed, and higher figures if properly paid for. Naturally, in view of these claims, the selling price is rather high, varying from about $33 for the smallest size up to about $45 for the largest. These figures would be net, in England.

Slide Valve Era Is Upon Us—In the past twelvemonth, those who thought that the automobile engine had at last assumed a permanent form have been shown to be in the wrong. Now, just to go to the opposite extreme, following upon the heels of the American, Knight, whose success with the Daimler people has been wonderful, the whole country has gone crazy over this form of engine. Designers are producing all kinds of substitutes for the poppet valve, some good, some bad, and some weird and wonderful, to say the least.



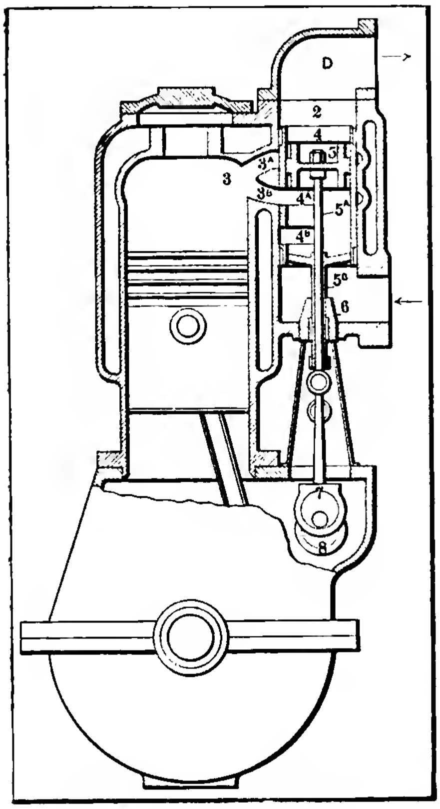
Chalmers-Detroit Slide Valve Engine

Among those which seem to show some merit is the form patented very recently by an American firm, the Chalmers-Detroit Company, Detroit, Mich., shown elsewhere on this page. This would seem to indicate some agreement with Knight, or excellent prospects of making one, for its basic idea is the same as his, and, therefore, covered by his patents, and not workable without a license from him.

In this form an additional slot in the sliding sleeves is introduced, which in combination with extra port openings in the walls and a bypass makes quite a change in the cycle. Through this medium, cool, fresh air is introduced into the base of the engine, where it is slightly compressed as in a two-cycle engine. This slightly compressed air is introduced into the working cylinder twice during each cycle,once during the inflow of the charge and once during the outrush of the heated exhaust gases.

The former adds air to the mixture, and through its own entrance gives an inductive or suction effect to the more pure gas entering in the regular way. Through having the whole suction stroke given up to the inflow of nearly pure gasoline vapor, while the air enters independently, a more even and certainly more thorough, charge is obtained.

Similarly with the exhaust, the air under pressure rushing into the cylinder at about the middle of the exhaust part of the cycle serves to push the rest of the burned charge out quickly, and if it does not clean it out more thoroughly than in the usual case, at least dilutes it to such an extent that any bad effect from its remanence in the cylinder during the gas inflow is completely offset.



Engine With Two Slide Valves, One Within the Other

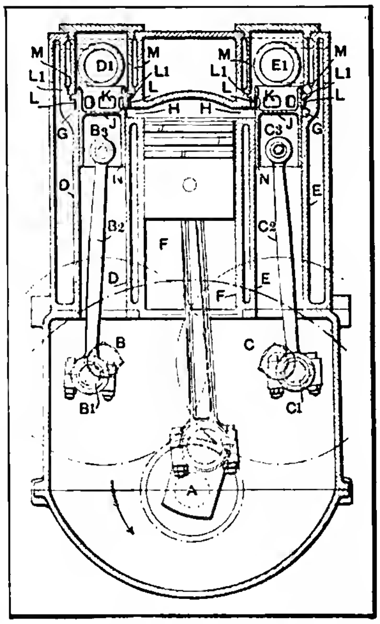
To accentuate the crankcase compression—for that is where the air is compressed—the piston is made very long, while the inner of the two sliding sleeves is carried down further at the bottom than Knight carried his. The head and sleeve construction otherwise is the same as Knight's, at least that is the way the English patent office drawing shows it. Whether this invention will ever be worked on this side is doubtful as this company has no factory over here, so that the first developments probably will appear in the United States.

Piston Valves Supplant Poppets—In the illustration elsewhere on this page is shown an English engine, which has just been brought out, and in which the ordinary poppet valves are replaced by piston valves. These are concentric, one being in the form of a piston, while the other forms a concentric sleeve around it. Both are driven from the camshaft by means of eccentrics and connecting rods, the one for the piston working within the one which operates the sleeve.

In this way the operation of the valve is positive on the down stroke as well as the up stroke, the uncertainty and wavering of the ordinary spring-closed valve being replaced with the absolute certainty of a mechanically closed valve.

As the illustration shows, the cylinder (3) is made with two passages (3a and 3b) to the valve chest (2), within which the valves slide up and down. The sleeve (4) also has two slotted passages (4a and 4b), which are alternately covered and uncovered by the movements of the piston (5). The latter is operated by the rod (5a), while the sleeve is moved by the tubular rod (5b). These slide within the guide (6), and the movement is supplied by the two eccentrics (7 and 8) on the camshaft. Above the valve chest is seen the exhaust pipe (D), while lower down is the inlet opening, not marked with a letter.

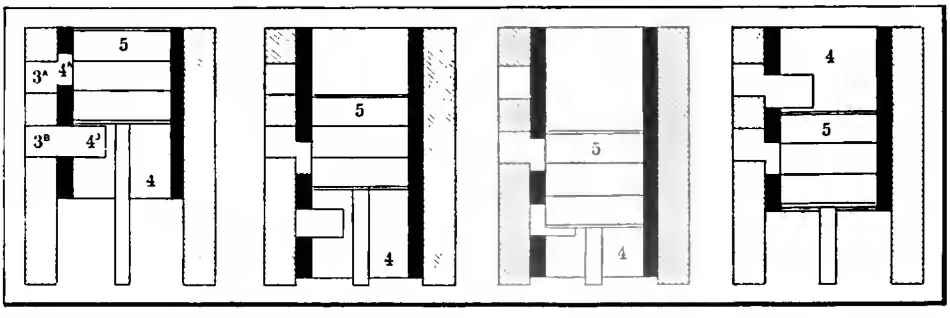
The eccentrics are so set on their shaft that, on the admission stroke, the sleeve (4) travels downwards, the piston (5) meanwhile moving upwards, until the port (4b) registers with the channel (3b). When the main piston reaches to half-stroke on the admission period, the port (4b) is fully exposed to the entire area of the channel (3b), and, subsequently, the sleeve (4), continuing its downward movement, cuts off the admission with swiftness at the outer dead point of the main piston. During the compression stroke, the sleeve (4) is still running down, while the piston (5) is likewise traveling down slowly, thereby covering the port (4a) in the sleeve (4). Upon completion of the compression stroke the center of the piston (5) is opposite to the port (4a), which latter is then almost in alignment with the channel (3b). At this period the port (4b) is right down below both the channels (3a, 3b). In this way the internal pressures are withstood not only by the gas-tight sleeve (4), but also by the wide faced inner piston (5).



Albion Engine Has Slide Valves on Opposite Sides

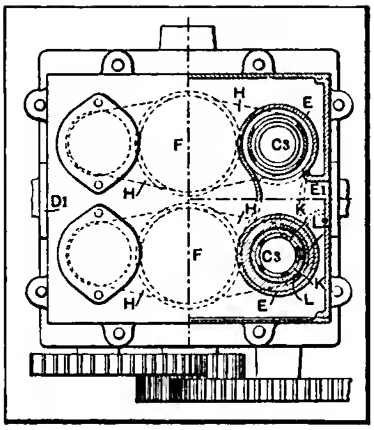
During the combustion stroke the sleeve (4) moves up, the port (4a) thereby ascending towards the channel (3a), while the piston (5) is also moving upwards. When the expansion is nearing its end, both the members (4 and 5) are traveling up, the port (4a) thereby coming fully into line with the channel (3a) when the main piston is approximately at half-stroke in the exhaust period. Gaining speed over the sleeve (4), the piston (5) runs past the port (4a), cutting off the exhaust as the main piston passes its inner dead point. Coincident with this motion, the sleeve (4), having reached its upward limit of travel, comes slowly down, bringing the port (4b) into line with the channel (3b). When the main piston has traveled half its course on the admission stroke, both the channel (3b) and the port (4b) are directly opposite each other, thus affording an inlet orifice of ample proportions. At the termination of the admission stroke the port (4b) in the member (4) runs down swiftly past the channel (3b), thereby cutting off the fuel supply. In order that the operation of the motor may be understood without difficulty, examination of the diagrams reproduced in conjunction with the foregoing information will render its action perfectly plain.

Advantages Are Numerous—Among the advantages which are derived from this construction are that of complete separation of the heated exhaust from the incoming charge by the piston (4), the danger of the one diluting the other being eliminated. Then, too, the design is such that it lends itself readily to



Middle of Admission End of Compression Middle of Expansion Quarter of Exhaust

Slide Valves in Various Positions Throughout the Operation of the Whole Cycle



Albion Engine from Above

water cooling. The valve stems, or what answer to valve stems in the ordinary case, may be lubricated, and are free from the heat of the exhaust. Cylinder pressures and temperatures are withstood better than in the ordinary case, for not only are they received on the outside, but are evenly distributed around the whole circumferential surface by the grooves in the chest. Side thrust is reduced to a minimum and port areas may be accurately proportioned to the desired power or speed.

On the previous page, near enough to the foregoing for comparative purposes, is placed another English piston valve engine. This one has recently been patented by the Albion Motor Car Company, Renfrew, and if reports can be believed, this concern is actively engaged in work on this model of engine, which will soon be placed on the market, as well as being used in the well-known Albion commercial cars.

Slide Valve Displaced by Piston Type on Tee Head Motor—In this engine, the valves are seen to be replaced by pistons, each one displacing one valve. The motor is of the tee head type, so that the change is not as radical as some of the others. The valve, valve lifter and cam mechanism are replaced by the piston valve, eccentric and connecting rod.

The valves are made of a considerable length, so that the opening or passage above is necessarily long, too. This makes the head of the engine very high, and if given over entirely to water jacket, as the patent office drawing shows, would make the engine so cool as to seriously impair the efficiency. This is, however, but a detail of construction.

Within the chest or passage are placed circular orifices (D^1) leading to the exhaust, and (E^1) for the inlet. Communication with these, from the cylinder interior, is effected by means of ports (K) in the valve walls, the same being prevented from ever uncovering the bottom edge of the cylinder wall, by the movement of the eccentric.

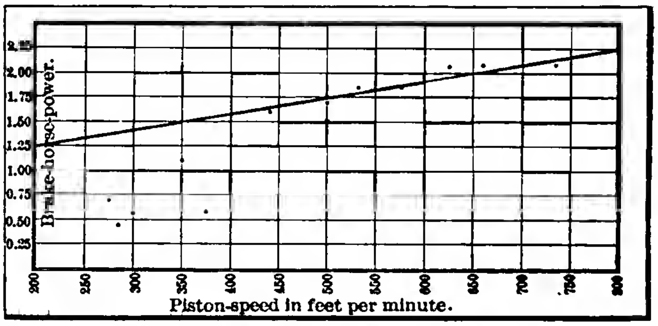
Otherwise the construction is very apparently like any other engine. The elimination of the use of an idler in the camshaft driving gears, however, makes a noteworthy point. As shown elsewhere on the page, this called for unusually large cam gears, and an idler of double width, as the two cam gears overlapped one another slightly.

Object of Variable Stroke Is to Eliminate Transmission—Inventors have worked upon the engine with a variable stroke at various times, and with varying success, most of the engines being little more than schemes on paper. The majority of these, too, sought a more perfect cycle, that is, the object of the variation in the stroke was an improvement in the cycle. Thus, commencing with Atkinson's two attempts in 1885 and 1886, with his Differential and Cycle engines, many attempts have been made. Atkinson's idea, however, was to perfect the cycle, particularly with reference to the length of working stroke and exhaust, while later experimenters followed blindly in his footsteps.

This was not the object sought in the latest English variable stroke motor, illustrated on this page. In this the desideratum was the elimination of the transmission, through the ability of the motor to vary its output from lowest to highest. This variation is effected by having the cylinder offset to a very marked degree and the piston worked through a linkage. This linkage is guided in its movements by another rod. The latter is so constructed as to be movable, this movement altering the length of the stroke, from a very short to an exceedingly long one.

The first figure shows a section through a proposed four-cylinder engine, the one built and successfully tested being but a small single cylinder outfit. In the second figure is the power curve of the "one-lunger" tested, and in the third illustration is to be seen a diagram of the action of stroke variation.

In the latter the letters used are the same as in the first or sectional drawing, A being the real and H the false connecting rod. C is the connecting link and guide, being pivoted to the two connecting rods at B, and movably pivoted at D. F is the double threaded screw through the medium of which the point D is altered, and with it the length of the stroke.

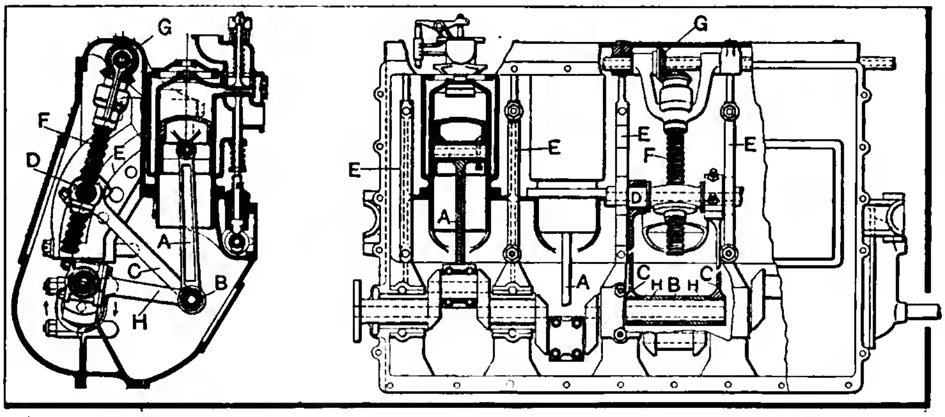


Power Curve of Variable Stroke Engine

This variation is controlled from an overhead shaft, the latter leading back to the dashboard or being actuated through suitable hand or foot levers. Aside from this, the valves, piston and other parts are regular in their construction.

This proposed engine will have four cylinders, nominally of 5-inch bore and 5-inch stroke, the variation in the latter being from a minimum of 2 inches up to a maximum of 7½ inches. This would give a variation in the ratio of bore to stroke of from 1 to .4 up to 1 to 1.5. It is expected that this engine will easily develop 50 horsepower, basing this estimate upon the results obtained in the test with the one cylinder.

Much smaller than this was the experimental engine, which had a bore of but 3 inches and a stroke variable between 1 inch and 3½ inches. This engine would rate by the R. A. C. formula (A. L. A. M.) at 3 horsepower, so that consulting the appended table, the loss due to the added linkages may be seen to be far smaller than one would suppose. That is the question which has held back the progress of this type of engine, the doubt as to the loss which the linkages would entail. In this small, single-cylinder engine, the loss amounted apparently to about 30 per cent, at least that is the amount which the highest power developed lacks of usual output.



Sectional Drawings of Gill-Aveling Variable Stroke Gasoline Engine

Results of Tests With the Experimental Engine

Stroke	Revs. per min.	Piston Velocity Feet per min.	B.H.P.
1 in.	1,700	284	.44
1 in.	1,000	300	.57
1 in.	2,250	375	.58
1½ in.	1,100	275	.7
1½ in.	1,400	350	1.08
1½ in.	2,000	500	1.5
2 in.	1,500	500	1.7
2 in.	1,600	533	1.84
2 in.	2,000	667	2.07
2 in.	2,200	734	2.09
2½ in.	1,050	438	1.6
2½ in.	1,500	625	2.05
3 in.	900	450	1.66
3 in.	1,000	500	1.76
3 in.	1,150	575	1.85
3 in.	1,500	750	2.07
3½ in.	750	437	1.59
3½ in.	850	496	1.74
3½ in.	900	525	1.77

Throughout the tests, the compression pressure was about 85 pounds per square inch for all lengths of piston-stroke, and, although not recorded in the table, we understand that the highest velocity was obtained with a 1¼-inch stroke, when the tachometer indicated 2,400 r.p.m. 320 r.p.m. was the slowest speed at which the engine would run with a 3½-inch stroke, but, with a 1-inch stroke, steady running, at 240 r.p.m., could be maintained. Taking the figures from the third and fourth columns of the table, we have plotted a chart, in which piston-speed in feet-per-minute is represented by the ordinates, and brake-horsepower by the abscissæ; an examination of this chart reveals the interesting fact that the brake-horsepower bears an almost-direct relation to the piston speed, although, for the lower piston-speeds, there is a considerable drop below the arbitrary line of proportion; the decreased efficiency at slow speeds may be attributed to valve leakage, and other causes that are eliminated with increased speed.

Those responsible for the design are J. F. Gill and T. C. Aveling, assisted by A. A. Remington. From the names of the engineers, the new motor is to be known as the Gill-Aveling. Other details than those commented upon are standard, that is, they follow regular automobile engine practice.

While not an epoch-making machine, by any means, the test curves would seem to give hope to the inventors that they are upon the right track, if they have not actually attained what they sought. The loss of power represented in the rather crude first example is not serious, being but 41 per cent. under the formula. This for a single cylinder, which is of notoriously poor balance, is not at all bad, and the outcome of the tests of the four-cylinder power unit will be awaited with much interest.

Rotary Overhead Valves Another Good Idea—The last figure shows another recent English construction, in which overhead valves are resorted to, these being of an unusual kind. The design, for which W. J. Crossley, of Crossley Brothers, Manchester, is responsible, is an exceptionally good one.

An end section and an end elevation are shown, which reveal clearly the valves themselves, and the driving mechanism. There are two separate valves for each cylinder, just like any other engine, but both of these are circular sleeves, rotating within other sleeves. The inner sleeves are driven from a diagonal camshaft at the front end, which in turn is driven from the crankshaft. A worm gear is used to drive the shaft, and the valves, too, are driven by means of another worm gear.

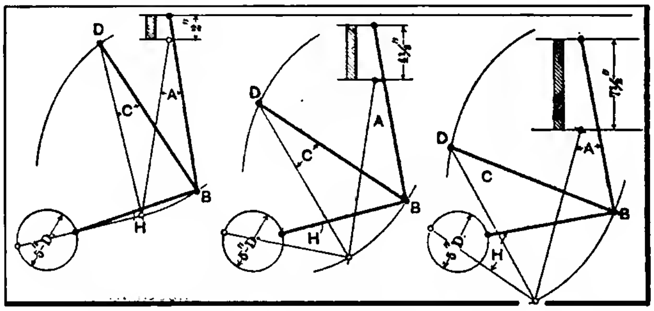
These valves are set at about 30 degrees each side of a vertical, and communicate with the combustion chamber, which is made spherical, through small slots. In addition to the revolution of the inner sleeves by the shaft shown, a similar shaft at the other end of the engine drives in a similar manner the outer sleeve, the rotation of the two being opposite in direction. That is, the inner sleeve on each side of each cylinder rotates opposite to the outer sleeve on each side of each cylinder. It would appear from the description of this engine as if, in multi-cylinder forms, the sleeves along each side of the engine were made and operated as a single unit, the gas having free access to the exterior and interior in a longitudinal direction.

This would mean, in turn, that the inlet valve sleeve acted as an inlet pipe, and the exhaust valve sleeve as an exhaust pipe, so that all piping of this nature would be eliminated. Then the carbureter would be attached directly to the exterior of the inlet valve sleeve. If this is the right idea a very considerable simplification will result a step in the right direction.

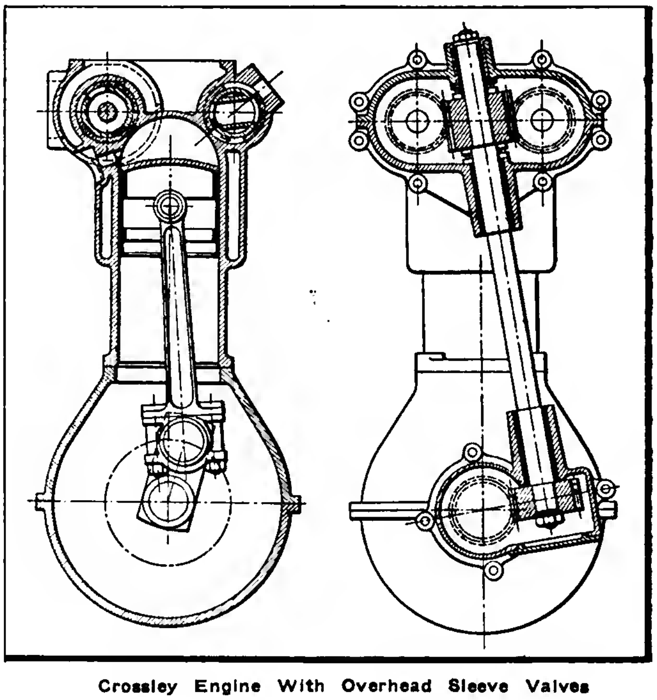
Another English sleeve valve engine, that of A. Reeves, Farnsborough, is very similar to the second one described, in that the ordinary cylinder (Tee-head) construction is unchanged, the valves being simply replaced by piston type of sleeves. He has this change, however, the inner or piston valve is operated in the usual way, with valve lifters, springs, etc., while the sleeve surrounding it is worked from an eccentric, by means of a rod.

It is hard to see that this has any advantage over the ordinary form, as the complications instead of being reduced are increased. More than this, by having the one valve, the inner, and thus the really important one, operated by a spring on the down stroke, it seems as if the biggest point in the sliding valves favor has been lost. The valves were made small in diameter, but of considerable movement, which gave to the valve chest, if it may be so called, a very long and narrow shape that was not displeasing to look at. The requisite amount of port opening was obtained by making the slots or ports very wide or high. The length would seem to call for rather high speed of valve movement, which in turn would seem to nullify the gain from height of valve port.

At any rate, whatever may be the merits and demerits of the various types of engines, and other parts described, their design, construction, testing and public appearance would all bear out the contention that whether intended or not, the Knight engine upset all the traditions of the automobile world, as to form of engine, some of which had been ten years in the making.



Variations in the Stroke from Lowest to Highest



Crossley Engine With Overhead Sleeve Valves

LETTERS INTERESTING

CLUTCH SPRING VALVES

Editor THE AUTOMOBILE:

[2,082]—I have a four-cylinder engine, four-cycle, bore 4¼ in., stroke, 5¾ in., and wish to attach a cone clutch to the same. The clutch is of 14 in. diameter, 2¼ in. face, and 10 deg., included angle, faced with leather. Is this surface ample to use with a spring of ¼-in. steel of 2-in. inside diameter, 6 in. long extended and 4¼ in. compressed? Kindly advise me as to the above.
Canaan, Conn. A. E. MOLANDO.

To answer this question correctly, it will be necessary to go into the clutch and spring problem rather deeply. It will also be necessary to know something about the power which the engine will develop. If we take the latter from the A. L. A. M. tables, and add a little to allow for the increased length of stroke, as well as to make an even figure to work with, we get 30 horsepower at 1040 r.p.m.

With this as a starter, the required spring pressure to transmit through the cone clutch described will be found using the formula:

$$P = \frac{H\ P \times 63{,}000 \times \sin\theta}{f \times r \times R}$$

in which, P equals the necessary spring pressure;
H P equals the horsepower;
R is the speed at which this power is transmitted;
sin θ is the sine of the clutch angle;
f is the coefficient of friction and
r is the mean radius of the clutch.

Supplying the required figures in this case, assuming the mean diameter as 13 in., which would make the mean radius 6.5 in., and assuming the coefficient of friction as .25, then we get the following:

$$P = \frac{30 \times 63{,}000 \times .174}{.25 \times 6.5 \times 1040} = 19.4 \text{ pounds.}$$

This spring pressure may be resolved into spring dimensions by using the well-known formula:

$$\delta = \frac{64 \times N \times L \times R^3}{E \times d^4}$$

in which δ equals the deflection of the spring in inches;
N is the number of free or complete coils;
L is the load in pounds;
R equals the mean radius of the wire used;
E is the modulus of elasticity, which may be taken as 11,500,000;
d is the diameter of the wire.

Now, in your case, we just found L to be 19.4 pounds, N must be determined, R is 2 ¼ in. and d is ¼ in. Then substituting:

$$1.75 = \frac{64 \times N \times L \times (2.25)^3}{11{,}500{,}000 \times (.25)^4}$$

from this we may evolve the following:

$N \times L = 111$;

now, L was just found to be 19.4, so that substituting it, we get

N equals 5.72 coils.

The conclusion then is that the spring will be all right for the clutch and engine described, if the spring has no less than 5¾ coils, or say 6 coils.

Clutch width is determined on a basis of average pressure, never exceeding a figure of 45 pounds per square inch. It is figured as follows:

$$W = \frac{z}{F \times 2\pi \times 45}$$

in which F is the same as r in the first formula, that is, the mean radius of the cone, while z is equal to resulting spring pressure or the axial pressure x divided by sin θ. This works out from previous figures to 1156 pounds. Then substituting, we get

$$W = \frac{1156}{6.5 \times 6.283 \times 45} = .65 \text{ in.}$$

It is at once apparent that the width which your clutch has is ample, being about 3 times as wide as is necessary, according to the formula. The answer to your question is that the clutch is very apparently all right, with the single proviso that the coiled spring must have 5¾ or 6 full coils.

KEEP GENERATOR WARM

Editor THE AUTOMOBILE:

[2,083]—Will you please tell me of some mixture to put in the tank of my gas generator, which will keep the water from freezing. I have no fear of radiator trouble, but am a bit worried in regard to the gas generator.
Corning, N. Y. J. H.

If you have reference to the water within the generator, anything added to this will reduce the amount of gas generated, and the ease and celerity with which the generator functions, that is, will have a tendency to clog it up.

On the other hand, if you refer to the water jacket around the outside of the generator, you can use anything you want to in that. In the past two or three weeks a number of anti-freezing mixtures have been given in the columns of THE AUTOMOBILE. Any one of these may be used.

On page 604 of the Oct. 7 issue, alcohol solutions were discussed in much detail, a curve of freezing temperatures of different mixtures being, both for denatured and wood alcohol. Then, in an earlier issue, that of Sept. 30, a similar curve was given for calcium chloride, showing how solutions of that vary as to freezing. On this page, you will find something about kerosene.

BRAND NEW ANTI-FREEZE

Editor THE AUTOMOBILE:

[2,084]—I would like you to inform me through "Letters Interesting, Answered and Discussed," as to why kerosene oil, commonly called coal oil, is not universally used in automobiles for anti-freezing purposes. I have heard of some individuals using it successfully and an all-kerosene solution is much cheaper than 25 or 30 per cent. alcohol solution. Maybe it is injurious, or what is the matter? Would offer as a suggestion to those using alcohol compound to plug up the overflow pipe when not in use to prevent the alcohol part from evaporating through the same, which would weaken the compound so it would have a lower freezing point than was originally intended. J. C. BROWN.
Riley, Wis.

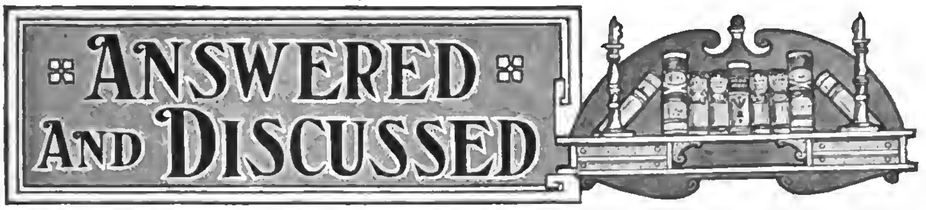
The last suggestion is a very good one, and should be brought to the attention of every automobilist using the alcohol solution. A cork could be carried around in the vest pocket for this purpose, and slipped into place every time the car was brought in from a run.

The first suggestion, on the other hand, is not a good one. Kerosene would be objectionable in that it would coat the walls of the radiator with a thin film of oil, and impair the conducting qualities of the metal composing those walls to such an extent as to reduce the capacity of the radiator for radiating heat to about one-third (1-3) that of the same radiator without an oil film. Worse than this, did you consider the effect of warming up about ten gallons of kerosene, and perhaps, holding a match over the vent pipe of the radiator?

If you did not, consider it now, for the result would be that you would make an unusually quick trip into the next county, if not into the next world. All kerosene needs to put it on a par with gasoline for explosive purposes is heat externally applied, just as the cylinders at about 250 degrees or possibly 300 degrees would supply. It seems as if the disadvantages of this scheme far outnumber and overbalance the gain.

Kerosene could not be used with water either, as oil and water will not mix. This makes it necessary either to accept your scheme as a whole or reject it as a whole. The latter is the best way, unless you "hanker" to visit the next county (or perhaps the next world) as indicated.

Why anyone would want to use a fuel for cooling purposes, is hard to explain, when it is an easy matter to get a real cooling mixture from substances, which never could, would, or should ignite, burn, or explode under any conditions whatever. The thing to do, is to get up a brand new cooling mixture from chemicals not now used, which will be superior to anything now in use.



KEEPS TO THE RIGHT

Editor THE AUTOMOBILE:

[2,085]—I drive a 1909 six-cylinder car, which has always had a tendency to steer to the right when running over an ordinary pavement or country road. The manufacturer has on different occasions replaced front axle, steering knuckle, and lined up the wheels, but the car still runs to the right. Do you think the trouble is in the steering mechanism, which is a screw and nut design? F. S. HARRISON.
Cleveland, O.

Whether the manufacturer changed any of the parts or not, it is a truism that if the car does not run straight normally, something must be out of true. The first thing to do is to find out what that is, so as to be able to correct it.

To go about this in a systematic and thorough manner, run the car onto a large, smooth, wooden floor, being particular to select a smooth one, as you will want to mark upon it. Then, with the car in an advantageous position, turn the front wheels straight ahead, or as near so as possible, and set the brakes.

Next secure a long steel square, such as carpenters use, being sure that both legs are more than 18 inches long. In addition, you will need a plumb line and bob. Using the latter, plumb down, or to put it otherwise, project, the front inside points of the frame as indicated on the sketch at A A. Having located these on the floor accurately, draw the line A-A to connect them. Bisect this at B, which will represent the center point of the front end of the car.

At the rear, project the corners C C, connect them with the line C-C, and find the center as at D. Draw the line B-D, which will represent the projection of the center line of the car. Now, with your square, project the front and rear points of each of the front wheels, in succession, as shown at E E, for the left front wheel, and F F for the right. Connect these by the lines E-E and F-F, to represent the center lines of the two wheels. In projecting the wheel points take particular care, in fact, to get these right you may have to project first one side of the wheel at the front end, then the other side, taking the center between the two as the actual center, and repeating for the other points.

Do the same for the rear wheels, obtaining the four points, G G and H H, from which draw the wheel center lines, G-G and H-H. Now, these may be bisected to obtain the centers at I and J, or the center of the hub cap or similar points may be projected to obtain it. In either way, obtain a projection of this center point on each side, and connect the two with the line I-K-J, K being the point where this line intersects the car center.

Going back to the front axle, project both sides of both ends, as at L L for the left end and M M for the right end. Take half of the difference between the two, being sure to do this accurately, and through the two resulting points, N and O, draw the front axle center line, prolonging it beyond the wheels as at Q-N-R-O-P. R will be the point of intersection with the car center line. Now, if you like, the car may be moved out of the way,

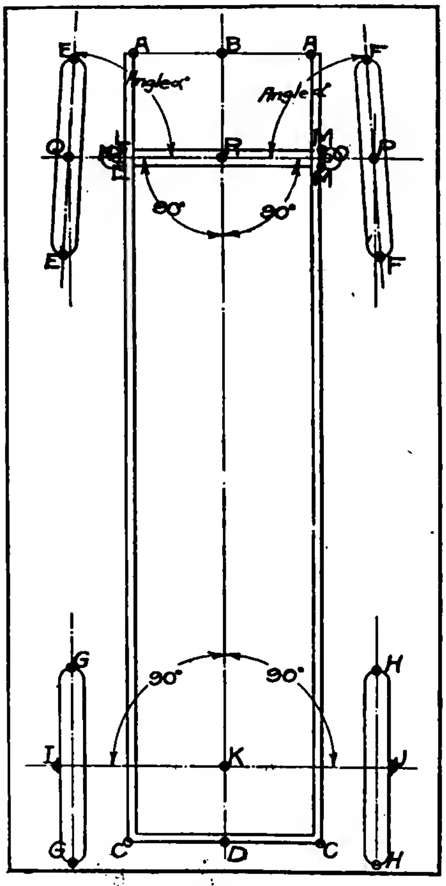


Diagram Showing Method of Lining Up Car

since all of the desired points have been obtained, and from these the car may be checked up, without the car itself.

Summing up the requirements for straight ahead running are four:

1. The angles NRK and ORK of the front axle center line with the car center line must each be exactly a right angle, that is, just 90 degrees.

2. The angles EQR and FPR of the front wheel center lines with the front axle center line must each be exactly the same, whether equal to 90 degrees or less, the latter being the more usual case.

3. The angles IKB and JKB of the rear axle center line with the car center line must be just exactly 90 degrees, a right angle.

4. The center lines of the rear wheels G-G and H-H must make exactly the same angle with the center line of the car, DKRB, whether that be 90 degrees or less, the former being more usual.

Having done this, you will know where you are at. It may surprise you to read the last two conditions, as the average owner has an idea that the alignment of the rear wheels has little or nothing to do with the straight ahead steering of the car, but such is not the case. The effect of disalignment of the rear wheels is very noticeable, in fact, it was one of the "bugaboos" which helped to make the chain-driven car less popular, the two chains having a tendency to pull differently, and thus pull one end of the axle.

In answer to your question, the type or construction of the steering gear would have little to do with a trouble of this sort, although it might be so connected up to the steering links as to pull to one side when apparently set to the middle of its throw. This could be corrected by simply turning the wheel a little farther to the one side.

MUST HAVE SOME NOISE

Editor THE AUTOMOBILE:

[2,086]—About two months ago I bought a Chalmers-Detroit "30" 1910 model, and am very well pleased with it in every way except that the differential produces a humming sound like an electric car. Some tell me to put in castor oil, and still others say graphite. I would appreciate it if you would tell me how to stop this humming, and also what causes it. G. D. STOLLENWERCK, JR.
Uniontown, Ala.

Some little noise in, or rather from, gears which mesh and run continuously is unavoidable. You can, however, reduce this very materially by using one of the lubricants spoken of. Between the two mentioned, the preference would lie with the latter, that is graphite. This should not be put in as clear graphite, but added to oil in about the proportion of a tablespoonful to a gallon of *good* oil. Note the italics. You should always use good oil, selecting it with the greatest of care, as much so in proportion as you would use in selecting a car. Running in oil of first quality, the gears will make as little noise as it is possible to have.

Another thing that you should remember is that gears, like cylinders and pistons, run in after a while, and then make much less noise than when new. From the record of the length of time you have had the car, it would seem as if you might begin to expect an improvement in this matter any time now, depending, of course, upon the amount of use which you give the car.

It is just barely possible that the shape of the differential case is such as to act as a sounding board for all noises which the gears make, thus really magnifying what little noise there is. Should you find this so, coat the inside with shellac.

Inter-State Model 30 Touring Car Fully Equipped with Top and Windshield

ALL the important features of the models made during the past season by the Interstate Automobile Company, Muncie, Ind., have been retained by the makers in the 1910 models, the details of which are now given out for the first time. The line consists of one chassis of 118-inch wheelbase, to which three standard types of bodies will be fitted. These will then be known as Models 30, 31 and 32, according as the body is a touring car, demi-tonneau or close coupled as some call it, or runabout, respectively.

Any or all of these—they are practically the same—sets a new value in the automobile world in that the worth of material, design, and workmanship for the money asked, is more than usual The wheelbase is long, the wheels are big and fitted with big tires, the springing is excellent, all of which go far toward making the riding qualities of the car as good as could be expected. Granting that all this may be had in a medium-price car—this one belongs in the $1,500 class—there seems to be little, if any, reason for paying more or looking farther.

Some changes have, of course, been made, such as the necessary refinements of detail, added to an increased wheelbase and larger cylinder bore, an improved type of clutch, a three-quarter elliptic rear spring suspension and more room in all styles of bodies. There is nothing omitted which could give better satisfaction in reliable running qualities, graceful appearance and economical up-keep. Improved features have been added in the later production, but only those which have been accepted universally as possessing exceptional merit.

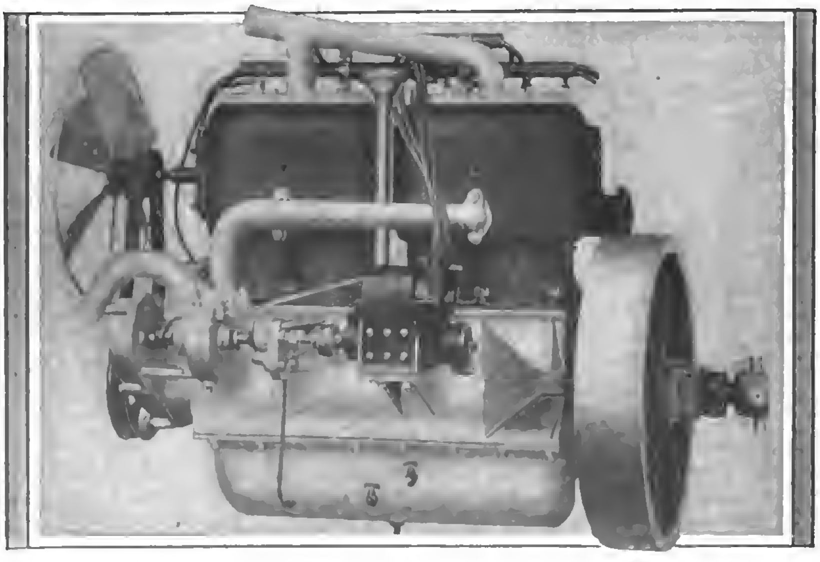
Among the motor changes are an increase of the cylinder bore, a larger cam shaft, the adoption of hardened and ground steel rolls in the push rods, giving frictionless rolling contact on the cams; a water-pump case integral with crankcase, and a rotary-gear oil pump on the outside of crankcase.

Four vertical cylinders with integral water-jackets and cast in pairs are given a high hydraulic test both before and after machining to discover any unseen sand spots or flaws. The bores are ground to exact dimensions, as well as the pistons and rings, and the latter are ground on the sides, assuring interchangeability. All are made of the finest gray iron.

All of the valves are located on one side with hardened and ground nickel-steel heads and ground stems, and both valves and passages are of large diameter, giving a high efficiency in power production. Valves are operated by a large single-piece camshaft, hardened and ground mechanically correct from generated master cams. The push rods contain hardened and ground steel rolls, giving rolling contact on cams, and eliminating all sliding contact on the cams. The whole construction assures a smooth, positive and noiseless action.

The crankshaft is made from a special carbon-steel forging, double-heat treated, and all bearing surfaces are ground to exact size. It is supported by three large main bearings, the center bearing support being integral with the crankcase. The rear and center bearings are adjustable for any possible wear. All bearings are of the very best bearing metal, which, in connection with the efficient lubricating system, assures long life under the unusually severe conditions met with.

High-Grade Materials, Aluminum and Vanadium—For the various parts of the car, the materials have been selected with much care, this, too, without any regard for the price. The light weight of aluminum is well known. So, too, is its high price per pound. Yet this medium-priced car uses it, and in large quantities, because the designers of the car considered it needed to round out the whole design in a proper manner.



Magneto and Pump Side of Inter-State 40 H.P. Motor

This is the material of the crankcase as well as the gearcase. The former is accurately machined by the use of many and various jigs, the expense of which is ungrudgingly borne in the desire for absolute accuracy and interchangeability. The oil reservoir is bolted directly to the bottom of crankcase. This is easily removed for adjustment or inspection of camshaft, crankshaft, connecting rods, or push pin rollers. It gives an accessibility which cannot be questioned, and still gives a very rigid crankcase. The lubrication is accomplished by the constant level splash system with a sight-feed indicator of latest type on the dash, indicating the flow of oil at all times from the reservoir to the crankcase. The constant level is maintained by a rotary-gear oil pump located on the side of the case and driven by the water-pump shaft. The oil reservoir holds two gallons, and receives the return from crankcase by gravity.

Motor cooling is effected by a fan-cooled radiator of the latest type and a fan flywheel, assuring perfect cooling at all times. A positive system of water circulation is maintained by a gear-driven centrifugal pump, the case of which is integral with the crankcase. Radiator cooling is by a ball-bearing fan, supported from motor and driven by a belt from the crankshaft.

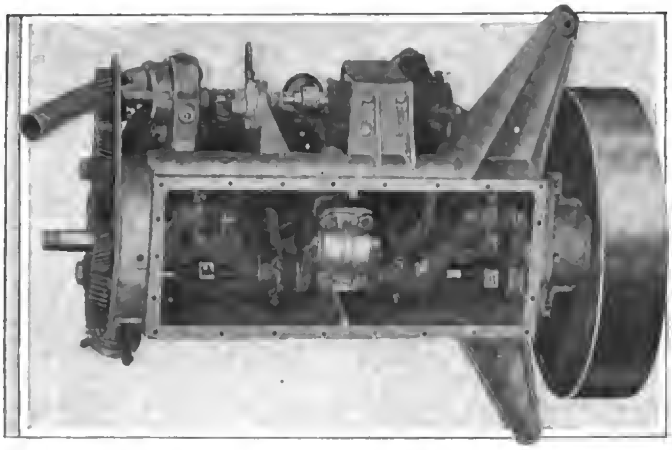
Ignition consists of two separate and distinct modes with a separate set of plugs for each system. The batteries, four-unit coil, timer and set of spark plugs constitute the first, and the second, a U. & H. imported high-tension magneto, with a separate set of spark plugs. Magneto is mounted on a standard of the crankcase and is directly connected to the pump shaft by an imported coupling.

The pump shaft is gear driven by a helical gear meshing with a helical camshaft gear and all gears are covered with an oil-tight case. The entire timing gears are of helical type, otherwise known as spiral gears, and they represent the highest type of high-speed gearing known, where smooth and noiseless action is required.

Helical Gears One of the Modern Refinements—This use of spiral gears, with their extra expense of cutting, indicates the modern trend toward the ultra-quiet car. This form of gearing is well known for its silence, and is used for that reason solely. The great cry nowadays is for quiet, absolutely quiet cars, and to answer, or rather, to forestall this, the spirally cut gears are used. The efficiency of well-cut gears of this variety being high, the losses to counterbalance the silence are practically negligible.

Gasoline is supplied by gravity pressure from a tank of large capacity and set high enough to assure a sufficient pressure on any grade likely to be encountered. The carbureter is of the latest float-feed type, having a visible gasoline level and easy and positive adjustment. It is automatic in its action and provides the proper mixture for all motor speeds. The throttle valve is controlled by a hand lever on the steering wheel and by a foot accelerator pedal conveniently located.

The drive is taken from the motor by a double universal joint of improved design, which can be disconnected without disturbing either motor or transmission, is practically noiseless, and easily lubricated, all important features.

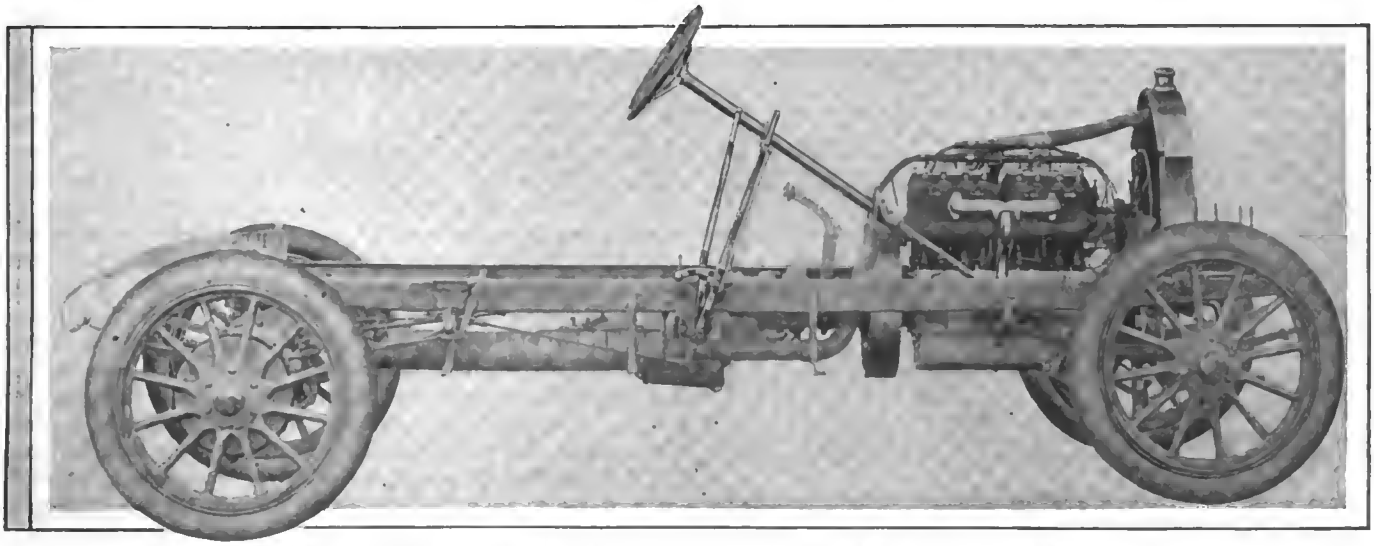


Crankcase Showing Bearings as Seen from Below

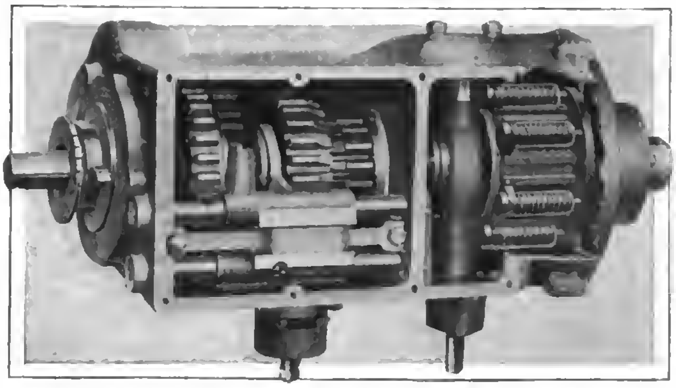
Features of Transmission and Clutch—An improved form of disc clutch is used, comprising 63 plates of tempered saw-blade steel running in a separate compartment integral with the transmission case. The large number of steel plates gives the same smooth positive action as from the use of bronze and yet has not the fast-wearing features of the bronze discs. A ball-thrust bearing between yoke collar and the clutch throwout yoke ring eliminates a large amount of friction and consequent wear. The clutch complete gives a smooth positive action at all times and the qualities described insure long life. The clutch tension is maintained by six spiral springs evenly spaced outside of the discs giving a very even thrust on the clutch discs and not depending upon the action of a single spring. This construction makes the failure of the clutch impossible from a single weakened or broken spring.

Inter-State design of transmission is well known for its durable construction and perfect ease of operation. The case is a high-grade aluminum casting, and the shafts are supported throughout on imported annular bearings.

Gear Details Sound Good—Nothing is more important than good materials, good workmanship, and efficient lubrication in the gearcase and gears, which give it the name. In this transmission all gears are of extra wide face and heavy pitch— five pitch being used throughout—and all gears in constant mesh are made of vanadium steel. The sliding gears shift on the four-keyed type of shaft and the keys are integral with shaft. All gearing is generated, hardened and ground, and chamfered with the most improved form of curve. A double locking device holds the gears and shifting lever in position and prevents



Side Elevation of Completed Chassis, Showing Inlet Side of Engine and Rake of Steering Column



Gearcase with Cover Removed Showing Clutch and Transmission

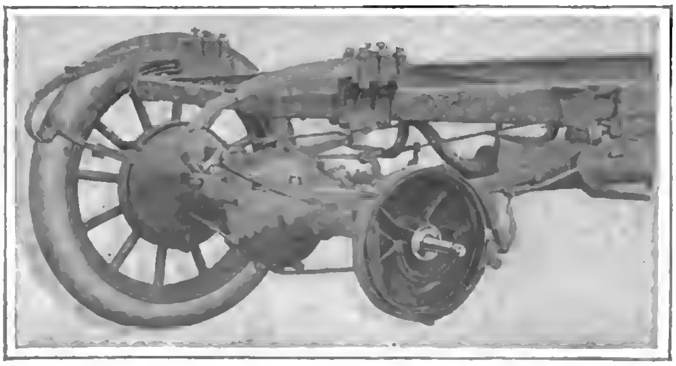
the careless driver from going by neutral position unintentionally.

Round or barrel-shaped is the name given to the gearcase, to describe the form of construction. This is in a single unit, with a large cover plate on the top for inspection purposes, being handy as well for adjustments and lubrications. The one-piece case is not only simple—a very good point—but it possesses added strength over any form of two-piece case, the division of the case representing a line of unavoidable weakness.

Propeller shaft is rigidly supported at both ends and the bevel drive pinion and gear and differential box are housed in an oiltight differential case. All bevel gears are carefully generated, assuring noiseless and efficient power transmission, and all the gears are easily removed. The axle shafts are of large dimensions, and made of very carefully selected steel.

Every motorist should look into the subject of brakes, for following the operation of starting the car, the next most important thing is to be able to stop. With the idea of stopping the car very quickly in emergencies, this one is fitted with four very large and efficient brakes. These are of the latest internal and external type, both working on the same drum attached to the rear wheels, one on the inside and the other on the outside. The two internal expanding brakes are used as service brakes. These are operated by foot pedal and are dustproof. All brake bands are lined with 2-inch thermoid lining and are provided with very simple adjustment. There is no transmission brake used, and, therefore, no stresses are imposed on the mechanism.

What the Springs Show in the Way of Merit—Springing has come to be regarded as one of the big problems of the automobile, and as such the details of the spring suspension of any car are worthy of more than ordinary scrutiny, particularly to the prospective purchaser. On this car an improved rear spring is of the three-quarter scroll-ended elliptic construction, affording more comfortable riding qualities. They are very rigidly suspended outside of the frame side rails and the wide spring base makes a more easy riding action of the car on rough roads. The rear springs are 45 inches long and the front springs are 42 inches long. All are 2 inches wide and made of vanadium steel, which means that they are unbreakable.



Rear Suspension Consists of Three-Quarter Elliptic Springs

Front axle is made of a high-carbon steel drop forging properly heat-treated and of I-beam construction. The steering knuckles are provided with extra large ball bearings fully ground and all connections are fitted with grease cups. The front axle road clearance is 11 inches and the rear axle clearance is 10 inches. The steel mud apron under the motor has an actual road clearance of 11 inches.

How the Frame Adds to the Whole—Since the units comprising the power plant, the clutch, transmission, springs, etc., all rest upon, or are attached to, the frame, that should have special treatment. It is of pressed steel, the channel section being employed to good advantage. The section of the stock used is unusually heavy, and is pressed out cold. The open side of the channel is turned in, so as to present a smooth exterior. At all corners and points where the cross-members are attached, heavy gusset plates are employed to retain the full strength.

Cross-members are four in number, located as follows: One at the extreme front, forming a bed for the radiator to rest upon; one passing under the front end of the engine, and forming the single point in the motor's three-point suspension; one just back of the flywheel and just forward of the transmission, lending stability at this hard-worked point, which comes at the dashboard; and the usual cross-member at the rear end.

At the dashboard, as just described, the bracing is worth special mention. Two unusually long triangular steel plates are riveted to the top and bottom of each side member, the lower one being much wider than the upper all along its length. Upon this widened lower member, the rear feet of the engine, extended in width for this particular purpose, rest thus forming the rear two points in the three-point support.

This unusual extra bracing, coming just at a point where the ordinary frame has its weakest point, is an excellent feature of an excellent car. The three-point suspension, too, is very good.

Engine bore, which has been omitted above, is 4 1-2 inches, while the stroke is 5 inches, the wheelbase is 118 inches, and the tread, standard, 56 1-2 inches. The wheels are 34 inches diameter all around, while the 4-inch diameter tires are also used on all four wheels.

Alumaloyd, the new aluminum-coated sheet steel, is the material for all bodies. This is bent to the desired shapes and used over bent-wood frames to hold that shape. The seats are of number one first quality buffed leather, stuffed with curled hair and fitted with spiral springs.

Unusually complete describes the equipment, which includes two gas headlights, with generator; two oil sidelights, one oil tail light, horn, tube, bulb, large combination tool and battery box placed on the left side of the car so as to leave the right or working side free, or if preferred for spare tires. The set of tools is complete and of the best makes throughout. The spare parts supplied are very complete, enough so to cover all small repairs for a whole season with ordinary careful driving.

MITCHELL EXPORTS GET DUTY DRAWBACK

WASHINGTON, D. C., Oct. 30—By ruling the United States Treasury Department, exports of automobiles by the Mitchell Motor Car Company, of Racine, Wis., will be allowed a drawback equal in amount to the duty paid on the imported materials used, less the legal deduction of 1 per cent. The materials include nickel alloy steel used in transmission and axle shafts and gears, ball bearings, aluminum crank and gear cases and parts of the Splitdorf magnetos.

The regulations set forth that the drawback entry must show the total number of automobiles exported, and the kinds and quantities of imported materials entering into the manufacture thereof, describing the several items as listed in the import invoices. The entry must further show, in addition to the usual declaration, that the exported automobiles were manufactured of the materials in accordance with the manufacturer's sworn statement filed with the collector of customs for the district.

Fig. 1—Model 0-3 touring car, with a roomy tonneau, wide side entrance, straight effect and metal body

WITH a brand new shop, ample and modern facilities, designers of skill, and a business establishment of wide experience, the Elkhart Motor Car Company, of Elkhart, Ind., is rapidly crystallizing, and the Model O series for 1910 will comprise some six separate styles of cars, one of which is shown in Fig. 1, and is a touring car, for five passengers, known as Model O-3, selling at $1,700.

A toy-tonneau, designated as Model O-2, using the same chassis, will undoubtedly be a popular type of car, and Model O-1, as shown in Fig. 2, is a roadster of caste. The toy tonneau will sell at the same price as the touring car, but the roadster will sell at $1,700, which is $50 below the touring prices, the difference being in the body.

Bodies All Equal in Point of Quality—The several types of bodies are with ash frames, properly joined, well ironed, and sheet metal is used for panels and doors. Upholstery is in M. B. leather of a careful selection, with spring cushions, and the standard colors of the finish are red, maroon, and black.

The touring car weighs 2,500 pounds, has a wheelbase of 118 inches, standard tread (56 inches), and the load is rolled on 12-spoked wheels, artillery type, using 34 x 3 1-2 inch Diamond tires, front and rear, with provision for 35 x 4 inch tires of the same make as an extra, at the option of the purchaser.

Power Plant Represents Competence—The motor, the right side of which is depicted in Fig. 3, is of the four-cylinder (vertical) type, placed in front, so that the radiator is over the front axle, and in this way the weight is so suspended between the front and hind axle that the performance of the car is superior. The cylinders of the motor are cast separate; of gray iron, with spherical domes, valves in heads, and rockers, R_1, R_2, R_3 and R_4, engaging tappet-rods, which are actuated by means of integral cams on a single camshaft, S, located within the crankcase, on the right side, driven by means of a silent (housed-in) gear, which meshes with a pinion on the crankshaft.

The carbureter, C, is also on the right side of the motor, and the manifold, M, is of the equalized type, made of aluminum, and properly proportioned, having in mind the fact that it is just as easy to exceed the requirement as it is to make the sectional area of the orifices too small. The location of the carbureter is advantageous, being high enough to be accessible, and low enough to afford a "hydraulic grade" for the gasoline in its migration from the nozzle to the cylinders, so that if some of it should fail to vaporize it will drain back to the carbureter, and the mixture will not be unbalanced by excesses of liquid being carried over.

Dual Ignition Includes Remy Magnetic—Besides a coil and battery, the latter comprised of dry cells, the Remy magneto is placed on the right side of the motor, on the pads, P, as shown (with the magneto removed), and is driven by a shaft which extends out of the gear housing, H, which meshes with the camshaft gear on the end of the camshaft, S. The ignition system, in view of the character of the devices used and the methods of installation, is up to a fitting standard, and the methods employed for advancing and retarding the spark renders the task of obtaining the maximum power from the motor but a matter of doing so.

The fan, F, Fig. 3, which is placed between the motor and the radiator, is of great capacity, having strong blades of liberal area, set at a well authenticated angle, and driven by a wide, flat belt, B, taking power from the crankshaft, through the good office of the pulley, P. The radiator, of the tubular type, is of adequate area of the cooling surfaces, and water is circulated by means of a gear-driven pump of good capacity.

The power of the motor, due to the use of 4 x 5-inch (bore and stroke, respectively) cylinders, is

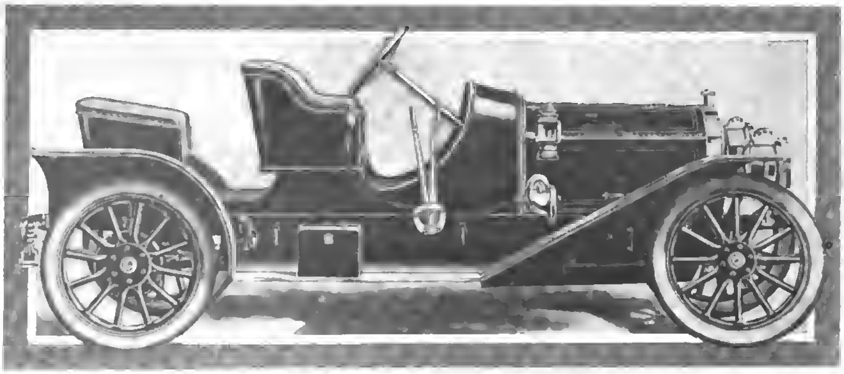


Fig. 2—Model 0-1 Roadster type, with runble seat in an accessible position, smart effect on the whole, and speed

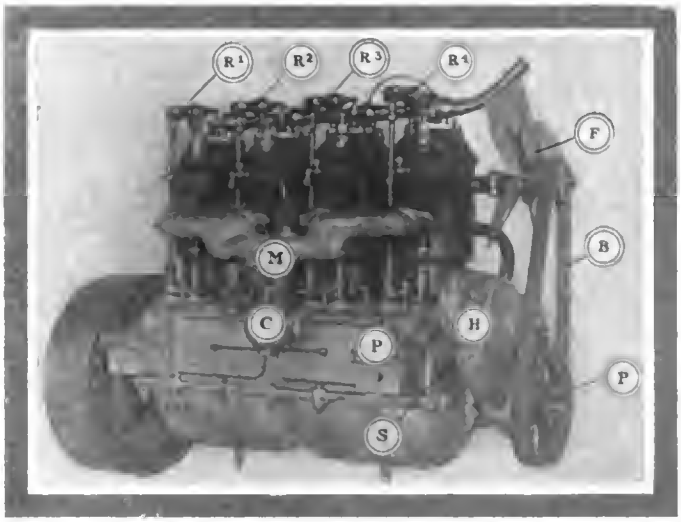


Fig. 3—Right side of Sterling 30-35 motor, of the individual cylinder, water-cooled type, overhead valves, belt-driven fan and furnished with magneto

large for the weight complete, and is rated by the makers at 30-35 horsepower. The crankshaft has five bearings, with a liberal projected area of each, and the motor delivers its power at about 800 revolutions per minute. Under these conditions, considering the use of Parson's white metal journals, it is a reasonable expectation that the motor will last long and work well. The even rotation of the crankshaft, under full load, and at low speeds, is accounted for, in a measure, by the well regulated compression, but the employment of suitable methods of design of the flywheel, considering adequacy of weight, has much to do with the good performance.

Clutch Represents Quality and Novelty—The clutch resides in the flywheel, comprises a cast extension 10 inches in diameter, machined and ground, and two accurately ground rings, side by side, extended by means of a toggle motion, press, at will, against the inner periphery of the ring. There is an entire absence of any facings, and the chances of wear are reduced to a minimum. The toggle motion affords very high surface pressures, and the clutch, while it is soft of engagement, is sure, with slipping eliminated excepting at the will of the driver, which, under certain conditions, is a positive advantage.

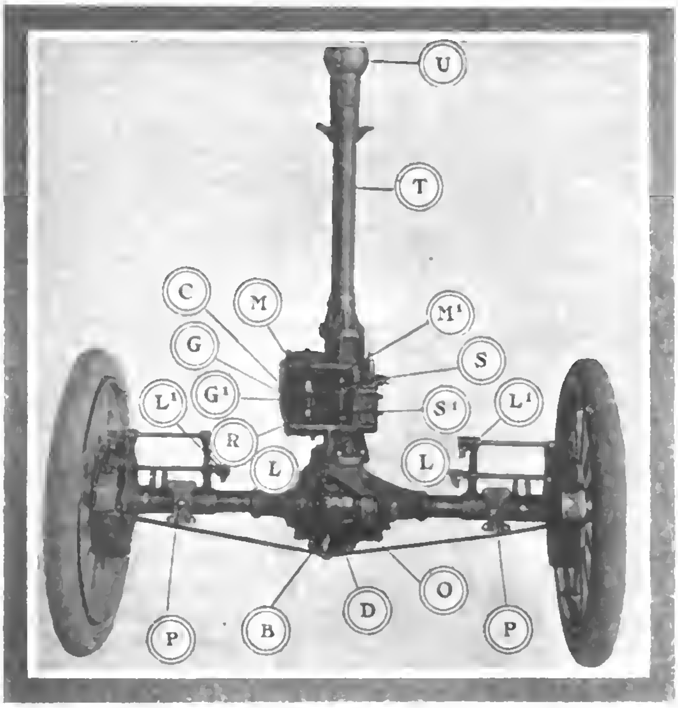


Fig. 4—Live rear axle, with transmission suspended, stout torsion tube, and protected brake levers

From the clutch to the rear axle, as shown in Fig. 4, is by means of a shaft, within a tube, T, on the end of which is a ball and socket universal joint, U, and between it and the bulge of the live rear axle the transmission case, C, is suspended. This transmission, deignated as the "Unit type," gives three forward speeds and reverse, and the direct, as well as the lay shafts, roll on New Departure ball bearings. The figure is from a photograph, with the cover of the transmission case removed, showing the master gears, M and M1, the change gears, G and G1, and the lay gear for the reverse, R, also the sliding sleeves, S, for direct on high and second, as well as S1 for third and reverse.

The bevel drive, by means of a bevel gear and pinion, is bolted to the differential housing, D, and the bevel gear, B, shows, the cover being off for the purpose. The differential gears are of the bevel type, and the case is provided with openings, O, at four points, to facilitate lubrication, one of which may be seen, and one of the differential gears may be spied through the opening. The tubing of the live rear axle is of the usual cold drawn, annealed, and brazed to make-up members of suitable contour.

Brake Control Members Are Inside—The control for the brakes extend in, past the perches, P P, for the springs, and the levers for applying pressure to the brake-shoes, L L and L1 and L1, are so placed as to be easily accessible, and what is equally to the point, out of harm's way. As indicated, there are two sets of brakes, both in drums in rear wheels, and the control is by foot pedal and side lever. The latter being for the emmergency brakes.

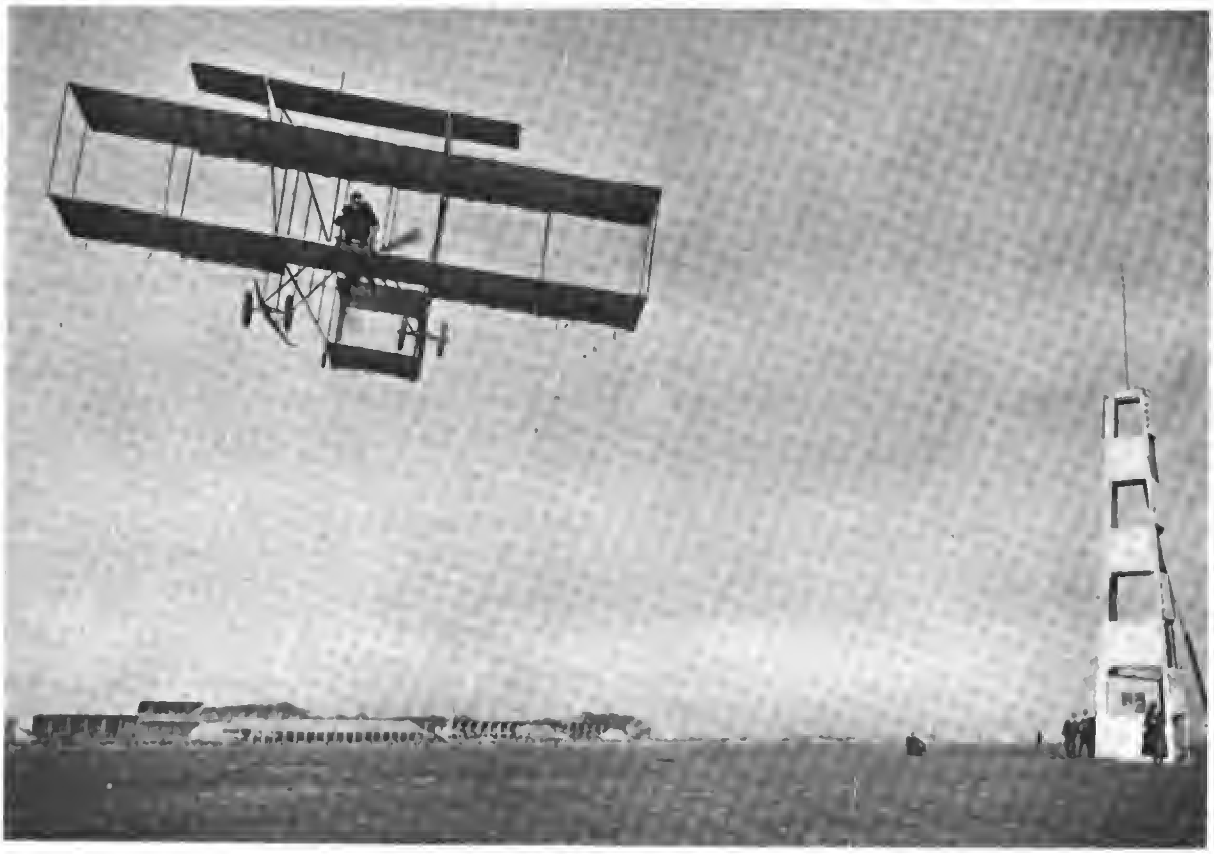
The front axle is of the I section, drop forged from special steel in one piece, and knuckles of good design, of the same grade of material, assure safety and long life free from lost motion. In the front wheels the ball bearings are designed for thrust and radial loading, with 5-8-inch balls inside and 1-2-inch balls outside. In the rear axle, which, by the way, is of the semi-floating type, is provided Hyatt roller bearings.

The chassis frame is a 4-inch channel section, pressed, with 3-inch cross members, and a grade of workmanship to assure the best results. The springs are of special grades of steel, 38 x 2 inch, semi-elleptic, front, and rear springs are of the platform type, 42 x 2-inch side members and 34 x 2-inch cross member, placed at the rear.

NEW ROYAL TOURIST MODELS OUT

In keeping with an old-established policy to avoid all revolutionary changes, and make only those which indicate mechanical progressiveness, the Royal Tourist Car Company, Cleveland, announces that the models for 1910 will be but a continuance of those for 1909 under a different name. The newer cars will be called Model M Series Two.

All of the cars of Series Two will retain the 5 1-2 by 6-in. motor of Series One, this having proved satisfactory in its predecessor. The motor has a speed range of from 5 to 65 miles an hour on high gear, actually developing 65 horsepower, and having an A. L. A. M. rating of 48.4. The manufacturers lay claim to having a machine that is a remarkable oil saver, an oil filter having been introduced and the oiling system having been further protected and simplified. The braking surface in this model is also a feature, being exceptionally large and correspondingly effective. One of the changes which greatly enhance the appearance of the car, is the adoption of a square dash made of Circassian walnut and also the employment of a longer hood, adding greatly to the lines of the car. Alloy steel is used exclusively in the frame, axles, steering knuckles and levers, as well as in all the gears and shafts in the transmission and in the rear axle. The car has a wheel base of 126 inches, 4 cylinders, and possesses all the very latest improvements known to automobile science.



Henry Farman, World's Record Holder for Distance and Duration, Making a Recent Flight at Blackpool, England

NEW YORK CITY PLANNING AERO MEET

Long Island is to have an aeroplane meet rivaling those of Rheims and Blackpool, if the plans of the Aero Club of America materialize. This announcement was brought forth by the return of Orville Wright on the *Adriatic* last Thursday, and the news of Farman's new endurance record on Wednesday. The particular connection between these two events is that Farman's flight was in competition for the Michelin trophy, an annual prize for the longest flight during each calendar year. This prize was won in 1908 by Wilbur Wright, with a flight of 76.5 miles in 2 hours 18 minutes 38 seconds.

The brothers naturally wish to keep it in the family, and although neither has definitely said that he would attempt to beat Farman's record, it is reasonably sure that they will appear at the coming meet. Wilbur Wright is authority for the statement that whoever wins the Michelin prize this year will have to fly from daylight till dark—at least eight hours of a midwinter day. According to the Aero Club's semi-official statement, the meet will take place at Belmont Park race track, near the Vanderbilt Cup course, during the last week of the year.

Orville Wright and Miss Katherine Wright were met at the pier by Wilbur Wright and President C. F. Bishop and W. J. Hammer of the Aero Club of America. The junior member of the partnership has been in Europe since August 10, and has made during this time approximately 100 flights. While in Germany Mr. Wright instructed Captain Engelhart, a retired naval officer, in the use of the aeroplane. He will in turn act as instructor for the German firm that is making Wright machines.

CROSS OF LEGION OF HONOR FOR WRIGHTS

Orville and Wilbur Wright have received the French Cross of the Legion of Honor, the greatest reward which the French Republic can confer, as a recognition of their labors in the field of aviation. The ceremony took place last Saturday at the French Consulate in New York, and Consul-General Georges Lanel, acting in behalf of the President of France, made the presentation.

GOVERNMENT AEROPLANE DAMAGED

WASHINGTON, D. C., Nov. 5—After on one memorable flight showing its possibilities in the hands of the military aviation corps, the Government's Wright aeroplane was badly damaged this morning, and will be laid up for at least a week. Lieutenant Lahm was driving this morning, with Lieutenant Humphreys as passenger. The accident apparently resulted from the faulty performance of the motor, which missed fire badly, causing the aeroplane to sink nearer the ground. The operators apparently failed to notice this, for they attempted a turn, and as the machine heeled over the right wing-tip struck the earth. It looked like a bad smashup, but the only injury sustained by either officer was a scratch on Lieutenant Lahm's nose. The machine will have to have its right lower wing-tip and the right skid replaced.

Wednesday morning the aeroplane made its best record, Lieutenants Foulois and Humphreys remaining aloft for 1 hour 1 minute 45 seconds, falling only ten minutes short of the world's record for flight with passenger. They came down at Wilbur Wright's request, because of the rising wind.

FARMAN'S MICHELIN FLIGHT A RECORD

PARIS, Nov. 3—Henry Farman broke all world's records for distance and duration to-day in a flight for the Michelin trophy at Chalons. He covered 144 miles in the time of 4 hours 17 minutes 53 seconds. It was a cold, gray day, but windless; the aviator's greatest difficulty was to keep his hands and arms from becoming numbed. The best previous records were made by Farman at the Rheims meet last August, when he made 111.8 miles in 3 hours 4 minutes 56 2-5 seconds.

The new record, being made under the officially prescribed conditions, will win the Michelin trophy for Farman unless surpassed by some other aviator before the end of the year. The Michelin trophy was instituted by M. Michelin in 1908. It consists of the sum of $32,000, divided into eight annual prizes of $4,000 each. The winner each year receives in addition a bronze trophy, and the club which he represents a similar trophy.

THE AUTOMOBILE

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ADAPTING CARS TO ROADS

Wiseacres—not all of them of rural origin—used to say, with much shaking of heads, that automobiles would never find much use in the country districts until they were adapted to country roads. Automobiles were fine things, said these prophets, to run on the macadam roads between large cities, and no doubt they were useful and had come to stay, etc., but they were not practical for the farmer's use. The first qualification mentioned was always high wheels.

It is hard to tell who has won. The prophets, of course, say that modern tendencies in automobile construction are the result of considering the demands of the country trade. The automobile manufacturers, on the other hand, say that the tendencies are the result of a natural evolution. It is certain that these developments add immeasurably to the comfort of the occupants, even on the best macadam roads.

At any rate, the automobile makers have taken up large wheels with a will—note, we now call them "large," and not "high." The makers of the buggy or "high-wheel" type of automobile now find that the makers of the more legitimate type have stolen their loudest thunder. In at least two cases the size of wheels of the regulars equals that of the former insurgent type; and in addition to these large wheels, the regulars have a length of wheelbase that gives them a further advantage.

These developments in the regular line are not at all confined to the high-priced cars. The medium and low-price classes are also in the movement for longer wheelbase and larger wheels. No one would dare try to sell a five-passenger car with 28-inch wheels and 80-inch wheelbase, such as we knew to our sorrow in the old days, on the plea that it was "cheap." For a $1,500 car the average is now 110 inches base and 34-inch wheels, with 36-inch not more than a year ahead.

Larger wheels have helped out materially on the question of clearance. This very important dimension is now never less than ten inches, and ranges up to twelve in a number of cases.

"Natural evolution" is a fine, mouth-filling phrase, and may mean something; on the other hand, we suspect that not a few makers of the regular type have cast longing eyes on the fat farm-lands west of the Mississippi and south of the Ohio. Without awarding victory to either side, it suffices that large wheels, ample clearance and long wheelbase are now standard features.

NOISE AND ITS ELIMINATION

Each day of each week, in an unending stream, this office receives letters on the subject of noise. They begin, "How shall I stop the noise of my differential?" "How may I take the hum out of my gears?" "How can I stop the noise of this, and of that, and of the other thing?" Some of these questions are not wisely asked, but throughout all of them there is a great and very apparent tendency toward the absolute elimination of all automobile noises.

Far from lessening with more and more quiet machines, this is a matter which seems to grow constantly worse. In this way, the standard set a few years ago is quickly replaced by a new and higher one, up to which manufacturers bring their cars, only to be met with fresh demands for the abolition of this or that thing, which makes a "little" noise.

First among the remedies applied to this matter was the correct and regular chamfering of clash gear teeth as opposed to the old inaccurate hand trimming methods. This made gear changing more quiet, but then the engine was too noisy. The latter outcry brought out the enclosure of the whole valve mechanism, and the deadening of the lifter and valve stem impact by means of fibre, rawhide and other sound-reducing materials.

Following that, improved valve setting, combined with more efficient muffling reduced the noise of the exhaust to a minimum. Then, some slight improvements in carbureters and carburetion reduced the noises of the fuel inflow to as negligible a quantity as was possible. The enclosure of brakes and some of the brake mechanism helped a little, as did also the universal adoption of the mud pan, with a noise-deadening air space between it and the base of the motor.

But even all these and the reduction in noises which they produced was not enough, and the cry of less noise is probably more heard to-day than ever before. It may be among the possibilities that the success of the slide valve engine when firmly established will help very materially in this direction, for this design of motor does away with the noisy and troublesome valve mechanism, toward the quieting of which much time, thought and work have been devoted.

COL. CLIFTON RE-ELECTED PRESIDENT OF A. L. A. M.

AT the annual meeting of the Association of Licensed Automobile Manufacturers held at the general offices of the Association, 7 East Forty-second street, New York City, November 4, the following officers were elected for the ensuing year: President, Charles Clifton, Pierce-Arrow Motor Car Company; vice-president, S. T. Davis, Jr., Locomobile Company of America; secretary, L. H. Kettredge, Peerless Motor Car Company; treasurer, Col. George Pope, Pope Manufacturing Company. The executive committee of the association is made up of the following: President Clifton, Vice-president Davis, Hugh Chalmers, Chalmers-Detroit Motor Company; Thomas Henderson, Winton Motor Carriage Company; Herbert Lloyd, Columbia Motor Car Company.

In addition to the above-mentioned officers, the following members of the Association were in attendance at the meeting: James Joyce, American Locomotive Company; Elmer Apperson, Apperson Bros. Automobile Company; John S. Clarke and D. S. Ludlum, Autocar Company; W. C. Durant and R. H. Goss, Buick Motor Company; W. C. Leland, Cadillac Motor Car Company; R. D. Chapin, Chalmers-Detroit Motor Company; H. W. Nuckols, Columbia Motor Car Company; M. S. Hart, Corbin Motor Vehicle Corporation; R. M. Brownson, Everitt-Metzger-Flanders Company; James H. Becker, Elmore Manufacturing Company; G. H. Stilwell, H. H. Franklin Manufacturing Company; Elwood Haynes, Haynes Automobile Company; Edward R. Hewitt, Hewitt Motor Company; R. B. Jackson, Hudson Motor Car Company; Alfred N. Mayo, Knox Automobile Company; H. A. Lozier, Lozier Motor Company; F. F. Matheson, Matheson Motor Car Company; Benjamin Briscoe, Maxwell-Briscoe Motor Company; C. R. Hathaway, Olds Motor Works; Henry B. Joy, Packard Motor Car Company; Albert L. Pope, Pope Manufacturing Company; R. E. Olds, Reo Motor Car Company; George J. Dunham, Royal Tourist Car Company; W. Mitchell, Alden Sampson, 2d; R. H. Salmons, Selden Motor Vehicle Company; Frank B. Stearns, F. B. Stearns Company; William R. Innis, Studebaker Automobile Company; E. R. Thomas and E. L. Thomas, E. R. Thomas Motor Company; John N. Willys, Toledo Motor Company; William T. White, Walter Automobile Company, and Windsor T. White, Waltham Manufacturing Company.

LACK OF SPACE AT PALACE SHOW A SERIOUS PROBLEM

JUST how to meet the demands for space of the 300 odd exhibitors in the coming Grand Central Palace Show, which opens on New Year's Eve, is getting to be a more serious problem every year. Not only do the manufacturers want more space each year to exhibit their cars in, but the ever-increasing demands of the accessory people make the erection of a more commodious exhibition building almost a necessity.

Manager W. M. Sweet, of the Motor and Accessory Manufacturers, in discussing this question, said: "Last year our association took 14,500 square feet of space in the Palace show, which was divided between 89 exhibitors. This year we have 103 members who will exhibit at the Palace show, and could use at least 20,000 square feet of space, yet all we can secure is 14,870 square feet, or about the same as last year.

"Our association is composed of the manufacturers of motors, motor parts, appliances or accessories used on or in connection with motor vehicles of every description. This includes tires, lamps, axles, motors, transmissions, gears, roller or ball bearings, shock absorbers, speedometers, springs, tops, carburetors, oilers, timers, batteries, radiators, hoods, etc. In fact, from the ranks of our members one could obtain all the material necessary for the construction of any type of machine on the market, provided we would sell them parts, which could not be done, as we cannot make quarter enough parts now to supply the legitimate needs of the automobile manufacturers."

As usual, all the exhibitors at the Palace show will be supplied with a distinctive sign for their booth in harmony with the general scheme of decoration adopted for this year's show. Unitt & Wickes, who have the decorations in charge, have designed a special sign which, in some form or other, will be used throughout the entire building. Standards of trellis work will support alabaster glass signs in which the firm's name will be printed in Egyptian letters of gold on a green ground, which will be illuminated from the rear by colored electric lights.

NOVEL RATHSKELLER FOR GARDEN SHOW

What promises to be a revelation in the rathskeller line is promised for the Tenth National Automobile Show at Madison Square Garden, January 8-15. Every nook and cranny of the historic building has been considered in the scheme of decoration, and those who have been privileged to see the decorative scheme adopted for the forthcoming show say that the big amphitheater will present a scene of unsurpassed grandeur that will make it unrecognizable to its regular patrons. The basement, where the commercial vehicles and motorcycles are to be on view, will be decorated more attractively than ever before and here, buried among dangling foliage, the rathskeller will be found. The rathskeller is of the Dutch Colonial type and is painted in cream white. The entrance with its two Doric columns is unique, and it is said that there is nothing along New York's "great white way" to compare with it. Crimson and green ramblers, clinging to lattice work effects adorn the edges of the inn and autumnal foliage trails to the top of it, on both sides of the entrance. There is a passageway on either side of the inn and a glimpse of what is within its walls can be had by peeping through the old-fashioned windows. Bay trees in boxes adorn the base of each column in front of the inn.

MILWAUKEE CLUB DECIDES SHOW DATE

MILWAUKEE, WIS., Nov. 8—The Milwaukee Automobile Club has practically decided on February 22 to 27 as the date for the second annual Milwaukee automobile show, and an option has been taken for that time on the new $500,000 Auditorium. The show committee consists of Lee A. Dearholt, Dr. Louis Fuldner, Christian Schlotka, Oscar A. Fischedick and A. C. Brenkle. The Auditorium is regarded as an ideal place for an automobile show, having an immense oval arena surrounded by seats. The building covers an entire block, including many smaller halls which can be used for accessory exhibits. Additional space here will allow twice the size of show that was possible last year.

MID-OHIO PLANS FOR AUTOMOBILE SHOW

COLUMBUS, O., Nov. 8—Arrangements for the automobile show to be held under the auspices of the Columbus Automobile Club December 25 to January 1, are progressing satisfactorily. More than half of the available space has already been contracted for, and the rest is going fast. In addition to the manufacturers represented in Columbus, a number of others have applied for space, and accessories will also be exhibited.

STATE AID FAVORED BY NATIONAL ROAD CONGRESS

COLUMBUS, O., Nov. 8—That the principle of State aid for the improvement of highways should be adopted in every locality in the United States was the consensus of opinion expressed by the 2,500 delegates that attended the National Congress of Road Builders and the annual meeting of the American Road Makers' Association, which closed their sessions October 29, after four days of instructive deliberation in this city. While no formal resolution to that effect was adopted, the leaders in the good roads movement from every State of the Union favored the plan. Men who have taken a prominent part in highway supervision and construction in many States spoke of their experiences and gained ideas from others.

The meeting was the largest good roads congress ever held in the Middle West, and probably in the United States. Delegates from practically every State which has a highway commission and many from other States and territories were in attendance, and exchanged views.

One of the features of the meeting was the address of Samuel H. Hill, an adopted son and son-in-law of James J. Hill, the Western railroad magnate. He hailed from Seattle, Wash., and delivered a long talk on "Blazing the Way on the Pacific Coast." Mr. Hill advocated the employment of convicts in road building, and believes that the highways can be improved with less cost in that manner. He told of the experience of himself and associates six years ago securing convicts to build Washington roads.

Addresses were made by James H. MacDonald, State highway commissioner of Connecticut; John Bristow, State highway commissioner of Rhode Island; Horatio S. Earle, State highway commissioner of Michigan; Charles P. Light, State highway commissioner of West Virginia; S. P. Hooker, chairman of the commission of State Highways of New York; R. D. Beeman, assistant highway commissioner of Pennsylvania; Paul D. Sargent, State highway commissioner of Maine; J. C. Wonders. State highway commissioner of Ohio; Fred H. Caley, State registrar of automobiles for Ohio, and a number of others of note.

One of the matters of interest considered by the meeting was the question of freight rates on road making materials. A resolution was adopted directing the president to take up the matter with the railroads, and see if a lower rate could not be obtained, the present tariffs being much too high.

Hundreds of delegates inspected the large exhibits of road-building machinery and materials at the State Fair Grounds, where part of the sessions of the congress were held. The demonstration of a water-bound macadam highway in process of construction under the charge of the county engineer also attracted widespread attention.

One of the most important projects which will receive the support of the Ohio Good Roads Federation is the Alsdorf county aid bill, with the new provision for perpetual maintenance. The State association urged the appointment by the governor of a perpetual commission to have charge of the State's highways. This latter plan was opposed, however, by the larger convention, the Road Makers' Association.

The annual election of officers of the American Road Makers' Association resulted in the re-election of James H. MacDonald, of Hartford, Conn., president; Samuel H. Hill, Seattle, Wash., vice-president; E. L. Powers, New York, secretary, and Joseph W. Hunter, Harrisburg, Pa., treasurer. A number of cities are desirous of having the 1910 convention, the place and date for which will be fixed by the executive committee.

Delegates to the international road congress to be held in H. MacDonald, E. L. Powers, S. H. Hill and A. C. Campbell.

SOUTHERN AUTOISTS FORM STATE BODIES

Three new clubs were elected to membership in the American Automobile Association at the regular monthly meeting of the executive committee, held recently at national headquarters, 437 Fifth avenue, New York. They were: Atlanta Automobile Association, of Atlanta, Ga.; Waco Automobile Club, Waco, Texas, and the Rowan County Automobile Club, Salisbury, N. C. At the same time favorable reports were received indicating that active work is progressing toward the formation of State associations in Texas, North Carolina, Alabama and Florida. Secretary B. M. Reed, of the Tampa Club, stated that automobile interest was increasing rapidly in all parts of Florida, and the clubs that are likely to be affiliated with the State body will be the Tampa, Daytona, De Land, Orlando, Bartow, Brookville, Ocala, Gainesville and Jacksonville local organizations.

President Lewis R. Speare, of Boston, who presided at the meeting, announced the appointment of Ralph W. Smith, president of the Denver Motor Club, also president of the Colorado State A. A., as a member of the A. A. A. executive committee.

Secretary Frederick H. Elliott was instructed to make arrangements for the customary reduced railroad rates for A.A.A. members desiring to attend some of the meetings to be held in New York City during the coming two big automobile shows, the Grand Central Palace show from Dec. 31 to Jan. 7, and the Madison Square Garden show from Jan. 8 to 15.

THANKSGIVING CLIMB ALONG THE HUDSON

OSSINING, N. Y., Nov. 8—The Upper Westchester Automobile Club will hold a hill-climb on Thanksgiving Day, November 25, on a one-mile course over Sunset Hill, near this city. There will be seven classes, open to all, arranged by price classificatiions and with divisions for stripped chassis and steam cars, as well as a free-for-all. Entries close November 23, with a $4 fee.

VANDERBILT WINNER IS DINED AT THE HUB

BOSTON, Nov. 6—In recognition of the fact that two of the three winners in the Vanderbilt Cup race were Boston men, the Bay State Automobile Association this evening gave a banquet in honor of Harry Grant and Joseph Matson, drivers, respectively, of the Alco that captured the Vanderbilt Cup and of the Chalmers-Detroit that won the Massapequa trophy. Mr. Grant was present, but Mr. Matson was obliged to leave for Atlanta for the races on the new speedway and so could not attend. He was represented, however, by A. E. Gilmore, Boston representative of the Chalmers car. Frederic Tudor, president of the Bay State Association, presided, and with him at the head table, besides Mr. Grant, was L. R. Speare, president of the American Automobile Association. About fifty members of the club were present. Gold fobs bearing the emblem of the Bay State Association, were presented to Grant and to Mr. Gilmore, representing Matson. The speakers included the guest of honor, President Tudor, Mr. Speare, James Fortescue, Frank E. Wing, representative of the Marmon that won the Wheatley Hills trophy; Charles J. Glidden, J. W. Bowman and A. E. Morrison.

DINNER DAY CLIMB OPPOSITE NEW YORK

New York dealers have promised their support to the proposed Edgewater-Fort Lee hill climb, on the Jersey side of the Hudson, and this event is now assured for Thanksgiving Day. The climb will be conducted by the Edgewater Motoring Society. The provision in the New Jersey laws forbidding racing will, it is said, be dodged by sending the cars up one at a time, so that, legally, they will not be racing. The trials will begin at 10 a. m. and will end by noon. W. J. Morgan is the New York representative, at his office in the Thoroughfare Building. A big delegation from New York is expected to attend.

AMONG THE BUSY FACTORIES IN THE BADGER STATE

RACINE, WIS., Nov. 7—Without going to Wisconsin and visiting such centers as Racine, it will be impossible to realize the extent of the automobile invasion. Wisconsin is an ideal center for this industry, and besides an abundance of skilled labor there is material to be had, and many natural advantages besides business acumen.

The Mitchell Motor Car Company, not going back more than three years, shows progress that may be set down as follows: Cars constructed during 1908, 1,800; and in 1909, 3,200. For 1910 the output is estimated to be 6,000, for which material is now in hand on a basis of 85 per cent. The value of the Mitchell product for these years was estimated by the company as follows: 1908, $2,000,000; 1909, $3,500,000, and for 1910 it is expected that the output of the company will foot up to the comfortable sum of $7,500,000. The number of men employed during the last three years may be approximated as follows: 1908, 500; 1909, 1,000, and this force has increased to 2,500. with the chance that it will be augmented considerably in the near course of events. All cars up to the limit of the output, in view of the machine tools actually in hand, have been sold and there are demands which may be satisfied, in excess of the expected output of about 1,200 cars. At the plant, everything is made excepting tires, magnetos and some unimportant small parts. The plant spreads over considerable space, increasing from 3 acres in 1908 to 6½ acres in 1909, and 13 acres at this time, counting floor space; the grounds spread over some 40 acres and expansion is therefore but a matter of continuing the Mitchell brand of activity.

Pierce Motor Car Company, having added 36,400 square feet of floor space, thus bringing the plant up to 96,400 square feet, has 500 of the new Model K, known as the Pierce 30, under way, and while the plant is just as busy as the management can make it, the question of the exact number of cars, over and above the number as here indicated, is a matter which can not be stated with certainty. At all events the Pierce is a "built" car, and this means much, since the amount of work to be done in the shop of the maker is enormously increased over a parts undertaking.

Racine Manufacturing Company, with 12,000 bodies to its credit for last year, is now turning out 100 bodies per day, and at is claimed by the management that this rate will be increased to 125 bodies per day within three months. It is stated that the trend is in the direction of metal bodies, using steel, and ash framing is being continued as the most reliable wood to employ, having in mind the necessity of properly joining and "ironing" the framing. Aluminum and wooden bodies are made by this company as well, and it is noteworthy that the taxicab business is having a vast influence on the amount of work in hand and in prospect.

KENOSHA, WIS., Nov. 8—Thomas B. Jeffery & Company, authoritatively announce that all the 1910 Rambler models will be designated as "The New Ramblers." This name has been chosen, it is said, to call attention to the success of the Rambler makers in their effort to make the new models more distinct even than their predecessors in point of quality, dignity, silence, and comfort.

The Badger Brass Company, maker of lamps, generators, and lighting equipment in general for use in automobile work, invited THE AUTOMOBILE representative to stay a few days and get a line on the class of work which is being done. It will be impossible to fairly depict the situation without doing so, and this detailed inspection is to take place early in November. In the mean time it is fair to say that the company is pushing work as fast as quality will admit of, and the line for 1910, which is well disposed of, will offer evidences of novelty in the contemplated description.

HUSTLING ILLINOIS TOWN HAS AUTO BOOM

SYCAMORE, ILL., Nov. 6—In the midst of a rich farming land, the town of Sycamore occupies a strong position, and while trade is the more important occupation of the residents, even so, manufacture is making inroads, and among the more prosperous of the industries of the town will be found the Turner Brass Works, makers of a hundred varieties of gasoline torches, some of which are especially for automobile work. With a foundry of competence, the company is turning out a line of brass and aluminum of every description, and the great variety of name plates made, for illustration, is worthy of note. Then, the "Harroun" auto bumper is a company product, and for this well-known device the demand is so great that the makers are having difficulty in keeping up with orders.

Sycamore will soon bask in the sunlight of a great new automobile project. The Fidelity Motor Car Works, with a plant of some pretence available, and plans in a large way under discussion, will place before discriminating buyers of commercials, a line of commercial vehicles, which, for up-to-date features, will represent the top of the designer's ingenuity.

EAMES TOURING STUDEBAKER BRANCHES

CLEVELAND, Nov. 8—Hayden Eames and Le Roy Pelletier, general manager and advertising manager, respectively, of the Studebaker Automobile Company, have during the past month been making an extended tour of the various Studebaker branches, covering over 15,000 miles. The itinerary included Salt Lake City, San Francisco, Portland, Seattle, Minneapolis and Chicago.

Mr. Eames says that to an even greater extent than last year the automobile manufacturers' problem is to meet the demand, which is particularly strong for the medium-priced cars. Even if the 200,000 cars which are predicted for next season could be built, the supply would still be inadequate. However, Mr. Eames, from his knowledge of the material and parts markets, believes that this prediction is far too high, and that the correct figure will be found about 125,000—certainly not over 150,000 cars. The Studebaker-E. M. F. factory in Detroit is now turning out about 1,200 cars a month.

During the present week Messrs. Eames and Pelletier will continue their tour, visiting New York, Boston and Philadelphia, and concluding at the Atlanta show.

TRADE CHANGES IN OHIO'S CAPITAL

COLUMBUS, O., Nov. 8—The F. H. Lawell Company, which has been handling the Franklin, will be succeeded by the Franklin Motor Car Company, to be located at Spring and Fourth streets. The new company will also handle the Reo. F. H. Lawell remains general manager. The Speedwell Company, of Dayton, O., will open an agency about January 1 near Spring and Fourth streets, to be in charge of Kimmel Bros., of Dayton. Frank Corbett, representing the Maxwell in central Ohio, will move about December 1 to a new salesroom which will be located at 58 East Spring street.

AUTOS INCREASING IN BLUE GRASS CITY

LOUISVILLE, KY., Nov. 8—The automobile business is having an awakening in this city. Heretofore Louisville has been very slow to buy cars, and its prominence as a distributing center has been due to the manufacturers' distribution of territory; some of the local establishments handle the entire business of their companies south to the Gulf of Mexico. Things seem to be changing now, for at the same time that the manufacturers are making more local Southern agencies the people of the city are buying more cars. There are at present twenty-two branches or agencies in the city, representing fifty makers.

DETROIT'S LATEST TO MAKE PARTS

Detroit, Nov. 8—The Metal Products Company, just incorporated, with a capital stock of $200,000, all of which has been subscribed, is the latest concern to invade the local automobile parts field. The main product will be automobile axles, delivery of which will begin early next Summer.

The company brings to Detroit men of high standing elsewhere, who have been attracted to this city by the exceptional opportunities afforded in the line in which they have embarked. E. E. Keller, president of the new organization, was a former vice-president of the Westinghouse Machine Company, and with J. H. Hunter came here from Pittsburg three years ago, establishing the Detroit Insulated Wire Company. With them in the new company are W. F. Evans, recently with the Westinghouse Company, and H. L. Barton, both of Pittsburg, and E. E. Arnold, who comes from Buffalo. Mr. Barton is vice-president and Mr. Evans manager of the plant.

ATLAS PROTESTS VANDERBILT DECISION

First place in Class 2 in the Vanderbilt Cup race has been claimed by the Atlas Motor Car Company for its entry. Class 2 is for cars rated from 301 to 450 cubic inches piston displacement, and was combined with Class 1, contesting for the Vanderbilt trophy itself. In addition a special trophy was offered for the winner in Class 2. This trophy was not awarded on the ground that no car had finished in that class; Chalmers-Detroit No. 7 completed but 19 laps, and the Atlas was running on its fifteenth when the race was called. The Atlas company contests the decision not to award this trophy, and claims it, if awarded, on the ground that the Chalmers-Detroit was out of commission at the time the race was called. The Atlas company has filed a formal protest with the Motor Cups Holding Association.

ANDERSON BUYS ELWELL-PARKER COMPANY

Detroit, Oct. 30—A deal of consequence in the automobile world was consummated this week when the Anderson Carriage Company, of this city, purchased outright the Elwell-Parker Electric Company, of Cleveland, a large manufacturer of electric automobile motors. The Elwell-Parker Company is capitalized at $400,000 and employs several hundred men.

The Anderson Carriage Company by this move has placed itself in a position of greater independence as regards its materials. With the absorption of the Cleveland concern it will manufacture practically every part of its product, the Detroit Electric, with the exception of wheels and tires.

Pretty Good Trip for an Eleven-Year-Old Pilot

"Piloted by little eleven-year-old Archie Smith, a big Stoddard-Dayton touring car swung into San Antonio yesterday afternoon, on the completion of a long overland trip from Denver, a distance of 1,385 miles by the speedometer."—San Antonio Daily.

BOSTON MOTOR CLUB DISBANDS

Boston, Nov. 6—The Boston Motor Club, which was organized last spring in the main by some of the members of the Bay State Automobile Association, dissatisfied with the conduct of motoring affairs by that organization, is going out of existence. The officers and directors of the Motor Club, after deciding that there is no field for another motoring club similar to the Bay State, and that that organization fills the field satisfactorily, voted to liquidate the affairs of the Motor Club. Consequently the members have been given the option of receiving back their money, minus a small percentage used for expenses, or having the money turned over to the treasurer of the Bay State Association as payment for admission to that association. The expenses of the club have been small so only a small part of the original payments has been deducted. Many members of the Motor Club have already applied for admission to the Bay State Association.

NEW RECORDS EXPECTED AT NEW ORLEANS

New Orleans, Nov. 8—Work began to-day on the mile race track at the Fair Grounds in preparation for the Good Roads automobile race meet to be held November 20-21. The course will be scraped of all its present top soil, until only the "buckshot" black loam is left. Then that will be oiled and made perfect for such record-breaking fast time as was made over the course last February. Arrangements were made last week with Capt. W. H. Hardee, city engineer, for the use of the city road repair forces for this work. This meet is being held by the New Orleans Automobile Club in connection with the first Louisiant Good Roads Convention, called by Gov. J. Y. Sanders, the New Orleans Progressive Union and the automobile club.

George Robertson, winner of the 1908 Vanderbilt Cup, the 1908-09 Fairmount Park races, the Lowell National Cup and two 24-hour Brighton Beach races this year, will compete. One of the certain starters against Robertson will be Lewis Strang, his oldest rival, who will drive the Vanderbilt Cup race Fiat.

QUARTERLY DIRECTORY BIGGEST EVER

With the quarterly issue of the *Automobile Trade Directory* dated October, the publishers of this excellent and very handy work have reached a point where further increases will be sure to result in the division of the volume into two parts. In the October issue, just off the press, the 1 1-2-inch thick volume includes some 40 or 50 pages of additional matter.

This added amount of space is divided about equally between the alphabetical lists, which have an increase of 22 pages, and the geographical section, which has the rest. This latter feature, introduced in the July issue, has proved of such sterling worth that it will be retained for all time. The arrangement of the subject matter is about the same as before, access to it being facilitated by three indices, located in the front of the book. These are: the index to advertisers; index to classifications, and index to tables and data for engineers.

Although the latter, as the name would indicate, are primarily for engineers, much of it is such as would be constantly referred to by every one. Thus, every one is interested in the horsepower of automobile engines and ready means of figuring out the same—six pages are devoted to this subject. So, too, with the matter of speeds, not everyone can figure these out quickly, yet everyone wants to know about speed—six pages of handy tables are given over to this subject.

Over and beyond all this, the real purpose of the directory is to furnish complete and accurate lists of the manufacturers and dealers in different lines of business closely related to the automobile business. In this, there can be no question either of its thoroughness, the care with which it is compiled and edited making for extreme accuracy. It is published by the *Automobile Trade Directory*, Inc., at 231-241 West Thirty-ninth street, New York City.

On the Way from Uniontown, Pa., to the Mountain's Summit

Party with 42-horsepower, six-cylinder Franklin touring car, making the climb from Uniontown. The rise is 1,400 feet in a distance of three miles

Suit to Protect Cadwell Patent—Action has been instituted against the Rapid Safety Company, of New York, for alleged infringement of patent on an automobile cushion tire granted to Edwin B. Cadwell, and licensed exclusively to the Swinehart Clincher Tire & Rubber Company, of Akron, O. The infringing tires in question were manufactured by the Motz Clincher Tire & Rubber Company, also of Akron. The Swinehart Company, through its legal representatives, have notified the trade in general that it is its contention that any cushion tires having recesses in their sides, and presenting an unbroken tread surface, is an infringement of the said Cadwell patent, and that persons buying, dealing or using same will be held as infringers by the owners of said patent.

Making Tires for Aeroplanes—Taking time by the forelock, the Hartford Rubber Works Company has brought out a line of pneumatic tires especially designed for aeroplane use. These are made in three weights, known by the trade names of "Aviator," "Aeroplane" and "Aeronaut," for light, medium and heavy machines respectively. These tires are single-tube, and differ from bicycle tires principally in their sizes, which range from 18x1 1-2 to 28x3. In the construction of these tires it is claimed that the conditions under which they work have been carefully studied, with the view of obtaining great resiliency, together with the ability to withstand the shocks of alighting.

Japanese Visit Auto Factory—When the members of the honorary commercial committee of Japanese merchants, financiers and legislators visited Syracuse, N. Y., on their trip through the United States one of the points visited was the factory of the H. H. Franklin Mfg. Co. The party was shown the various operations in the making of the Franklin car, from the manufacture of the smallest parts to the finished machine. One of the developments which the members of the party expect as a result of their trip is an increased use of autos in Japan.

Mitchell Spreading Abroad—In the year of its organization, 1904, the Mitchell Motor Car Company built eighty cars, and a steady yearly increase has brought the output in 1909 to 2,500. Cars have been shipped to the Philippine Islands, South America, Australia and several other foreign countries, and the Mitchell catalogues are printed in French and Spanish as well as in English. Recently, also, a branch has been established in Paris at 20 Rue de Tilsitt, and in London, and an exhibit will be maintained at the Olympia Show.

Reo Challenges Tourists—R. M. Owen, who drove the new four-cylinder Reo in the New York-Atlanta good roads tour, has challenged the other perfect-score cars to submit to a technical examination to determine the real winner. Each car, after checking out at Atlanta, is to be delivered to a comimttee headed by Referee Scarritt, to make an examination under rules which it shall itself make. Repairs or replacements made on the route, or which may be necessary to restore the car to perfect condition, are to be charged against each.

Seven Molines in Kalona—The Moline Automobile Company has received a letter from J. W. Southwick, of Kalona, Ia., telling of his experiences with his Moline Model M. According to Mr. Southwick, there are seven other Molines in his neighborhood, all in the hands of inexperienced farmers, and all are giving perfect satisfaction. He further says that during the several months he has had the car he has had no expense for repairs. This seems to vindicate the Moline Company's policy of devoting especial attention to the country trade.

Toledo to New York Overland—Seven hundred miles through sand and mud in 40 hours' running time is the record of an Overland runabout driven by George L. Riess, the New York agent for the Willys-Overland Company. The trip was made on the spur of the moment, a new car just from the factory being used, without any special preparation. The trip from Toledo to Cleveland was made in 4 hours 5 minutes, over roads in some places deep in sand. The next day's run was to Westfield, N. Y., 6 hrs. 30 min.

Morgan Trucks Increase Stock—The capital stock of the R. L. Morgan Company, of Worcester, Mass., was increased at a recent meeting of the stockholders to $1,000,000, of which half is 7 per cent cumulative preferred and half common. This follows on the big South African contract recently made; the company, altogether, it is said, has signed contracts for 121 trucks. One trial order has been received from the Curtis-Blaisdell Company, of New York, which may result in the ordering of 30 or 40 more. The increased capital will enable the company to make all its own parts.

Badger Wins Patent Case—The Badger Brass Mfg. Co. announces a decree sustaining patent No. 841,799, granted to Geo. Maris and Besnard, Maris & Antone, of Paris, January 22, 1907, for improvements in automobile lamps. The suit was brought against Herman Saxon in New York City and the usual perpetual injunction was granted against him and his agents.

Moon Tours in Texas—E. J. Moon left the St. Louis factory recently for Texas, taking with him one of the first 1910 Moon Thirties. He will make an extensive trip through the State by road, winding up at San Antonio. The object of the tour is of course to demonstrate the adaptability of the small car to the roads found in that part of the country. The Moon output for the coming season is estimated at 1,500 cars, an increase of 100 per cent over last year. Each car receives a 220-mile road test.

Lexington Stays in Lexington—Lexington and Georgetown, Ky., capitalists, represented by A. G. Morgan, have secured an option on the controlling interest of 340 shares in the Lexington Motor Car Company, held by G. D. Johnson, of Connersville, Ind. Mr. Johnson had planned to remove the Lexington plant to Connersville, and the plan to buy his stock was formed by the Lexington Commercial Club to keep the plant in that city. The option sets the purchase price at 115 per share.

Portola Race on Fisk Tires—The Pope-Hartford driven by Jack Fleming, which won the 258-mile Portola race, at Oakland, Cal., in 238 minutes, was equipped with Fisk tires. The car made the run, at an average speed of 64.7 miles an hour, without any tire trouble whatever on the road. Three of the car's shoes were changed near the end of the race as a precaution, but the other shoe and its tube went through the whole race and finished in good condition.

Friction-Drive Patent Suit—The Cartercar Company, of Pontiac, Mich., has commenced suit against J. B. McIntosh, as agent, and the Buckeye Mfg. Co., of Anderson, Ind., maker of the Lambert, as principal, for infringement of the Carter patent, No. 761,146, dated May 31, 1904. Proceedings were begun in the United States Circuit Court at Detroit through Parker & Burton, who have been prominent in the litigation over the Selden patent.

New Owen Thomas Company—Capitalists controlling the Wisconsin Engine Company, at Corliss, Wis., have purchased the patents and rights of the Owen Thomas Motor Car Company, of Janesville, Wis., and will engage in automobile manufacturing. The holding company is capitalized at $500,000. No announcement of the location of the prospective factory has been made, but it is expected that it will be near Corliss.

Goodyear Gets Big Contract—What is said to be the largest tire contract ever made in this country was made recently between the Goodyear Tire and Rubber Company and the Buick Motor Company. It is estimated that the Buick Company will make 40,000 cars during the coming season, and Goodyear quick-detachable tires and rims will be their standard equipment.

Ajax, New York to Atlanta—The latest performance of Ajax tires was on the New York to Atlanta tour, in which five cars had this equipment. Not a single Ajax casing was replaced during the tour, and the twenty tires only had three punctures. Every casing, it is said, was in condition when it reached Atlanta to turn around and make the trip back to New York.

Standard Roller Bearing Officers—At the meeting of the directors of the Standard Roller Bearing Company in Philadelphia Lenox Smith was elected president, Osgood Field vice-president, R. S. Woodward, Jr., general manager, and W. M. Baldwin secretary and treasurer.

IN AND ABOUT THE AGENCIES

Great Western Agencies—The Great Western Automobile Company, of Peru, Ind., announces that it has made contracts with the Sheldon Automobile Garage, Sheldon, Ill.; J. F. Metzler, Helena, O.; C. A. Kenney, Nicholasville, Ky.; H. O. Vogel, 1610 South Main stret, Los Angeles, Cal.; Geo. H. Peddle, Perry, N. Y.; the Albert Sterne Motor Car Company, St. Louis, and O. B. Shutt, Peru, Ind., all of whom will handle the Great Western exclusively.

Apperson, Philadelphia—The branch-house habit struck the Apperson plant in Philadelphia last week, and hereafter the car will be represented in the Quaker City direct from the factory, with Alexander M. Benson, formerly head of the local agency, as general manager and Harry Jones, from the factory, as his assistant. There will be no change in location, the present quarters at 620 North Broad street being admirably adapted to the purpose.

Palmer & Singer, Philadelphia—George Parker, manager of the Philadelphia agency of the Palmer & Singer car, has secured the corner section of the new concrete building now in course of erection at Broad and Callowhill streets, where he will open well-equipped quarters soon after the first of the year.

Studebaker, Brooklyn, N. Y.—The Studebaker Company has chosen the Carpenter Motor Vehicle Company to act as its representative in this borough of the metropolis, with quarters at 1239 Fulton street.

Parry, Velie and Demot, Toledo, O.—The Norris-Toledo Motor Sales Company has been formed in this city to represent the Parry, Velie and Demot runabout, with salesrooms at 623 Madison avenue.

Stoddard-Dayton, Harrisburg, Pa.—The Cox Automobile Company, the local agent for the Stoddard-Dayton, is now located in its new building at 23 South Fourth street.

Empire "20," Philadelphia—The Motor Supplies Company of Philadelphia, which a fortnight ago secured the local agency for the Empire "20," has taken over the old Acme quarters at 608-610 North Broad street.

Autocar, San Francisco—Walter Morris, who is the local representative for the Autocar, is now installed in his new salesroom on Golden Gate avenue.

Lexington and Parry, Providence, R. I.—The Nock Auto Company, of this city, now represents the Lexington and Parry cars, with salesrooms at 486 Broad street.

Ford, Streator, Ill.—The Pontiac Motor Car Company, the latest addition to the local field, will handle the Ford and in addition make a car of its own.

Martin Commercial, Philadelphia—D. P. S. Nichols, Broad street above Vine, is handling the Martin Commercial delivery car in the Quaker City.

PERSONAL TRADE MENTION

P. J. Dasey, who has been identified with the automobile business since its inception, and who for several years past has been eastern manager for the Motsinger Device Manufacturing Company, has been appointed sales manager of that concern and is now located at the factory at Pendleton, Ind. R. S. Bryan has been appointed eastern manager, with his office at 31 West Forty-second street, New York City.

J. C. Matlack, who has been vice-president and manager of the Michelin Tire Company, of Milltown, N. J., since its inception in 1907, has resigned his position with that company. No announcement has been made of Mr. Matlack's future plans nor of his successor.

N. Lazarnick, the photographer, has removed his place of business from 29 W. 42nd street, New York, to more commodious quarters at 246 W. 42nd street, on account of increased business and the desire to include other and broader fields of photography.

Flavius Sudrow, formerly secretary and treasurer of the National Battery Company, has secured the exclusive sales rights in the United States for a device known as the American Auto Heater, and is located at 15 West Swan street, Buffalo, N. Y.

C. Royce Hough, formerly with Fickling & Company, New York, has returned to Washington, D. C., as sales manager of the General Motor Company's distributing branch for Maryland, Virginia and North Carolina.

Jesse Froehlich, managing director of the Benz Auto Import Company, sailed for Europe on the *Amerika*. He will visit the London automobile shows and then go to the Benz factory at Mannheim, Germany.

Stanley A. Allen has left the Packard Motor Car Company of New York to accept the position of general manager of Fickling & Company, of New York, manufacturer of auto bodies and tops.

F. R. Bump, sales manager; J. E. Walker, advertising manager, and R. H. LaPorte and L. E. Hoffman, salesmen, are representing the H. H. Franklin Mfg. Co. at the Atlanta show.

GOODRICH NEW YORK BRANCH MOVES

The B. F. Goodrich Company of New York has moved its entire business from 66 Reade street and 1625 Broadway to its new twelve-story building at 1780 Broadway, which has been illustrated in these columns. Commodious reception rooms have been provided for the accommodation of visitors. W. H. Yule remains in charge as manager and H. C. Miller superintends the tire department.

A NEW METROPOLITAN AGENCY

The Colt-Stratton Company has been formed to handle the Cole "30" and the Paige-Detroit roadster in New York City and vicinity, and is located at Broadway and Sixty-eighth street. William L. Colt, ex-president of the Cleveland Motor Car Company, and later advertising manager of "Hampton's Magazine," heads the concern. Harry L. Stratton, vice-president and treasurer, was formerly with the Amalgamated Copper Company. The Paige-Detroit is a newcomer from Automobile City.

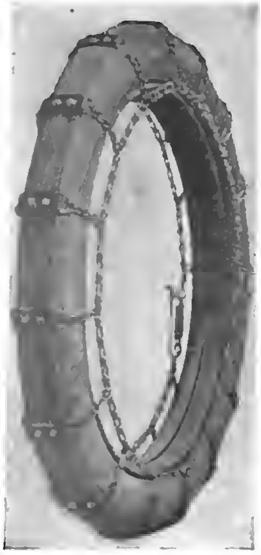
PACKARD'S NEWARK, N. J., STORE

NEWARK, N. J., Nov. 8—The Packard Motor Car Company of New York has opened a new salesroom on Branford Place, Newark, which it will operate as a branch office. The building is fireproof, of reinforced concrete and brick construction. The main office is finished in mahogany in simple style. The main floor contains a stock room, where a complete supply of parts for all models of Packard cars is maintained, and a repair department. L. Fitzgerald, formerly of the New York office, is in charge.

New Salesroom of the Packard, on Branford Place, Newark, N. J.

Information for Auto Users

Extra Hard Anti-Skid Device—The latest anti-skid device to be placed on the market with the coming of winter is known as the Traver Non-Skid Device, and is manufactured by the Philip Traver Mfg. Co., Far Rockaway, N. Y. The manufacturer is so confident of the quality of this device that he guarantees it to run 1,000 miles without showing any appreciable wear. The non-skids are curved pieces of doubly hardened steel spaced around the tire. The edges are flared, both to increase the non-skidding properties and to make impossible the cutting of the tread of the tire. A strong spring attachment on the side members of the device prevents the chains from coming loose, rattling, and losing their efficiency. This spring device is operated by a simple wire lever, so constructed that the non-skid pieces are held firmly and evenly against the surface of the tire. This is one of the best features of the Traver product.



TRAVER NON-SKID DEVICE

In addition to the non-skid device made up as one chain, the company manufactures what it calls a sectional non-skid device. This utilizes the same principle as the complete chain, differing in that each piece is put on individually and held in position by rubber-guarded chains which fasten to the spokes. A wheel may be equipped with as many or as few of these as conditions require. All of the tread pieces which take the wear are doubly hardened by a secret process, the result being a surface so hard that a file will not scratch it.

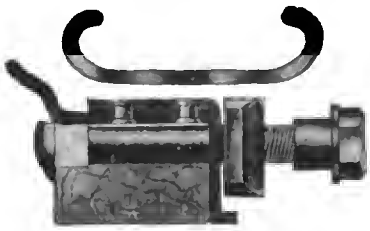
New Paste Makes Valve Grinding Easy—A new substance recently put on the market with the idea of saving motorists labor, material, and money in valve grinding, is being manufactured by the Victor Auto Supply Mfg. Co., 42 West Forty-third street, New York, and is known as Vasco Grinding Compound. In the past, many car owners have experienced repeated trouble with valves that have been improperly ground by the old method, employing oil and emery. Aside from this being an expensive process, it has been found by experts to be highly injurious in many cases. Vasco Grindine has been orepared to eliminate the dangers of emery, and machinists who have tried it find that it does so most efficiently. The abrasive in the compound is an electro-chemical product and was selected over all others owing to its extreme hardness, sharpness, and temper. The binder used has a high viscosity and produces a smooth, even surface. Conveniently put up in collapsible tubes, both coarse and fine, the preparation always remains at the right consistency. One of the chief virtues is that it does not waste away or drop into the cylinder during the process of grinding. It also cuts more rapidly than any other compound.

What's in a Name?—The old saying, "What's in a name?" will be clearly proven as to truth or falsehood in a few short months by one New England concern, the Dover Stamping & Mfg. Co., of Cambridge, Mass., which is now asking the public to give a name to the latest output of the factory. This is an improved funnel, which not only is effective as such, but a great fuel saver in that it is so made as to automatically cut off the outflow of gasoline when the top level is reached. In this way the surplus poured into the funnel may be poured back into the fuel can and saved. The way in which this is accomplished without complications is interesting. Within the funnel is a ball, which is held up off of the outlet hole when the funnel is in use, but as soon as the funnel is raised this ball drops back and covers the hole so that no more liquid can flow through. Those who have had experience with the overflow running all over the floors, seats and other parts of the car will appreciate this new device at its full worth. And still the contest is open for the $50 which will be paid for a good, suitable name. The cut is partly sectioned and shows construction.

DOVER (NAMELESS) GASOLINE FUNNEL

New Removable Rim and Tire—To be able to make a tire change on the road in from two to three minutes, and that with little or no exertion and without getting the hands dirty, is the function of the removable rim. Among those put on the market with this idea in view is the new rim brought out by the Empire Tire Company, Trenton, N. J. This newest addition to the rim family, as shown by the two figures on this page, has a clincher rim, which bolts to the wheel by means of eight bolts. Only six of them, however, must be loosened to make a change, the bolts on each side of the valve being left tight at all times. When the bolts have been loosened the lug is turned over to present the short side to the tire and rim, which may then be pulled off. The new Empire tire, which will be exhibited at the Atlanta show for the first time, has an unusual tread. This has been given the name of "checkered" by the makers, as that indicates the shape and condition of the raised tread portion. The tire is of the same heavy, moulded construction as all other Empire tires, but the new addition, the checkered tread, renders the tire non-skidding. The showing of this new tread at this show, just at this time, when winter is coming on, is particularly appropriate, as this is the time when automobilists are interested in anti-skidding devices. The tire with a tread of this sort is a big advance over the removable and consequently bothersome type. This tread is seen in the illustration to be raised above the surface, so that the "checkers" are really added material.

EMPIRE REMOVABLE RIM ASSEMBLED



SCHEME OF ACTION OF EMPIRE RIM

NEW CHECKERED TREAD OF EMPIRE NON-SKID TIRE

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VOL. XXI NEW YORK—THURSDAY, NOVEMBER 18, 1909—CHICAGO No. 21

THE AUTOMOBILE

Wide Track, Plenteous Entries, and Generous Attendance, All Made for the Success of the Big Meet

ATLANTA AUTO WEEK AWAKES SOUTH

ATLANTA, GA., Nov. 13—The show is ended, the races are over, and the tourists are wending their varied homeward ways. Atlanta's automobile undertaking was crowned with gratifying success, and substantial results have come to the industry, to the buyer of cars, and to the man who enjoys speed contests, not forgetting the greater number who are interested in the building of roads so that they can more thoroughly enjoy the most economical and pleasurable necessity of the age.

It needed a National show to awaken in great degree the interest of the South, and this hustling city has met the requirements of the situation with commendable enterprise and a unanimity of effort which contained only minor mistakes. The first exhibition of 1910 cars in the new Auditorium-Armory attracted large attendance, though it is unquestionably a fact that a plethora of racing caused the out-of-town visitors to give the show less attention than would have been the case had there been less of the spectacular on tap to occupy their time.

To those who had never seen automobile contests, the events on the remarkable speedway presented a magnetism which could not be resisted, and even the old-timers enthused over some of the notable contests of the week. Managers Miles and Reeves expressed satisfaction when the reports began to reach the

Knipper's Chalmers-Detroit, Winner of One of the Important Events, in Full Flight

Aitken's Six-Cylinder National Was a Notable Performer

executive offices that the exhibitors were doing much business in the way of establishing Southern agencies, and also securing in many instances a considerable number of individual orders.

As to a National show in Atlanta another year, that question will have to be answered by the National Association of Automobile Manufacturers, when a summation of the entire exhibition is available.

The various tours into Atlanta from all over Georgia added immensely to the good roads campaign which is being vigorously pushed throughout the State. A thorough realization of this only comes through touring into the country districts where a frequent scene includes the stripe-suited convicts healthily digging away at Mother Earth, from which task they desist only long enough to importune the passing tourist for some change for the ever-needed tobacco. The New York-to-Atlanta tour of the New York *Herald* and Atlanta *Journal* set the ball a-rolling, and this was supplemented most successfully by the half-dozen runs into Atlanta, promoted under the auspices of the Atlanta *Constitution*. With the other Atlanta paper, the *Georgian*, an ardent advocate of convict labor on the roads, it is to be seen that the press of the city is united in its espousal of the automobile and the sequent building of highways.

During the week there have been numerous dinners and an abundance of entertaining, so much so that the recipients lost sleep in generous quantities. It might be mentioned that Georgia is a prohibition State, and the favorite beverage in Atlanta is Coca-Cola, the production of which supplied the basis of the Candler millions. That alcoholic nourishment was obtainable in Atlanta, however, was discovered in due course of time by those who sought such alleviation of thirst.

Of course, there were the usual first sales of cars, but no concern reported that its entire output has been sold at the show. This statement will be reserved, as in previous years, for the forthcoming exhibitions in New York City. All around it is the concensus of opinion that at this time the Atlanta show was more than worth while, and the resultant good will offset by a comfortable balance any expense to which the exhibitors were subjected in thus opening up a section of the country where good roads progress will materially increase the sale of automobiles.

What the Racing Summary Shows—Medium-priced American stock cars have again demonstrated their marvelous speed capacity. No one would have imagined a few years ago that cars selling to every-day customers for from $1,500 to $3,000 could

CONDENSED SUMMARY OF THE ATLANTA SPEEDWAY RACES, NOVEMBER 9 TO 13, 1909

Distance	Winner	Time	M.P.H.	Second	Time	Third	Time
	STOCK CHASSIS (451 TO 600 CUBIC INCHES)						
200 MILES	Rainier (Disbrow)	2:53:48	71.8	Fiat (Robertson)	2:57:47	Renault (Basle)	2:58:43
20 MILES	Fiat (Robertson)	17:47	67.4	National (Aitken)	18:22	Apperson (Harding)	18:23
10 MILES	National (Aitken)	8:27.22	71.0	National (Kincaid)	8:27.71	Apperson (Harding)	8:50.65
10 MILES	Apperson (Harding)	8:30.68	70.5	Stearns (Rutherford)	9:30.67	......	
6 MILES	Fiat (Robertson)	4:43.37	76.0	National (Aitken)	5:11	Apperson (Harding)	5:13
	STOCK CHASSIS (301 TO 450 CUBIC INCHES)						
200 MILES	Buick (Chevrolet)	2:46:48	72	Chalmers-Detroit (Dingley)	2:53:33	Chalmers-Detroit (Lorimer)	2:55:15
20 MILES	National (Aitken)	16:62.70	71.7	Marmon (Stillman)	16:46.86	Chalmers-Detroit (Lorimer)	16:49
12 MILES	National (Aitken)	10:07	71.0	Chalmers-Detroit (Lorimer)	10:09	Chalmers-Detroit (Dingley)	10:10.43
12 MILES	Buick (Chevrolet)	10:12	70.6	Chalmers-Detroit (Dingley)	10:28	Chalmers-Detroit (Lorimer)	10:37
	STOCK CHASSIS (231 TO 300 CUBIC INCHES)						
120 MILES	Marmon (Harroun)	1:49:26	66.0	Chalmers-Detroit (Matson)	1:57:22	Renault (Basle)	2:09:15
	STOCK CHASSIS (161 TO 230 CUBIC INCHES)						
100 MILES	Chalmers-Detroit (Knipper)	1:40:46	59.8	Chalmers-Detroit (Matson)	1:41:52	Buick (Nelson)	1:43:10
24 MILES	Chalmers-Detroit (Knipper)	23:40.42	60.8	Chalmers-Detroit (Matson)	23:40.71	......	
10 MILES	Chalmers-Detroit (Matson)	9:49.46	61.2	Chalmers-Detroit (Knipper)	9:49.84	Buick (Nelson)	9:50.18
10 MILES	Chalmers-Detroit (Matson)	10:41.06	56.2	Chalmers-Detroit (Knipper)	......	......	
4 MILES	Chalmers-Detroit (Matson)	4:05.52	58.0	Chalmers-Detroit (Knipper)	4:08.42	......	
	FREE-FOR-ALL						
50 MILES	Fiat (Robertson)	40:14	70.8	National (Aitken)	43:11	Marmon (Stillman)	43:30
2 MILES	Fiat (Strang)	1:31.40	79.0	Benz (Oldfield)	1:37.18	National (Aitken)	1:43.70
2 MILES	Fiat (Strang)	1:37.18	75.0	Christie (Christie)	1:41.70	......	
1 MILE	Fiat (Strang)	37.70	95.5	Benz (Oldfield)	40.13	Christie (Christie)	48.02
	SPECIAL AND EXHIBITION						
10 MILES	Fiat (Strang)	7:27.04	80.3	Benz (Oldfield)	7:27.71	......	
4 MILES	Fiat (Strang)	2:47.03	86.5	Christie (Christie)	3:10.41	......	
2 MILES	Fiat (Strang)	1:21.51	89.0	Fiat (Strang)	1:22.07	......	
	FREE-FOR-ALL HANDICAPS						
20 MILES	Rainier (Disbrow)	19:51	60.4	Marmon (Harroun)	20:10	Marmon (Stillman)	20:23
10 MILES	Fiat (Robertson)	8:29.08	71.0	National (Aitken)	8:50.25	Marmon (Stillman)	8:50.53
10 MILES	Marmon (Stillman)	8:54.56	67.2	Marmon (Harroun)	9:05	National (Aitken)	9:12.41
8 MILES	National (Aitken)	7:42.70	62.5	Rainier (Disbrow)	7:48.03	Fiat (Robertson)	7:59.59
6 MILES	Marmon (Harroun)	5:40.83	63.3	Chalmers-Detroit (Knipper)	5:41.20	Chalmers-Detroit (Matson)	5:50.91
	HANDICAPS (231 TO 300 CUBIC INCHES)						
10 MILES	Buick (A. Chevrolet)	9:03.18	66.2	Marmon (Harroun)	9:18.07	Chalmers-Detroit (Knipper)	9:18.09
10 MILES	Marmon (Harroun)	9:51.01	60.8	Chalmers-Detroit (Matson)	9:51.23	Chalmers-Detroit (Knipper)	9:51.27
	HANDICAP, NEW YORK-ATLANTA RUN CARS						
20 MILES	Benz (Stoecker)	20136	58.5	Matheson (Whalen)	21:15	Renault (Schaab)	21:55
	AMATEUR						
24 MILES	Stearns (Rutherford)	20:35	70.0	Pope-Hartford (Kizer)	......	......	
10 MILES	Stearns (Rutherford)	8:42.60	70.4	Buick (Oldknow)	9:04	......	
10 MILES	Buick (Oldknow)	8:52.56	67.6	Stearns (Rutherford)	8:52.57	......	

be stripped, brought out on a track, and made to show 60 to 75 miles an hour for 2000 miles at a stretch. Admitting to the fullest degree that speed is not the only thing to be sought for in automobile construction, this remains at once a demonstration both of the power and the reliability, in the face of the hardest of usage, of the machines in question.

There can be no doubt, either, of the value of these races to the manufacturers who have consistently participated in them, from the engineering as well as from the advertising point of view. Their 1910 models may be expected to show the influence of the experience thus gained, not in ways patent to the casual observer, but nevertheless important in the final performance of the car.

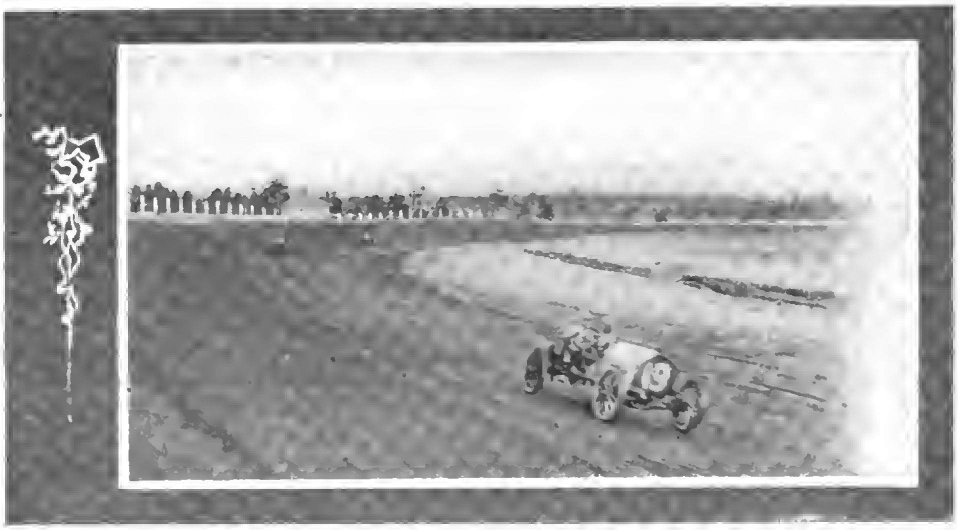
The summary shows that in the largest class the National, Apperson and the Rainier each made away with one event, while the Fiat, which was driven by Robertson, took two. In addition National scored three second places, and Fiat one, while Apperson got three thirds. Disbrow's performance of 200 miles in 2.53:48 was creditable.

In the class for cars with a piston displacement of from 301 to 450 cubic inches displacement National and Buick split even, each with two victories. Chalmers-Detroit was the heaviest runner-up, garnering no less than three seconds and four thirds, which, scoring by points as a track-meet is scored, would put them ahead of the other two.

Marmon proved the leader in the 231-300 inches class, scoring two firsts to the Buick's one; it must be admitted, however, that in one of these, a handicap, the Marmon was given far too great a distance. Marmon also took one second, and Chalmers took two seconds and two thirds. The baby Chalmers had it all their own way in the smallest class, and the real racing was between Matson and Knipper. In this Knipper had the better of it, but only after several of the hottest kind of races. Nelson squeezed his Buick in for two thirds.

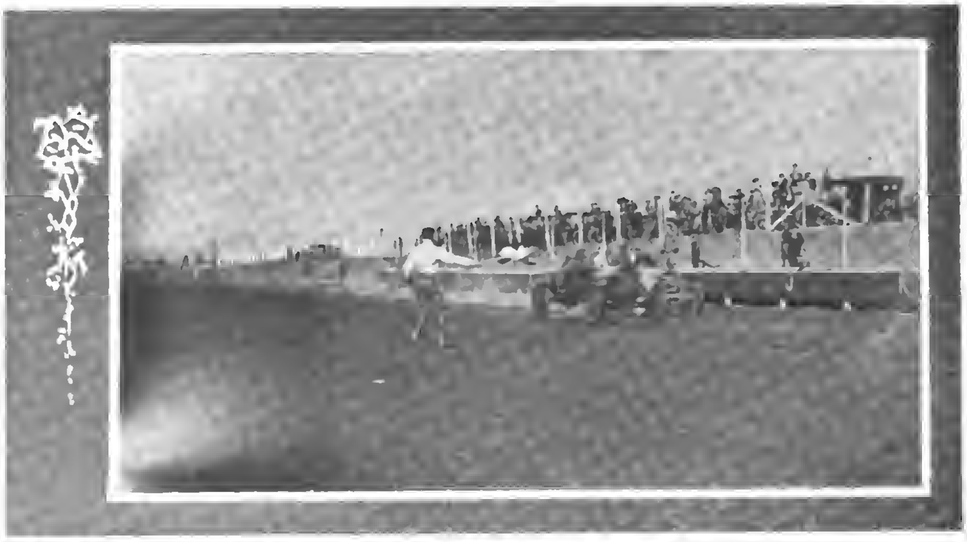
In the free-for-alls Strang and his big Fiat had it all their own way, at least on the shorter distances. Barney Oldfield, who has often found easy picking with his Benz Grand Prix racer, had to admit himself outclassed. It was a case of "defeated, but not dishonored," for the relative powers of the two machines left no doubt as to the outcome. Incidentally, Michelin tires scored a goodly percentage of victories.

The twenty-mile handicap for New York-Atlanta tourists was a particularly interesting event, for it showed the possibilities of cars which were "stock" in the strictest sense of the word. All of these machines had of course to be geared low enough to take the hills and bad roads met with on the way, but nevertheless Stoecker drove his Benz over the twenty miles in 20:32, close to mile-a-minute speed.



As the Cars Rounded Upper Turn They Decreased Speed

Especially Well Equipped Were the Pits for Rapid Work



Harroun's Marmon Demonstrated Its Ability Repeatedly

STORY OF THURSDAY'S RACING

Atlanta, Ga., Nov. 11—If, as the dictionary alleges, "recrudescence" means the "breaking out after temporary abatement or suppression," then the recrudescence of Robertson was certainly the feature of the Speedway races on Thursday. Up to that day there can be no denying that Robertson was well suppressed. His Fiat was new and not tuned up, and though it showed symptoms of speed, it never really broke out with it all over.

But Thursday Robertson arrived—twice in fact. The first time was in the 10-mile stock chassis race for cars of 600 cubic inches displacement or under. Five cars started in this and four finished. But it was all Robertson. He was away first and finished the same, some three-quarters of a mile or more ahead of Jack Aitken in the No. 3 National, of lesser horsepower it should be said. Robertson came again in the 10-mile handicap, in which he figured as the scratch quantity. The handicaps were a joke to Robertson, though he was some time in demonstrating it.

The day's card opened with the long race, a 120-mile stock chassis affair, 231 to 300 cubic inches piston displacement, for the Atlanta Automobile Association trophy and some additional trinkets in the way of 1,050 gold dollars divided into three prizes.

According to a careful reading of the form charts Chevrolet was a certain winner over a field made up of Ray Harroun in a Marmon, Joe Matson in a Chalmers-Detroit, and Charley Basle in a Renault. The Buick ran for a good two dozen miles, opening up an awful lead. Then something went wrong with a valve. Chevrolet stopped on a turn and tinkered awhile, and then came back to the pits and tinkered some more. Then he tinkered a little while longer, and then he ran some. Finally he drew up in front of the pit and with the assistance of a hammer demolished much of the top of one cylinder, whittled out a wooden plug to fill the resulting hole, hammered it in and went on after third money.

By that time the Marmon had a defeat-proof lead and the Chalmers was second, but the Renault was no very excellent third, and the Buick, running on three legs, went after it. It was a game chase, and one that had the pit men cheering and shouting; but, though Chevrolet could pick up 10 seconds to a lap, he could not overhaul the Frenchman and his French car, and Basle finished third, taking the first money of what has been an unlucky meet for him. Whereupon he bought a bottle of lemon soda and a bag of chocolate creams, and, sitting in the shade of a pit wall, celebrated copiously.

The winning Marmon made the 120 miles in 109:26:94. Of course, there was no Indianapolis record to check this against, but when Harroun finished his one-hundredth mile he was 1 minute 33 seconds ahead of his Indianapolis time for that distance.

The second race run was a 20-mile handicap, which was one wild, grand scramble, a veritable motor melée, in which L. A. Disbrow's Ranier proved the best scrambler. There was a desperately narrow escape as the cars were lining up. The Matheson, which was slated to make its Atlanta début in the race, was the last car to come down to the line, and it came with a rush. Neil Whalen tried to put on the brake when the line was nearly reached, but it did not stay put. Whalen yanked his car one way and then the other, slowing it down by the skidding method, and finally headed for a very narrow hole between the pit fence and the inside car of the machines lined up. In this opening were two useful officials, one of which jumped one way and the other the other, just in time to escape the big six-cylinder, which reeled through the opening and out safely on the other side. Before the car was well stopped Starter Wagner and Referee Pardington hove alongside, and began telling Whalen just what sort of a driver they thought he was, which, being completed, they sent him back to the garage to repair his brake, starting the race without him.

A 10-mile event open to amateurs for the Southern championship followed, and John Rutherford in a Stearns was a winner by a safe margin.

At this point there was an "extra." Strang's 200-horsepower Fiat was driven on the track, and with it was the original Haynes runabout, with Elwood Haynes in the driver's seat and Asa Candler, Jr., beside him. The two cars were driven down in front of the judges' stand, photographed, and then the Haynes was driven off the track while Strang went an exhibition two miles from a flying start in 1:21:51.

In event 13, which was next, another Indianapolis (and likewise American) record was demolished. This race was at 20 miles for cars of 301 to 450 displacement and a field of a half dozen faced the starter. For the first lap the ones you could have covered with the proverbial blanket were the two Nationals, a Marmon, and Dingley's Chalmers-Detroit, in the order named. At the end of the next lap it was the same, except that Dingley's Chalmers had nosed out Lorimer. The next laps the two National changed places and the Chalmers cars likewise "swapped." On the fourth time around the Kincaid National went out of business, but Aitken's car continued steadily in the lead, except in the fourteenth mile, when Lorimer made his last desperate drive and for a few seconds led the procession. In that one lap he shot his bolt and dropped back to third, while Harry Stillman's Marmon worked up into second place and stayed there until the end.

It was a grand race. For mile after mile the three or four leaders were separated by inches only, and the crowd, demonstrative always, was wild in its enthusiasm.

The only other event not already described was the seventeenth, a 4-mile stock chassis affair, for cars of 161 to 230 cubic inches displacement. In this race the two little Chalmers finished "one-two," with Joe Nelson in a Buick third and an E-M-F fourth. The time was 4:05:52. Summary:

120-MILE STOCK CHASSIS (231 to 300 Cubic Inches)

First Prize, Atlanta Auto Association Trophy and $600 in Gold; Second Prize, $300 in gold; Third Prize, $150 in Gold.

1	Marmon	Harroun	1:49:26.94
2	Chalmers-Detroit	Matson	1:57:22.92
3	Renault	Basle	2:09:15.20

20-MILE STOCK CHASSIS (301 to 450 Cubic Inches)

First Prize, Cup; Second Prize, Cup.

1	National	Aitken	16:42.76
2	Marmon	Stillman	16:46.86
3	Chalmers-Detroit	Lorimer	16:49.63

The winner's time is a new competition record.

10-MILE STOCK CHASSIS (600 Cubic Inches or Under)

First Prize, $100; Second Prize, $50.

1	Fiat	Robertson	7:47.71
2	National	Aitken	8:22.87
3	Apperson	Harding	8:23.17

10-MILE STOCK CHASSIS (Amateur Drivers Only for Southern Championship)

First Prize, Cup; Second Prize, Cup.

1	Stearns	Rutherford	8:42.63
2	Buick	Oldknow	9:04.17

4-MILE STOCK CHASSIS (161 to 230 Cubic Inches)

First Prize, Cup; Second Prize, Cup.

1	Chalmers-Detroit	Matson	4:05.52
2	Chalmers-Detroit	Knipper	4:08.42

20-MILE FREE-FOR-ALL—HANDICAP

First Prize, $150; Second Prize, $50.

1	Rainier	Disbrow	(2¾ min.)	19:51.15
2	Marmon	Harroun	(2½ min.)	20:10.63
3	Marmon	Stillman	(2 min.)	20:23.41

10-MILE FREE-FOR-ALL—HANDICAP

First Prize, $150; Second Prize, $50.

1	Fiat	Robertson	(scratch)	8:39.08
2	National	Aitken	(32 sec.)	8:50.25
3	Marmon	Stillman	(32 sec.)	8:50.53

2-MILE EXHIBITION

Fiat	Strang	1:21.51

THE EVENTS OF FRIDAY

Atlanta, Ga., Nov. 12—The Atlanta Speedway has had luck in its weather, in its entries and in a score of ways, but Friday there were horseshoes and rabbits' feet pinned all over the track. From the start of the meet any car could smash a steering knuckle, blow out a tire or lose a wheel going at absolutely top speed and not a soul would be even scratched.

But on Friday there were two accidents, either of which was calculated to kill a man or two, and yet, barring a scratched face, not a person suffered.

The first and most sensational accident happened in the morning—an accident that marked the passing of "The Merry Widow," the big Pope-Toledo racing car of ill repute and worse manners, which Asa Candler, Jr., president of the Atlanta Automobile Association, bought for use in the local races.

This car had showed its real class on the first day of the local races by back-firing when Louis Cliquot, its driver, was cranking and thereby fracturing his arm in three places. The car was then given over to Charlie Basle, who tinkered with it for a day, and then passed it on politely, but firmly, to Kilpatrick, who had come to Atlanta to drive a Hotchkiss, which went wrong and left him temporarily without an occupation.

Kilpatrick almost got the evil old craft in running order. He tinkered with it and nursed it along, and in the early hours of Friday's practice the old boat was running passably well. Then came the accident. Going at a good rate of speed the car rounded the first turn in good order and started into the second. As it did so the engine blew up. What gave way nobody knows, but a piece of steel from the engine went hurtling into the air, carrying the hood with it, and in a second the machine was beating itself to pieces and reeling up the track. At the head of the backstretch the "Merry Widow" headed for the outer rail, where there was a drop of 20 feet to the ground below. The fence straightened it out and it reeled back into the track, gave way all at once, threw the driver and mechanician high in the air and over the bank, turned a somersault, rolled over a couple of times, exploded mildly and then burned fiercely.

The miracle was that neither driver nor mechanician was hurt. It was only a matter of pacing to prove that both men were hurled nearly 60 feet from where the car threw them and that the drop from the track level to the ground below was 20 feet. And yet both men sailed this distance through the air and landed safely and with no damage done. The mechanician was not even scratched or jarred. Kilpatrick was slightly burned, but not otherwise hurt.

The "Merry Widow" burned fiercely, and it was nearly an hour before the flames could be sufficiently checked so that the wreck could be hauled off the track.

Strang, in his 200-horsepower Fiat, was the hero of another miracle. In the 50-mile free-for-all, while going at a good 80 miles an hour, the tread of his right rear tire came off. He shut off, slapped on the brakes, and managed to slow down his car to a moderate gait before the inevitable blow-out came.

The next accident, and the last one of the meeting, came later on in the 50-mile race. The two big Chalmers had kept the Apperson "Jack Rabbit" pretty well pocketed for a couple of laps, when Harding, in the last-named car, took a long chance. Motioning that he was coming between the two cars he slipped through a narrow opening and went out in front. His lead was short lived. As his car finished the first turn the right rear tire threw its tread; and Harding, foreseeing a blow-out, turned sharply into the inner rail. As he did his car skidded and the rear wheels went into the front of the Chalmers-Detroit driven by Lorimer. Both cars spun dizzily, smashed up a trifle, and came to rest without capsizing. Not a man was thrown from his car and the damage to the machines was so slight that the "Jack Rabbit" was running the next day, and the Chalmers could have been if it had been necessary.

Owing to the extreme length of the meet the fourth day's racing was notable largely for the small fields. There was really only one good race, and that was the 50-mile free-for-all.

If Louis Strang could have kept tires under his 200-horsepower craft there would have been nothing to it. He made the first 10 miles of the race in 7:18:21, which was way under the Indianapolis record for that distance. Then came the blow-out Strang retired, well knowing that his machine was not cut out for 50-mile performances on a track.

Then the race became a picnic for Robertson's stock "60" Fiat. Aitken's "40" National was always second, after Strang dropped out, and Stillman's Marmon came in a good third, pulling up from nowhere by steady work. The time of the winner was 40:14.02, which was well below the Indianapolis record of 44:31.2. In fact, the first four cars which finished were below the Indianapolis mark.

None of the other races was sensational. In Event 20 the only starters were two Chalmers, driven by Knipper and Matson, who circulated around the track in slow time. Event 21 was another picnic for Robertson and the Fiat. It was at 6 miles, and he romped home in 4:43.37 with Jack Aitken in the No. 3 National second and the Apperson third.

Aitken was the winner in the event for the 301 to 450 class at 12 miles in 10:07.65. It was not any runaway, however, for Dingley, in one of the Chalmers, gave stern chase and led on the fourth and fifth laps, only to be nosed out by a margin of less than two seconds.

The two-mile free-for-all, which was changed from a two-heats-in-three to a one-heat affair, was easy for Strang and the big Fiat. Robertson in the smaller Fiat made great time on the turns and seemed to have second place cinched, but Walter Christie, who had to take it easy on the turns, came down the stretch faster than ever car had done before and took second money.

The handicap, limited to contestants in the tours to Atlanta, was won by a Benz, driven by Ernest Stoecker. Summary:

24-MILE STOCK CHASSIS (161 to 230 Cubic Inches)

First Prize, $100; Second Prize, $50.

Pos.	Car	Driver	Time
1	Chalmers-Detroit	Knipper	23:40.42
2	Chalmers-Detroit	Matson	23:40.77

24-MILE STOCK CHASSIS (Amateur Drivers)

First Prize, Kriegshaber Trophy.

Pos.	Car	Driver	Time
1	Stearns	Rutherford	20:35.25
2	Pope-Hartford.	Kiser	

12-MILE STOCK CHASSIS (301 to 450 Cubic Inches)

First Prize, Cup; Second Prize, Cup.

Pos.	Car	Driver	Time
1	National	Aitken	10:07.65
2	Chalmers-Detroit	Dingley	10:09.26
3	Chalmers-Detroit	Lorimer	10:10.45

6-MILE STOCK CHASSIS (451 to 600 Cubic Inches)

First Prize, Cup; Second Prize, Cup.

Pos.	Car	Driver	Time
1	Fiat	Robertson	4:43.37
2	National	Aitken	5:11.11
3	Apperson	Harding	5:13.02

20-MILE HANDICAP (New York to Atlanta Run Cars)

First Prize, Cup; Second Prize, Cup.

Pos.	Car	Driver	Time
1	Benz	Stoecker	20:36.86
2	Matheson	Whalen	21:15.60
3	Renault	Shaab	21:55.83

10-MILE HANDICAP (231 to 300 Cubic Inches)

First Prize, Cup; Second Prize, Cup.

Pos.	Car	Driver	Time
1	Marmon	Harroun	9:51.01
2	Chalmers-Detroit	Matson	9:51.23

50-MILE FREE-FOR-ALL

First Prize, $500; Second Prize, $250; Third Prize, $100.

Pos.	Car	Driver	Time
1	Fiat	Robertson	40:14.02
2	National	Aitken	43:11.41
3	Marmon	Stillman	43:30.56

2-MILE FREE-FOR-ALL

First Prize, $200; Second Prize, $100; Third Prize, 50.

Pos.	Car	Driver	Time
1	Fiat	Strang	1:34.47
2	Christie	Christie	1:41.71
3	Fiat	Robertson	1:42.30

SATURDAY'S CONCLUSION RATHER MILD

ATLANTA, GA., Nov. 13—If it had not been for the 200-mile race for big cars the officials would have been hard put to it to scrape up enough entries to-day to keep things under way. Four days of hard, even if lucky, racing had put a few drivers and more cars temporarily out of the running. However, a good field was patched and scraped up for the long event, and the contest was not without spectacular features. It proved a revival of the good old tale of the hare and the tortoise, with the Rainier car, driven by Disbrow, in the rôle of the tortoise.

The Rainier, except for the winning of a handicap, had not had any luck. But in the 200-mile race for the wonderful City of

Past and Present.
1893 Haynes and 1908 Fiat.

Stillman, the Marmonite

Chalmerites; Lorimer, Knipper, Dingley and Matson.

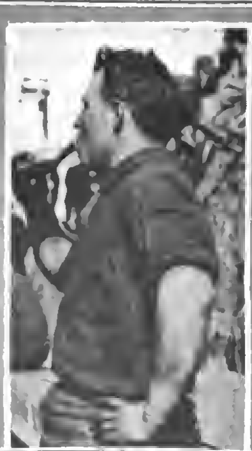
The Paddock in Action

Speed Merchants:
Robertson,
Christie,
Strang
Oldfield.

Finish of Asa Candler Junior's Speed Craft

Chevrolet, daredevil;
Asa Candler, Sr., capitalist.

"Ned" Broadwell and Referee Pardington



Robertson Indulges in Coco Cola.

Timekeeper C.H. Warner

Atlanta trophy and $1,000 in gold it was the easiest kind of a winner. And, incidentally, the two Renaults, which finished third and fourth, both broke out of the non-winner class in the greatest event of the week. These cars ran through the 200 miles, with only one stop, and that for oil. The Rainier even bettered this. Not once in all the long grind did it hesitate, not a single time did it stop for repairs or supplies.

An even eleven cars started in the race—practically all the high powered machines that were in commission at the track. There were Robertson and Strang in stock Fiats; the Basle brothers in Renaults; Matson and Dingley in Chalmers-Detroits; the winning Rainier, the Apperson "Jack Rabbit," Stillman and Harroun in Marmons, and Chevrolet in a Buick.

In the natural course of events Robertson was the favorite. His Fiat was working marvelously, and if it could have kept going would have had the race won. All the heavy betting was on him. For 163 miles he was the leader of the race. This wily driver well knew that this race was not altogether with the swift. So he put a good lead to his credit, and then tacked to Disbrow's Rainier and hung on like grim death, accepting pace though his car had all the advantage in speed.

Then came the accident that caused the trouble. Whirling into the last turn his chain gave way. It was only the matter of a couple of links, but it cost him a half dozen laps and the race.

Two other prominent early contenders were Strang in his Fiat 60 and Chevrolet in a Buick. Strang was in the hunt for 28 laps, and then a series of mishaps which ended in the breaking of an oil pump case caused him to withdraw. Chevrolet made an even more brilliant race of it. For 42 laps his machine ran like an eight-day clock. Then the transmissions gave down in a heap; and, from a second-place position to a wreck at the pits, was the sudden transformation of his car.

The Chalmers team were good at the start, Dingley in particular staying well ahead of the ruck. But five days of hard racing had told on the cars, and both were eliminated before the race was well begun.

It took about 65 laps to get the race shaken down to a standing where even the experts could get a line on the finish. A broken spring put the Apperson out at about that point, and the Fiat of Strang had been driven slowly over to the garage and the five cars which were to finish were the only ones running. At that point Robertson was in the lead; the Rainier, which had pulled up from a chronic fifth, was second; and Charley Basle in his red Renault was third, with his brother in another Renault fourth. These two French machines had hung around the tail end of the procession when speed alone counted, but had pulled up when the reliability test had been applied.

Up to the 81st lap and nearly the end of the 82d the race has been a grind, with Robertson apparently the winner. Then came the accident to the chain and the race took a new aspect. The delay had killed Robertson's chances, but when he got under way again he was in third place and he set off like the wind to gain what distance he could. It took him 24 miles of furious driving to overtake Charley Basle and gain second place, and then he set off after Disbrow. It was a hopeless task, however. His only chance was that the Rainier pilot would have to stop, if only for a few seconds. So he took the chance and drove like mad. But never once hesitated the Rainier. As it had run at the start, it was running at the finish steadily and well. And it crossed the line a winner in 2:53:48.32. This broke the record of 3:24:13.4 made in Indianapolis; and, in fact, all four prize winners were comfortably under the Indianapolis record. The only other car that finished was Harroun's Marmon. It had no earthly chance and was dozens of miles back, but Harroun hung on in the hope that enough cars would drop out to put him in the prize money. But he missed being "placed" by just one position, finishing fifth.

The other races of the day were mediocre, owing to small fields and the fact that frequent clashes between all the cars had given the spectators a pretty good idea of how every race was to come out before it was even started. One of the few real contests was in the ten-mile event for cars of 231 to 300 cubic inches displacement. This was a see-saw affair in which the Buick, driven by A. Chevrolet, scratched up from third place to first and the Marmon, driven by Harroun, worked up from fourth to second; dropping a couple of Chalmers out of the prize money in consequence. The twelve-mile race for the 301 to 450 class was a procession with Chevrolet always leading, but the eight mile free-for-all handicap furnished a better contest. Aitken in his National was a winner, though at least three cars made it interesting for him.

The races closed with the long event and after it ended the crowds dispersed, not to assemble again until next Spring, when another meet is to be held. It is estimated that over 100,000 people attended the races and they proved a vast financial success. The $100,000 insurance that the Atlanta Automobile Association took with Lloyds against rain proved unnecessary, for barring a sprinkle on Wednesday the weather was beyond human criticism. Here is the summary of the last day's racing:

200-MILE STOCK CHASSIS (451 to 600 Cubic Inches)

First Prize, City of Atlanta Trophy (Which Must Be Won Three Times to Become the Property of the Entrant) and $1,000 in Gold; Second Prize, $500 in Gold; Third Prize, $300 in Gold; Fourth Prize, $200 in Gold.

Pos.	Car	Driver	Time
1	Rainier	Disbrow	2:53:48.32
2	Fiat	Robertson	2:57:47.05
3	Renault	C. L. Basle	2:58:43.93
4	Renault	L. Basle	3:13:41.87

12-MILE STOCK CHASSIS (301 to 450 Cubic Inches)

First Prize, $100; Second Prize, $50.

1	Buick	L. Chevrolet	10:12.66
2	Chalmers-Detroit	Dingley	10:28.83
3	Chalmers-Detroit	Lorimer	10:37.76

10-MILE STOCK CHASSIS (231 to 300 Cubic Inches)—HANDICAP

First Prize, $100; Second Prize, $50.

1	Buick	A. Chevrolet	9:03.15
2	Marmon	Harroun	9:10.07
3	Chalmers-Detroit	Knipper	9:18.09

10-MILE STOCK CHASSIS (161 to 230 Cubic Inches)

First Prize, Cup; Second Prize, Cup.

1	Chalmers-Detroit	Knipper	10:41.06
2	Chalmers-Detroit	Matson	13:35.73

6-MILE STOCK CHASSIS (231 to 300 Cubic Inches)—HANDICAP

First Prize, Cup; Second Prize, Cup.

1	Marmon	Harroun	5:40.83
2	Chalmers-Detroit	Knipper	5:41
3	Chalmers-Detroit	Matson	

8-MILE FREE-FOR-ALL—HANDICAP

First Prize, Cup; Second Prize, Cup.

1	National	Aitken	7:42.73
2	Rainier	Disbrow	7:48.63
3	Fiat	Robertson	7:59.50

2-MILE EXHIBITION

Fiat	Strang	1:22.07

METZ CAR IN 24-HOUR ENDURANCE RUN

WALTHAM, MASS., Nov. 13—The makers of the Metz car, which is usually sold unassembled, the parts being put together by the purchaser, gave one of their machines a strenuous reliability test recently. The run was over a five-mile course in the vicinity of Waltham, of which Glenn Curtiss in his motorcycle days once said: "For a speed contest this course is about the limit; but for an endurance run it's a dandy."

The car started at 5:45 P. M. One hundred miles were completed at 10:24; 200 at 6:19 A. M.; 300 at 11:07; 400 at 2:56 P. M., and 460 at 5:34. The gasoline consumption was 13 gallons 1 quart, and the oil consumption 6 quarts 1 pint.

The car ran with great regularity, making round after round without a stop. The only incidents were a puncture and the removal of some cotton waste which got into the inlet pipe.

Zengle's Narrow Escape—Len Zengle, who is now with the Pennsylvania factory at Bryn Mawr, Pa., was testing a racer last Saturday afternoon when a large touring car filled with women loomed up ahead. He deliberately steered his car up a high bank, hoping to dodge the trees, but one caught the Pennsylvania on the middle of the radiator. Zengle landed on a pile of leaves unscratched.

FRANCE FINDS NEW RULES OF THE ROAD IMPERATIVE

PARIS, Nov. 12—In addition to the international automobile regulations which have recently been studied in Paris, France is interested in bringing up to date her national laws governing traffic. The present set of regulations was drawn up in 1851, at a time, naturally, when automobiles were unknown, and when traffic was not as intense as to-day. Admittedly the laws need modernizing, and in order that this work should be done properly Louis Barthou, then Minister of Public Works, appointed a commission of experts, representing the automobile industry, road makers, horse owners, cyclists and the ministries of justice and public works, to draw up an ideal road code, which should be presented to the Minister of Public Works, and by him brought before the government for presentation to parliament.

The experts met last June, then again this month. In the meantime they had gathered together, in a classified form, all the road regulations of all countries. From this mass of regulations, some good, some bad and many indifferent, the experts will pick out the best and with them create an ideal set of laws governing traffic. Although the automobile men occupy a prominent position on the commission, the intention is to study the question from an even broader standpoint than that of motorists. The interest of all parties have to be considered from the standpoint of the foot passenger, the horse owner, the automobilist, and dwellers along the roadside. In addition the road builder will be consulted.

The commission is now in two sections, one of them studying the road itself, and dealing principally with the weights of vehicles that shall be allowed on the road, the type of wheels they shall employ, etc. The other section has the larger problem of creating laws for the regulating of traffic. It is very probable that the new code will adopt a free speed limit. At present official France is in contradiction with itself, for it has a maximum speed law of 18 miles an hour, which if rigorously applied would put every French automobilist into prison. Practically no limit is imposed, but there is always danger of an attacking party taking advantage of the legal limitation. What will doubtless be done will be to make the law as reasonable as its present application, which is no limit, but every man responsible for the accidents he may cause. This will also put a check on the mayors of little villages, who at present have the power to fix local speed limits varying from a walking pace to 10 miles an hour—but rarely have the courage to enforce them.

Lights on all vehicles will be a strong point of the new code. Where the maximum speed is less than 18 miles an hour, only one light will be required, but it must be of such a nature and placed in such a position that it will be seen as clearly from behind as from the front. Cattle and sheep driven on the road at night will have to show a light in a similar way, and it is more than probable that the same regulation will apply to troops and any considerable body of men marching together.

Another proposed improvement is that all cases of dispute between any stranger and a native shall not be tried before the local courts, but in the chief town of the department, corresponding to the capital of the State in America. Almost invariably in a dispute between an automobilist and another person the automobilist is a stranger to the district, or probably a foreigner, while his opponent is a native. The local judge has such strong local attachments that it is rare indeed that the stranger receives fair treatment. It is but natural that in case of a doubt the local judge should decide in favor of his townsman rather than of a stranger he has never seen and may never see again. At times, too, the automobile brings exceedingly important cases before exceedingly unimportant courts, the judge of which has not the experience necessary to arrive at a just decision. The transference of all such cases to the capital town would not cause much inconvenience to the natives and would assure fairer treatment to the automobilist.

Indications are that the new code will become law at an early date. Automobile touring in France has become so widespread, traffic is so great on all the main highways, that it is impossible to continue with a set of regulations brought into existence over forty years ago. What is needed is a set of regulations that will clearly define the duties and responsibilities of all users, that will make it impossible for the dare-devil chauffeur to endanger the lives of others, and equally impossible for the farm laborer to sleep in the bottom of his cart while his team wanders along at its sweet will. The highway has come to life and must have rules and regulations as clearly defined as those of the railway—and as rigorously enforced.

PRESIDENT TAFT O. K.'S THE SAVANNAH COURSE

SAVANNAH, GA., Nov. 13—President Taft, during his recent visit, gained the honor of being the first president of the United States to enjoy a ride around an automobile race course. He much enjoyed his circuit of the twenty-five-mile course on which took place the greatest automobile contest that was ever held. President Taft was greatly pleased with the reception in Savannah, and the ride was the best he ever had. When asked what he thought of the course, the President said: "This is the finest course that I have ever laid eyes upon, and you shouldn't let it be idle. Why, if we had it in Washington, we would have Grand Prize races every six months."

President Taft in Mayor Tiedeman's Packard "30"

The picture shows President Taft, Mayor George Tiedeman and Capt. Archibald W. Butts, in the rear seat, while James Sloan, Jr., the secret service man, occupies the front seat with the driver. The picture was taken in front of General W. W. Gordon's residence, where the President stopped. The car was the Packard "30" of Mayor Tiedeman.

NEW YORK "COPS" FOUND TOO FRIENDLY

Police Commissioner Baker of New York has decided that the bicycle policemen are getting too friendly with the chauffeurs who customarily pass on their beats. The "cops," it is said, are not averse to accepting an occasional ride, and in return look the other way when their acquaintances go by at a twenty-mile clip. As a result wholesale transfers have been made.

President Battey "At Home"

Tourists Leaving Louisville, Georgia, After the Prolonged Stop

HOW SAVANNAHIANS TOURED ACROSS GEORGIA TO ATLANTA

SAVANNAH, GA., Nov. 13—With thirty cars participating, the first endurance run from Savannah to Atlanta started from the DeSoto hotel on the morning of November 8 at 6.45 o'clock. As each car left a cheer was given, for more than five hundred saw the tourists begin their journey.

While traveling at forty miles an hour, Harvey Granger's big "6" Stevens-Duryea ran into a stump some nine miles out of Savannah, and had its front somewhat dented. Luckily for those in the car, it was thrown against a telegraph pole which kept it from capsizing.

The first greeting was received just after passing out of Chatham county, and it came from the road-making convicts. Brooklet was the first stop, and here hung a banner with the words: "Welcome to Brooklet." The next sign read "Burke County Line," and from here on the roads were so good that the cars arrived at Louisville two and a half hours ahead of schedule time. DeBorde's Buick lost two of its wheels near Waynesboro as a result of trying to get out of the way of a horse and wagon. Slight bruises came to the car's occupants, who were well enough to continue the trip after new wheels had been received from Savannah.

At Louisville, the former home of President Battey, a big dinner was awaiting the tourists, who were the guests of his old townsmen. The feast was bounteous and unique and the tourists found it hard to leave the fair ones who had served them so gracefully.

At Waynesboro came more luncheon, and again the contestants had no use for their money. At Sandersville the same treatment was repeated.

When about twenty-five miles out of Statesboro, Mayor Tiedeman was thrown from his Packard, and broke one of his fingers, besides sustaining a wrenched back. His finger was dressed by N. H. Van Sicklen, and he continued the trip.

When Milledgeville, the night stop, was reached, it was found that fifteen cars of the thirty had managed to keep in the front and check in.

All of the cars that checked in and those that broke down on the road and caught up after running all night, left Milledgeville the next morning at 8 o'clock. The send-off was one of the greatest the town had ever given to anybody. The cadets at the military school were drawn up in companies, and saluted as the contestants passed. On the steps of the old capitol where the ordinance of secession was passed, several hundred young ladies stood and waved American flags. When the cars passed the girls' normal school, the girls, who numbered way into the hundreds, stood in line and cheered each car as it went by.

Eatonton had a large banner carrying the words: "Welcome to Eatonton," which place was reached at 9.15. The sign "Newton County Greets You" introduced some of the best roads that had yet been passed over, and here the same "glad hand" was again extended.

Of the whole trip the best reception was received at Covington. The streets were roped off so as to allow the automobilists to go through to the place prepared for them at the court house, where dinner was served by a committee of young girls. The boys from Emory college also took part and gave a few college yells. While leaving Covington a slight accident happened. An E-M-F, driven by Adkins, ran into a Buick, driven by Youmans, and both cars suffered somewhat. A blacksmith was near at hand and soon had the cars running. The stay at Covington was stretched from forty minutes to 1 hour 55 minutes.

When it was heard that the party had reached Stone Mountain, a reception committee in three cars, headed by R. V. Connerat, met the party just below Decatur, in which were J. W. Hill, of Atlanta; Judge A. B. Moore, of Savannah, chairman of the commissioners of Chatham county; J. F. Lewis and C. Lochridge, of the Atlanta *Constitution*. The first car to reach Atlanta was the pilot at 4.30 o'clock, with twenty-five others following closely behind. The route then was out to the speedway and the clubhouse.

The following twenty-six cars out of the thirty starters finished the run: Stevens-Duryea, F. C. Battey; Stevens-Duryea, Harvey Granger; Packard, George W. Tiedeman; Chalmers-Detroit, T. A. Bryson; Packard, N. G. Browne; Stevens-Duryea, C. Barrow; White Steamer, F. F. Stacy; Stevens-Duryea, A. W. Solomon; White Steamer, L. H. Hilton; Buick, J. F. Toole; White Steamer, O. B. Martin; Crawford, W. C. Mahoney; Chalmers-Detroit, G. I. Taggart; Maxwell, W. H. Towles; Maxwell, R. Brockett; Cadillac, W. G. Austin; Cadillac, W. T. DeBorde; Buick, Frank Hahne; Ford, M. Ed. Wilson; Schacht, B. B. Tippins; Buick, T. E. Youmans; Buick, D. P. Everett; E-M-F, Charles Graham; Buick, A. Weill; Maxwell, E. G. Gager.

The technical committee soon set to work examining the cars, but discovered that it was impossible to get through that night, so gave up the work until the following day. It was found that two or three cars in each class had made perfect scores, or very

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Capturing the Juicy 'Possum in Sunny Georgia

nearly perfect, and to decide the winners it would take almost a week. The winners will be announced by the middle of next week. Those that have a look-in at first prizes in each class are:

Car	H.P.	Owner	Driver	Observer
CLASS A				
Stevens-Duryea	24	C. Barrow	C. Barrow	J. Jones
Buick	40	R. V. Connerat	J. S. Toole	H. F. Kuck
Packard	30	N. G. Browne	N. G. Browne	C. Osborne
CLASS B				
Maxwell	30	W. H. Towles	W. H. Towles	W. J. Robider
Maxwell	30	W. L. Hazzard	R. Brockett	G. R. Foltz
Crawford	30	Savannah Taxi Co.	W. C. Mahoney	W. T. Knight
CLASS C				
Maxwell	10	Maxwell-Briscoe Co.	E. G. Gager	H. Wright
Buick	22	A. L. Well	A. L. Well	A. Ferst

J. L. Sibley, Jr., driving a Cadillac, started the same morning the Savannah club left, and, suffering from record-breaking fever, dropped out of the run, making the 304 miles in twelve hours.

LIMITATIONS OF STRANG'S ATLANTA RACER

ATLANTA, GA., Nov. 13—Strang's big Fiat racer, it appears, is helpless when attacked by the puncture demon. Strang had the 50-mile free-for-all at his mercy, when, on the eighteenth mile, he had a blow-out on his right rear wheel, which caused him to drop out. It is said to be impossible, for some mysterious reason connected with the construction of the big car, to make a quick tire change on it. Strang had done the first ten miles in 7:18.32, at the rate of 82.1 miles an hour.

Experts who have looked up the comparative "dope" on the Fiat and Barney Oldfield's Benz find that the Italian has much the greater cylinder capacity. Its bore is 7.48 inches and its stroke 6.29 inches, giving it a piston displacement of 1,106 cubic inches. What this means will be realized when it is remembered that the biggest stock car class is for 451 to 600 cubic inches displacement. The bore and stroke of the Benz are 6.1 and 8 inches respectively, giving it a displacement of 935.5 cubic inches.

THE STUNT OF ONE SALES MANAGER

ATLANTA, GA., Nov. 12—What is regarded as one of the most remarkable feats ever accomplished by an automobile was the run up Stone Mountain yesterday afternoon by a 12-horsepower Maxwell runabout. The trip was the result of an ambition on the part of General Sales Manager C. W. Kelsey, of the Maxwell-Briscoe Company. About a year ago some mention of the mountain was made in Mr. Kelsey's presence and he then ventured the opinion that if man could climb the steep ascent his machine could, too. He was laughed at, but quietly waited his time.

Thursday afternoon he announced himself ready to make the trial and chose E. G. Gager, of the Pittsburg office, to accompany him. Another party went in one of the larger Maxwell cars and included M. Rambo, of Birmingham; William Towers, of Rome, and Robert Davis, of Detroit. Mr. Kelsey chose the same machine that made the tour from New York to Atlanta, and which immediately on its arrival here was shipped to Savannah and made the Savannah-Atlanta *Constitution* good roads run with a perfect score.

The start from Atlanta was made about 1 o'clock and the run out to Stone Mountain accomplished in about forty minutes. The little machine was sent immediately at the beginning of the ascent and went up like a squirrel climbing a tree.

When it reached the top the party were so excited they could hardly express their admiration, and in order to confound all scoffers, Mr. Kelsey left the machine standing to remain there over night. So, if you don't believe this, go up and look at the little marvel yourself.

CHICAGO AUTO DRIVERS ORGANIZE

CHICAGO, Nov. 13—To combat the percentage of reckless chauffeurs and other automobile drivers who are bringing discredit on all, 115 owners and chauffeurs organized at a meeting yesterday evening the Auto Drivers' Protective Association. Walter W. Wilcox was elected president, and Neil Gronberg secretary. The principle of the organization is the rigid enforcement of the laws.

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The Docile Donkey and His Pickaninny Sextette

May Race in Golden Gate Park

On the Main Drive of Golden Gate Park—Dutch Windmill to Right

A Stretch on the Parkway Shows a 70-Miles-per-Hour Possibility

Sloat Boulevard, Recently Completed, Without a Bump in It

SAN FRANCISCO, Nov. 13—With the Oakland Portola road race a brilliant success, the officials of the Automobile Club of California have already begun to plan its renewal every year so that it may become as much a fixture as any of the big contests of the East. It is felt, however, that the race ought to be held in this city, as the festival with which it is connected is distinctly limited to San Francisco. When the plan was broached for holding the race here the instant objection was made that no suitable course for such a race could be found within the city limits. But one of the most enthusiastic racing men of the club had been doing some quiet investigating and it did not take him many minutes to show the committee that San Francisco has within her borders the finest race course in this country.

The course as proposed by the racing man goes through the famous Golden Gate Park, down the Great highway, over Sloat boulevard, and back into the park by the way of Nineteenth avenue. "Jack" Fleming. who drove the winning Pope-Hartford in the Portola race, declared that with one exception every turn on the course can be taken at sixty miles an hour, and the noted driver spoke with authority, for while the park police were not looking he tried out the turns with his racer.

The course starts and finishes where the main driveway joins the south drive in the park. It swings into the Great highway where the Norwegian ship *Gjoa*, the first vessel to sail through the Northwest passage, lies at rest, and from there by an easy double turn into the new Sloat boulevard, which is wide enough for ten machines to run side by side on it. The turn from the Sloat boulevard into Nineteenth avenue is sharp, but it could be banked so that racers could pass it without danger. From Nineteenth avenue the course plunges up a short incline into the park again. The total mileage of the course is slightly over 11 miles, the ideal distance for the road race.

Within the park the roadway has the finest oil surface ever constructed in this State of oiled roads. The Great highway is also oiled, and the hard sea sand forming the foundation makes it an ideal road. The Sloat boulevard, but lately constructed, is an example of what an automobile road ought to be.

Just before approaching the Ocean boulevard the Pacific can be seen in the distance, and on the right is the famous Dutch windmill recently presented to San Francisco. The photograph at the top of the column illustrates this view.

Maurice Clement, in New Bayard-Clement Auroplane, Which He is Now Flying at Issy les Moulineaux

WHAT THE FRENCH MAKERS ARE NOW PRODUCING

PARIS, Nov. 12—Although there is no automobile salon in Paris this Winter, French constructors have not altogether neglected to produce new models or to modify their old ones. Modifications, indeed, will be much more numerous than the creation of new types. It can be taken, as a general rule, that all the old types remain with but few modifications with a view to simplicity and silence. The new creations are small cars, or rather light cars, varying from 12 to 18 horsepower, designed for town service with closed bodies, or for touring work with open bodies. This class of automobile is the only one meeting with any real success in Europe at the present time. The moderate-powered car has its limitations, but its advantages are such that it not only interests present owners, but by reason of its moderate price and economical up-keep attracts those who have not hitherto been interested in automobiling.

What Darracq Has Produced

Darracq has produced a car of this type, which is really a simplification and development of the previous models, the features being a design of such a nature as to reduce the cost of labor and thus make possible a very cheap production. The frame is original, being pressed in its entirety from one piece of steel and having its side arms and undershield all in one piece. The side members are of inverted U-section, and the lips on which the engine and gear-box are mounted prevent distortion, and absolute rigidity is secured by a cross-member at the front of the pan and two other members behind it, one being at the bend of the frame and the other at the extreme rear. All riveting is economized with the exception of the three cross-members mentioned and the dumb irons.

Maurice Clement at Wheel of Bayard-Clement Biplane

This type of frame is the outcome of a long series of experiments, one of which was the production of a complete frame and a two-seated body in two steel stampings. The new Darracq engine is a four-cylinder monobloc of 85 to 100 millimeters bore and stroke, rated at 14-16 horsepower. Only slight changes have been made in the design of the engine, one of them being the fitting of an oil float, the spindle of which projects through the crankcase breather and indicates the amount of lubricant in the base of the crank chamber. The gearbox, bolted to the inswept portion of the frame, is of very short over-all length, and provides three speeds forward and reverse. Shaft drive is employed with a universal at each end. There is no torsion rod, the three-quarter elliptic springs acting as distance pieces and resisting the reaction of the driving effort. Engine control is by accelerator pedal; the dashboard is perfectly free, not even carrying a sight feed, while the gear change is of the selective type, the levers being steel stampings.

Renault Has Four-Cylinder in One Casting

Renault has in hand a four-cylinder model in one casting, this being the first time that cylinders have been produced at this establishment in other than twin castings. Details of the motor have not yet been decided upon, but it is doubtful if any very important changes will be made other than in the method of casting. A new six-cylinder model of only 18 horsepower is being produced, and attention has been paid to the American market by the creation of a 20-horsepower Colonial model, with enough clearance for any American road, and all parts strengthened for high-speed work over rough surfaces.

Panhard Joins the Monobloc Division

Panhard, after being an advocate for years of separate casting, has brought forth a monobloc engine of 12-14 horsepower. The four cylinders have each a bore and stroke of 3 1-10 by 4 7-10 inches, valves on one side, a crankshaft carried on three bearings, thermo-syphon circulation and high-tension magneto. Piping has been reduced to a minimum by casting the intake and the exhaust manifolds with the cylinders, thus giving the exhaust the advantage of the cooling water and warming up the intake. The high-tension magneto, with fixed sparking point, is alone on the valve side; the leads are very short, for the sparking plugs are carried in the cylinder head immediately over the intake ports.

The carbureter, a modified Krebs, is alone on the opposite side of the engine, the only intake piping being a single length passing into the manifold cast with the cylinders within the water jacket. Thermo-syphon cooling, also an innovation for Panhard, is through a special type of gilled tube radiator, with a water tank assuring a head of water and very wide area of straight pipes. Lubrication is a combination of drip and forced feed, the flow being to the engine bearings and to the gearbox. The power is transmitted through a cone cutch, a three-speed gearbox and propeller shaft to a rear live axle. An armored-wood torsion rod on the girder principle is used, though the forward halves of the three-quarter elliptic springs are used as radius rods. This is the only "armoring" about the car, the frame being of the usual pressed-steel type.

Henry Fournier Now Operating Voisin Biplane

Clement Copies Renault Radiator

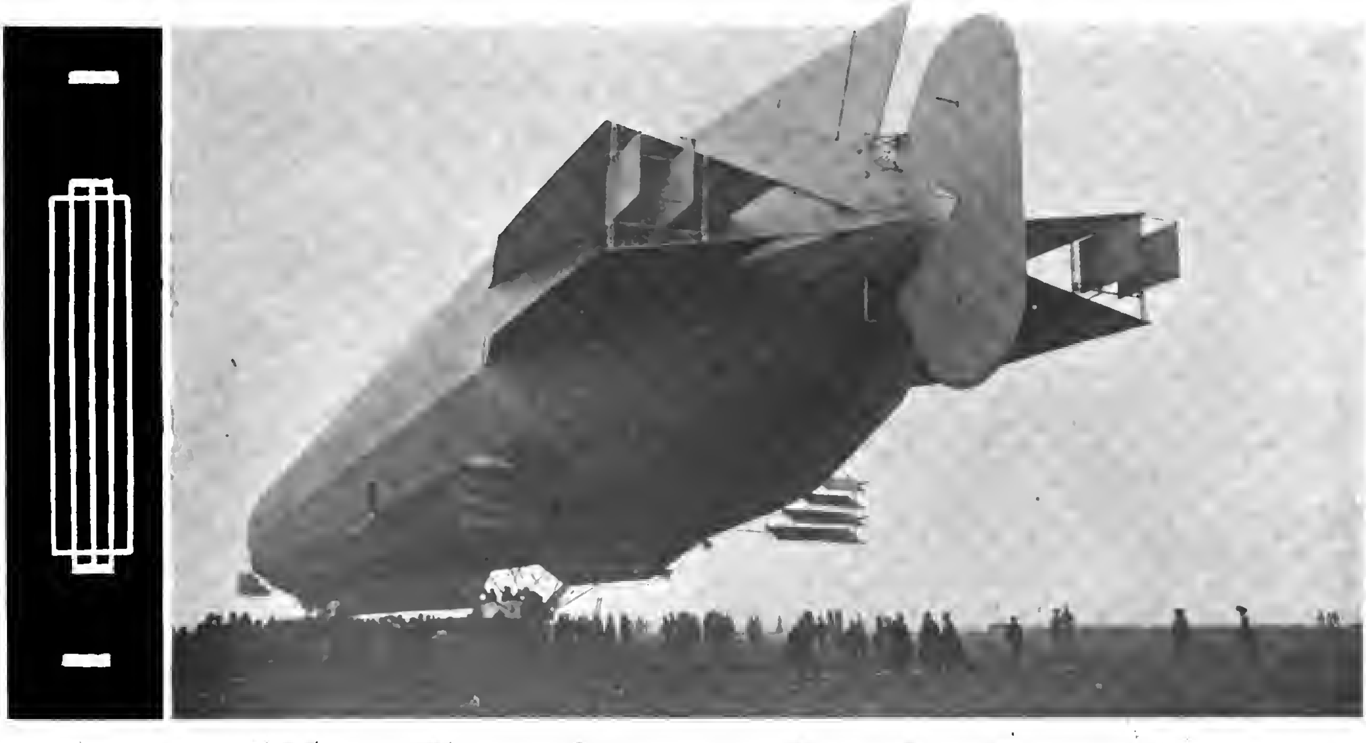
Bayard-Clément is another large firm having copied the Renault design of a radiator on the dashboard with thermo-syphon water circulation. The models on which this has been produced are two and four-cylinders identical with the exception of the number of cylinders. In each case dimensions are 3 1-10 by 3 7-10 inches bore and stroke, the fours as well as the twos being a single casting. Every effort has been made to produce a simple, clean-cut engine. The intake manifold is cast with the cylinders; the water piping and exhaust manifold are separate, but each one is held by a couple of bolts only. Valves are on one side, and magneto in front, in the most accessible position when the radiator is at the back.

The carbureter is a model of simplicity, consisting of a float chamber having its top held on by a spring finger, and a vertical nozzle, around which is a straight tube with a bell bottom, the upper end of which screws into the intake manifold. There are no oil pipes on the engine whatever. The lower portion of the crankcase forms an oil tank, from which the lubricant is pumped into a series of troughs for each connecting rod to dip into; the overflow finds its way back to the base of the chamber. On the right-hand side of the engine is a combined oil filler and crankcase breather, through the cap of which projects the spindle of a float in the oil chamber, this indicating the amount of oil in the base. There is a three-way cock by the side of the filler, which allows more oil to be run into the case or excess drawn off as desired. Paris regulations against smoky exhausts are doubtless responsible for these details.

A three-speed progressive type of gearbox is employed, one of the features of which is a lever passing directly onto the gear-shifting mechanism without the use of any intermediary. This is rendered possible by having the driver's seat on the left instead of the right-hand side. Final drive is by propeller shaft carrying a single universal joint.

New Type of Concentric Valve

In connection with a four-cylinder aeronautical motor, Panhard has produced an interesting type of concentric valve. The motor has four separate steel cylinders with copper jackets having a bore and stroke of 4 3-10 inches by 5 1-2 inches. The cylinders are set so close together that the circulating water ports touch and are made watertight merely by a steel collar lined with rubber. The valve seating is screwed into the cylinder head. It comprises a guide for the concentric valve, the intake port, and two arms to receive the rocker-arm bearing. The stem of the exhaust valve is a hollow steel cylinder with the walls cut away to allow admission into the tube. Within the



This Excellent Photograph of the Zeppelin Airship Gives a Comprehensive Idea of its Hugeness exhaust valve is the intake valve, the seating of which is on the head of the exhaust. Although the concentric valve is not new, being adopted by several French makers of aero engines, most of them make their intake automatic.

On the Panhard the intake, like the exhaust, is mechanically operated. By means of the vertical push rod and the overhead rocker arm, the exhaust is operated in the usual way, and although the intake is carried down at the same time, it remains seated on the head of the exhaust. When the inner end of the rocker arm is raised, causing the exhaust valve to be brought back to its seat, it has in turn to depress the intake. The end of the rocker arm is forked, and as it rises this end lifts up a second and shorter rocker arm, pivoted on the disc-shaped end of the exhaust and at right angles to the main rocker. A suitable spring causes the roller at the end of the push rod to follow the depression on the face of the cam, without which the rocker arm would not rise sufficiently to allow the forked end to fully operate on the intake valve rocker.

The intake manifold runs down the head of the engine, the mixing chamber, with air inlet, being in its center and the carbureter by its side. The combustion chamber is hemispheric, with sparking plugs inserted just below the concentric valves. As the fresh cool gases pass within the cylindrical exhaust valve stem, this latter is always maintained at a reasonable temperature. The motor is rated at 35-45 horsepower. Fully equipped, but without cooling water, its weight is 200 pounds.

TENTH GARDEN SHOW WILL BE ELABORATELY DECORATED

SOME interesting light on the methods of decorating Madison Square Garden for the Tenth National Automobile show, which will be held there during the week of January 8 to 15, has been given by W. W. Knowles, the decorator, and the committee in charge of the show, consisting of Col. George Pope, chairman, Charles Clifton, E. P. Chalfant and Secretary Merle L. Downs. The discussion turned upon the details of the preparatory work which is now in progress. From the way the various items were dealt with it seemed almost as if the committee were planning to create a permanent hall of art instead of a seven-day affair in an exhibition building. It is almost unbelievable that so much elaboration ever would be entered upon for a single exhibition. Already carpenters, sign-makers, wood-workers and painters are working zealously on the skeleton for the decorative creations.

In seeking to produce a proper setting for the automobiles, motorcycles and accessories, the show managers will not spare expense; this is made very clear by the fact that more than $30,000 is to be expended for the decorations. The annual automobile show in the Garden is becoming every year more important as a social event, at which the latest fashions in both cars and costumes are displayed, and for several years now it has been the yearly affair for which the Garden is most handsomely decorated. White and gold are the colors that have been selected to predominate in the decorative scheme next January, although crimson and green also will be strongly in evidence. On the whole, the Tenth National show, under the auspices of the Association of Licensed Automobile Manufacturers, at which are shown only American cars, the output of representative makers will be brighter in its general tone than any of its predecessors, which is saying a good deal, past exhibitions considered.

At the show of last January the employment of plaster statues and other staff work was done away with to a great extent. The forthcoming show will be practically free from this rather tawdry class of ornamentation and an effect of solidity and massiveness will be produced, together with an impression of distance, breadth, and general roominess. At some former shows the visitor entering the Garden was confronted by a mammoth piece of statuary which interrupted the view of the *ensemble* on the floor beyond. This time a Roman seat, or fountain, which is not of a height to assert itself offensively, and permits a comprehensive view of the Garden, will be constructed opposite the entranceway to aid in the plan of "opening up" the interior.

The fountain will be in the form of a low abutment of gray stone, curving gracefully about the spaces of those exhibitors that face the entrance on the Madison avenue side. It will have a trough-like basin, and at each end and in the center water will spray from the mouths of griffins and gargoyles upon the pool beneath, made iridescent by cunningly hidden lights. The falling water also will be electrically radiant. There will be goldfish and natural pond-lilies in the pool and mingling with the natural lilies will be artificial water plants from which will radiate other vari-colored lights. Carved into the front wall of the fountain will be a long settee for the visitors. Two bay trees will be seemingly growing through this seat.

ITS TRIMMINGS ARE GOLD PLATED

SOUTH BEND, IND., Nov. 15—One of the most elegant and elaborate automobiles ever turned out of the factory, a Studebaker landaulet, was recently shipped from this city to San Francisco, where it was on display in the salesrooms of the Studebaker Brothers company during Portola week. An idea of the elegance of the machine may be gained when it is stated that all the metal trimmings of the car are gold plated. The two headlights, the sidelamps and the taillamp, grease cups, hub caps, body handles, both inside and out, are gold plated. The horn and tube, the mouldings on the running boards, the gear shift lever, the emergency brake lever, the glass front and hood hinges, handles and catches are all gold plated.

The interior of the car is no less elegant than the outside; it is upholstered in a covert shade of the finest broadcloth with handsome gold lacing. The electric light globes are of cut glass and when the switch is turned the interior is flooded with light. The motor is of 40-horsepower and is of the new Studebaker type, the "G-7." All the new features of this model are embodied in this car, which is painted blue with a fine white stripe.

The immense Studebaker plant promises to enjoy one of the busiest years in its history during the coming season. A volume of orders is awaiting shipment, with more coming in daily.

TO PROTECT BRIDGES OF CHICAGO RIVER

CHICAGO, Nov. 15—A suggestion to the board of managers of the Chicago Automobile Club, which is to take up the matter of safeguarding the bridges at a meeting to be held today, is made in a letter sent to that organization by the Walden W. Shaw Taxicab Company, which offers to contribute $100 to a fund to be used for the erection and maintenance of permanent iron gates at the bridges in case the city declines to do so. The Shaw Company feels that such gates are necessary for the protection of the traveling public, and believes they should be placed 40 or 50 feet from the brink of the river. Mr. Hertz, of the taxicab company, points out that accidents occur even when a car is keeping well inside the speed limits, it being possible to skid on a wet pavement even with a speed of ten miles an hour.

AUTO TRADE INCREASES CHICAGO VALUES

CHICAGO, Nov. 15—Michigan avenue frontages in the vicinity of automobile row are rapidly advancing in value. Leon Mandel, of Mandel Brothers, of department store fame, has just purchased 150-foot frontage in the block south of Twenty-eighth street, for which he paid $250 per front foot. It is the only plot available in that section, and several auto concerns are after it.

Should Gears Progress Geometrically or Arithmetically?*

By Louis Lacoin

AN explanation can hardly be clear unless every one of the words used in it is clearly defined—unless its entire signification is made plain. It is necessary for the benefit of the non-technical reader, not to go beyond the usual terms. Unfortunately, however, that is not always possible. How, for example, can the difference which exists between the two series of speed changes of an automobile be explained, when they are merely expressed by the following numbers: 12-21.5-31-40.5, or 12-18-27-40.5? In the first case, the steps are regularly spaced; in the second, each is 1.5 times that of its predecessor.

Certain builders prefer the first series. Others have a leaning toward the second; they find that the motor "picks up" better, when there is a constant relation between the different steps in the speed. To be precise, they say that the series of speeds of an automobile should be in *geometric progression,* rather than arithmetical progression. These expressions can convey no very definite meaning unless just what these progressions are is known, and just what constitutes the difference between a geometrical and an arithmetical progression. For the benefit of those readers who are not familiar with the terms, they are explained here, in addition to which the manner in which they came to receive their names is also appended.

In mathematics, there is an infinity of progressions; they comprise all those series of numbers which follow a determined law. Each number, or *term* of the progression, is deduced from its predecessor by means of a calculation which is always the same. The most simple calculations being the four operations of arithmetic, the most simple progressions, as well as the most common, are those which are formed by successive additions of the same number, or by substraction, multiplication, or division. Progressions formed in this manner have received the designation of arithmetic, ascending or descending, and of geometrical progressions, increasing or decreasing. The geometrical progressions may be formed, just as in the case of the others, by purely arithmetical operations, but they may also be formed geometrically, as will be shown presently. From the latter comes their name, and it is well to distinguish the two by different appellations, as their properties are different.

Arithmetical Progression—The law governing the formation of the arithmetical progression is very easily comprehended. Each term is deduced from its predecessor by the addition, or subtraction, as the case may be, of a quantity that is always invariable. For instance:

2-4-6-8-10-12

or 1-3-5-7-9-11-13-15

are two series of numbers in arithmetical progression. Both are termed ascending progressions, because each succeeding term is greater than its intermediate predecessor. In both cases their formation consists of the simple addition of the same number, *i.e.,* 2. This constant is termed the ratio of the progression. Descending arithmetical progressions are formed by the subtraction of a constant, as for instance:

10-9-8-7-6-5-4-3-2-

a descending arithmetical progression, of which the ratio is 1.

To distinguish them further, the first two would be designated as arithmetical progressions, of which the ratio is plus 2, and the third, as minus 1, making it unnecessary to state whether an arithmetic progression is ascending or descending, as the signs plus or minus indicate this. When they are omitted, it is assumed that the progression is ascending. In this manner, the speeds of an automobile are represented, in kilometres per hour, by the following: 12-21.5-31-40.5, this being an arithmetical progression of the ratio of 9.5.

Geometrical Progression—Multiplication and division are the operations involved in the formation of the geometrical progression. To produce each succeeding term, its predecessor is either multiplied or divided by a fixed quantity. This constant, as in the case of the arithmetical progression, is also called its ratio. The series of numbers:

1-2-4-8-16-32-64

is a geometrical progression of which the ratio is 2, while

18-8-4-2

is another of the descending order, but having the same ratio.

It will be observed that the law of the formation of the last progression may be expressed in two ways. It may either be said that each is equal to its predecessor divided by 2, or, what amounts to the same thing, that it is equal to its predecessor, multiplied by 0.5. In order to avoid confusion, the latter operation is always indicated, and 0.5 is known as the ratio of the progression. A geometric progression is increasing when its ratio is greater than 1, and decreasing when less than unity. We have already had an example of two arithmetical progressions that were totally different, yet each had the same ratio. This is equally the case with the geometrical progression. Here are three having 2 as ratio:

3-6-12-24-48-96-192
5.5-11-22-44-88
1.1-2.2-4.4-8.8-17.6

Their Application to the Auto—Let us see how the geometrical progression may be applied to the change speed gears of an automobile. Assume, in order to have terms of comparison, that the extremes of the speed are 12 and 40.5—the figures we have already employed. It is always possible to find a ratio which will make the problem possible. Here this ratio is the quantity 1.5. The result of three successive multiplications by 1.5 gives the following series of speeds:

12-18-27-40.5

while the arithmetical progression would be:

12-21.5-31-40.5

The difference in the formation of these two progressions will be clear at a glance. In one, there is an equal distance between speeds, *i.e.,* 9.5, while in the other, there is an equal relation between the speeds as $\frac{18}{12} = \frac{27}{18} = \frac{40.5}{27} = 1.5$, the relation each term bears to its predecessor.

Even though the arithmetical progression appears to space the speeds better, the motor accommodates itself infinitely better to the geometric progression, for the following reasons:

Let us take a motor the most favorable speed of which lies between 1,000 and 1,500 r.p.m. If the speed may be maintained within these limits it will be working under the best possible conditions. But with each change of speed, the number of turns of the motor vary in inverse proportion, and if two of the speeds, the first and second, for example, bear the relation of 1.5 to each other, the motor running accelerated on the first speed will be

* Translation from "Omnia" by C. B. Hayward.

turning over at 1,500 r.p.m. Passing to second, which means dividing 1,500 by 1.5, its new speed will be 1,000 r.p.m., which means that it will still be within the limits of its most favorable operating conditions, upon reengaging the clutch for second speed. If the successive speeds be all in the same relation, the motor, except on the first slow speed, or the fourth accelerated speed, will not have to make a number of turns less than 1,000 r.p.m. or greater than 1,500 r.p.m. Should it race or slow down overmuch, a change of speed will bring it back within the desired limits.

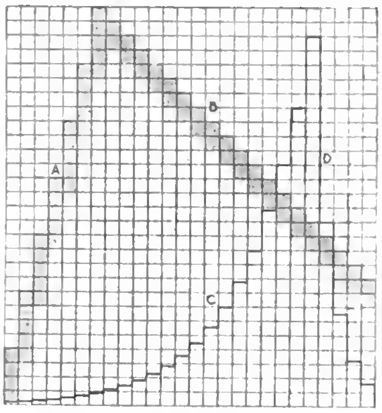


Fig. 1—Showing different progressions

Under such conditions the motor will always produce its maximum effort, and to achieve this the geometric progression is certainly ideal.

Arithmetic Progressions Compared — To show how true the foregoing is, a contrast may be drawn between it and the variations of running condition brought about by the use of an arithmetical progression between the same limits, as:

12-21.5-31-40.5

The two first speeds give as their relation 1.79, and at the moment of passing from first to second, it will either be necessary to race the motor until its speed reaches 1,790 r.p.m., to redescend to 1,000, or, in case the motor has not reached higher than 1,500, its speed will fall to 837 r.p.m. In both cases, it will be outside of the limits of its most favorable operating conditions.

On the contrary, in the two following changes $\frac{31}{21.5} = 144$, and $\frac{40.5}{31} = 1.305$, the variations in the r.p.m. rate are very small. Why not profit to the full extent of the flexibility of the motor at these two higher speeds, when at the lower two it is so abused. This involves an anomaly that is excusable to but a certain degree.

Instead of dwelling on the point, let us explain the difference in another way by referring to the first illustration, showing the arithmetical progressions A and B, and the geometric progressions, C and D. It will be seen that in the aritmetical progressions the steps fall either above or below one or the other of the equal quantities. In A, for example, each number is raised four units more than its predecessor; in B, it is one unit less, but the ascent and descent are always regular.

In the geometric progression, on the other hand, the increase takes place in proportion to the increase in the number. Each number of the series C is greater than its predecessor by a quantity equal to one-fourth of the number. Finally, in D, which is a decreasing geometrical progression, each number is half of the preceding one. Mathematicians base numerous calculations on these progressions, but they are without immediate interest in the present case. Ability to distinguish between the two is the important thing, and this is not difficult, as will be seen.

Fig. 1 has served to show in a striking manner the difference between the two progressoins, and it has the further advantage of showing the *raison d'etre* of their appellations. Mention has already been made of the fact that in the arithmetical progressions shown on the diagram in question, the steps rise one above the other by equal quantities. But it must be added that the extent of the quantity is not known except by that characteristic. Without having the step of the diagram, neither the numbers which form the different terms of the progression, nor the ratio of the progression would be known. The curve A might represent quite as well an arithmetic progression of the ratio 1, if we take as unity the measure of the height of the steps, that is, the vertical distance separating two consecutive steps, as of the ratios of 2, 3, or 4, or we might take for unity, one-half, one-third, or one-quarter. It is well known that in certain diagrams the measure of the length of the step may exceed that of its height, and in consequence, the length of the steps gives no indication of the exact value of their height, expressed in figures. As a result, diagrams, or to put it in another way, geometry, is of no assistance in the arithmetical progression. All arithmetical progression may be represented geometrically in the same manner, simply going up the given distance each step.

Taking up the geometrical progressions, C and D, it will be seen that by simply comparing the heights of the two series of steps, the fact that the first of these two progressions has a ratio of 1.25 and the second a ratio of 0.5 will be known. This geometric characteristic distinguishes this type of progression from the other, but does not suffice to justify its name. The true origin of the latter is to be found in a method of formation which is peculiar to the geometrical progression. In fact, with the aid of geometrical constructions, it is possible to form the different terms of such a progression. There are quite a number of such constructions, but it will be sufficient to describe one of them.

Let OA be the first term of the progression, and OB the second, AO and OB being distances measured on the same line OX. Trace another line OY, also having as its starting point O and mark on it the arbitrary point C. Join CA and CB. If now a line from B be drawn to D, parallel with AC, and a second one from D, parallel with CB, it is easy to see that $\frac{OE}{OB} = \frac{OB}{OA}$. OE is, accordingly, the third term of the progression, of which OA and OB are the first two. Continuing in the same manner, the following terms, OG, OK, OM are found, from which it will be plain that the term geometric is well applied to a progression which may thus be constructed geometrically. The same figure provides a whole series of geometrical progressions, first, the one already pointed out, viz., OA-OB-OE-OG-OK-OM, and then on the line OY, the progression OA-OD-OF-OH-OL of exactly the same ratio as the preceding, but with different terms. In the same manner, AC-BD-EF-GH-KL and CB-DE-FG-HK-LM are two further progressions having the same ratio.

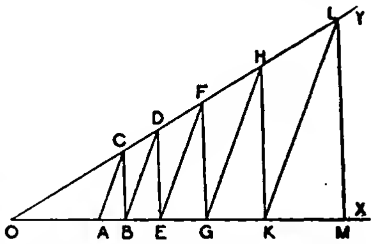


Fig. 2—Form of geometric progression

ENGLISH FORM OF PNEUMATIC SUSPENSION

The current issue of the *Automotor Journal* contains a description of an English invention designed to form a pneumatic support for the chassis of a car, entirely replacing steel springs. The apparatus, known as the Cowey pneumatic suspension, consists of four cylinders, attached to the frame, and corresponding pistons, connected to the axles by ball-jointed links. Air pressure is maintained by a motor-driven pump, with a reservoir, supplying all four cylinders. The air inlet valve to each cylinder is controlled by the piston, through a coil spring and oil-filled dash-pot. The ordinary shocks of the road do not affect the valve, but a steady load, such as that of an extra passenger in the tonneau, will open the valve and let in more air, raising the frame to normal position. The pistons are lubricated and sealed by a layer of oil on their heads, maintained by oil carried by the incoming air. The suspension has proved very easy-riding. Its relative increment of stiffness caused by a given travel of the axle toward the body is very much less than that of a steel spring. At the same time it automatically acts as a shock absorber, checking the recoil of its own motion.

Advantages of Multiple Ignition Batteries*

By A. L. Haskell

ONE of the main objects of the manufacturers of gasoline engines of all kinds at the present time is to furnish to the user an outfit that is practically "fool proof" and free from trouble. It is the purpose of this paper to show what dry-battery manufacturers have been doing to help attain this object.

No part of the equipment of a gasoline engine is so subject to the control of the operator as the ignition devices, and since the operator is more often a mechanic than an electrical man, it is very desirable to have the whole ignition outfit in such shape that his adjustments will not do an appreciable amount of damage. On account of its simplicity, efficiency, accessibility and low cost, the dry battery is particularly valuable in this connection. The other desirable quality is reliability, and it is to insure this point that the dry-cell manufacturers have devoted much time, labor and money in research work.

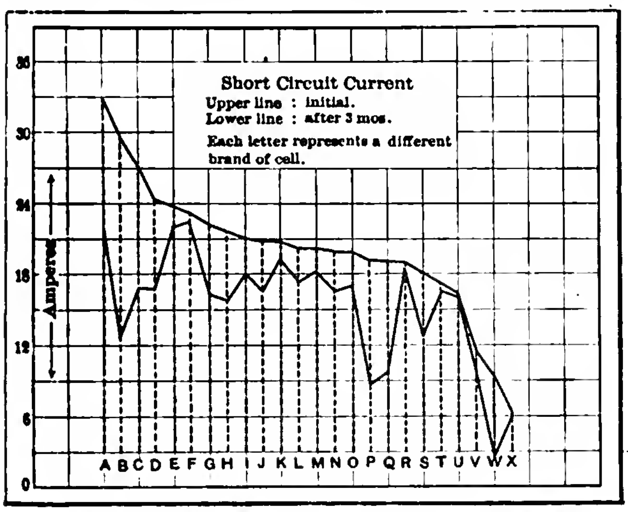


Fig. 1—Curve of short-circuit current in amperes

How the Perfect Battery Is Evolved—The batteries are tested a number of times in the course of manufacture; are then seasoned for a sufficient length of time to allow any internal defect to show itself; then subjected to a final inspection and test before shipment. This factory inspection is very necessary to insure the customers getting a uniform and satisfactory product, for, as we will now show, it is practically impossible for the user to determine beforehand whether the battery he is buying is a good one or a poor one.

The method quite often followed is to test out batteries with an ammeter and go on the assumption that a battery that registers a high current is a good one, and one registering lower in amperage is not so good. Unfortunately, this method is practically valueless, as will be shown by the illustrations.

On the drawing Fig. 1, showing the short-circuit current of a number of batteries of different makes, the letters A, B, C, D, etc., each represent a particular brand of battery, and the upper line shows the corresponding initial amperage of each battery. For instance, battery A has an initial amperage of 33; B runs 29; K runs 21, and X runs only about 6 amperes. The lower irregular line indicates the amperage of each cell at the end of three months standing idle on a shelf. It will be seen that battery A dropped from 33 to 20; battery B has dropped from 29 amperes to 13; battery F has dropped from 23 to 22 1-2 only, and so on. Since it is not always possible to put dry cells into service immediately after manufacture, and they are sometimes kept on the shelves for several months before reaching the user, it is evident that the amperage reading alone is of very little value unless the characteristic initial current and the age of the battery are known.

No Real Relation Between Initial Amperage and Service Capacity—In Fig. 2 the letters represent the same batteries batteries, the solid black line represents the initial current of each, and the irregular dotted lines represents the service in ampere hours given by these batteries under accurate testing conditions. The ampere-hour figures are given on the right-hand side and the initial current figures are given on the left-hand side. Battery B, which registered 30 amperes to start with, gives 25 ampere hours; battery L, which registered 20 amperes to start with, gives 36 ampere hours, and battery T, which registered 17 amperes to start with, gives 43 ampere hours. The diagram shows very clearly the lack of any real relation between the initial amperage and the service capacity.

This amperage test does have some value, however, in the fact that if it is known how high a certain battery generally tests when new, the current reading will show whether the battery is very old or has been used to any considerable extent. If a dry cell is supposed to register 20 amperes normally, and is found when tested to show from 18 to 22 amperes, it is a good sign that the cell is in good condition. If, however, a battery normally shows 30 amperes or higher, as some of them go, and is found testing 18 to 20 amperes, it either means that the battery is deteriorating very rapidly or is quite old.

It is easy to explain why a high amperage does not necessarily mean a good battery, as this amperage is only an indication of the internal resistance of the battery, and has nothing to do with the service life of same. If a cell were made up with the mix composed entirely of active chemicals with a high resistance, the internal resistance of the whole battery would be high and the resulting initial amperage would be very low, although the service life obtained might be good. If, on the other hand, there were very little of this high resistance active chemical in the mix, and some substances with a low electrical resistance, but which had no beneficial action in the battery, were introduced, the current would be very high and the service life proportionately short. The only advantage of such a cell would be that it would sell easier to a novice than one registering a lower amperage. The best practicable method, of course, for

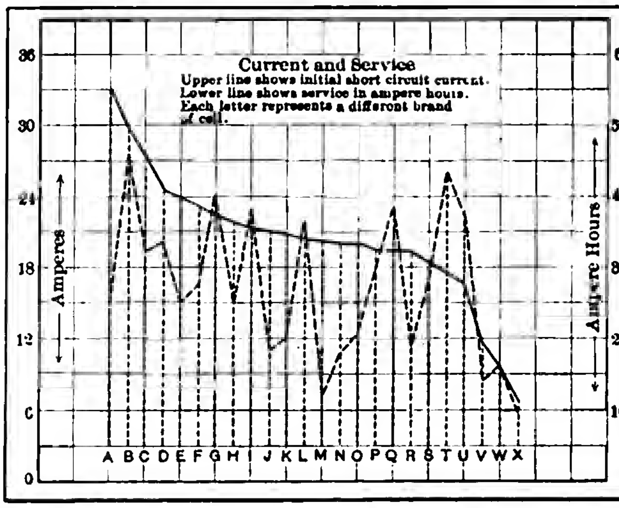


Fig. 2—Short-circuit current and service in hours

* Paper read before National Gas and Gasoline Engine Trades Association annual meeting at South Bend, Ind., summer of 1909.

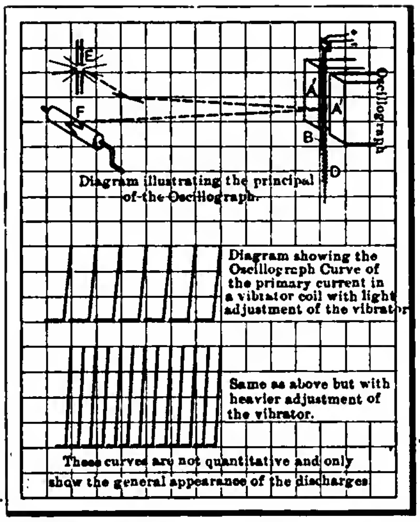


Fig. 3—Construction of the oscillograph and several typical curves made by it

a manufacturer to follow in the long run is to make up a battery to give the maximum amount of service under the conditions in which the battery is intended to be used, and let the resulting amperage be what it may.

Some Coils Draw More Current Than Others—There are certain ignition devices on the market at the present time that give most satisfactory results in operation on a very small amount of current; some of them, using a mechanical make-and-break with a non-vibrating coil, will operate a four-cylinder engine on an average current consumption of from .1 to .2 of an ampere and develop the maximum amount of power from the engine. There are coils of the vibrator type that will do the same thing on an average drain of .2 to .3 of an ampere. With a coil of either of these types the user is practically assured of getting perfect service from dry cells.

Unfortunately there are a number of other coils that require an excessive amount of current to operate satisfactorily, and it is usually the case also that these coils require frequent adjustment, as a consequence of which they are drawing much more current than they need by the time the adjustment has been changed a few times. In the first place, the coils are poorly designed, the vibrator is not made of the best material, the contact points are not made of material that will stand the pitting due to the heavy current, and the operation in general is apt to be unsatisfactory. There has been a marked improvement along this line, however, in the last year, and excellent oils can be obtained at a very reasonable price.

A number of manufacturers have made the claim that a high current consumption with a coil is necessary to give a fat, hot spark that will develop the maximum amount of power from an engine. The importance of the big spark has unquestionably been overrated, as tests that we have made on engines equipped with a brake and on a number of automobiles have proved that a spark can be obtained with a reasonable drain on the batteries that will operate the engine with just as much power as will the excessive spark, and has the further advantage of not causing pitting and burning of the contact points.

Where a mechanical contact maker is used, so the explosion takes places at exactly the same point in each cylinder in a multi-cylinder engine, the degree of intensity of the spark does not make an appreciable difference, provided you have a good spark to start with. In other words, there is a certain point beyond which it does not pay to go, and this point can be reached with a very economical use of current.

What Test Results Show—It might be of interest to show here some preliminary results obtained with standard types of coils in testing with an oscillograph. This is an instrument with which very delicate oscillating currents can be accurately measured, and it is claimed that this instrument will respond accurately to any number of vibrations up to 10,000 per second.

The principle of the oscillograph is illustrated in the sketch Fig. 3. A and A¹ are the poles of a powerful electro-magnet, between which is suspended a fine U-shaped wire of silver, B. This wire is held under tension by the spring D, and the very small mirror C is attached to both legs of the U at its middle point. The legs of the U are only .4 of a millimeter apart, and the diameter of the mirror C is the same. If a current flows through the silver U it will be slightly turned because of its being in the magnetic field AA¹ and its motion will be indicated by a beam of light shown as a dotted line coming from the arc E. This motion can be registered on a drum at F or can be thrown directly on a screen and observed by the eye.

The first tests made were on one unit of a coil vibrating continually. The oscillograph was connected in the primary circuit of the coil and it was allowed to vibrate with a ¼-inch spark gap in the secondary. The measurement of the maximum rise in impulse with 6, 5 and 4 cells in series, and a number of adjustments of the vibrator in each case were taken. The measurements were also taken showing the maximum of current in the secondary discharge. The appearance of the discharges obtained through the spark coil as shown by the oscillograph are indicated diagramatically on the two sketches shown below the sketch of the apparatus in the attached drawing. The upper sketch shows the appearance of the discharge when the vibrator is making a light contact and the coil is operating economically. As the vibrator is gradually tightened the record on the oscillograph glass becomes more nearly as in the lower figure.

The values of the maximum currents under various circumstances are given in the following tables:

No. of Cells	Voltage	Impulse Current	Vibrator	Primary Circuit Voltage	Primary Circuit Current	Oscillograph Record Primary	Oscillograph Record Ratio	Oscillograph Record Secondary
6	4.55	9.5	1	8.55	.70	3.36	35.4	.030
6	4.55	9.5	2	8.55	.72	3.10	32.6	.023
6	4.55	9.5	3	8.20	1.22	4.10	43.2	.034
6	4.55	9.5	4	7.95	1.70	4.04	42.6	...
5	4.0	8.15	1	7.10	.32	2.68	32.9	.015
5	4.0	8.15	2	6.90	.72	2.99	36.7	.021
5	4.0	8.15	3	6.60	1.27	2.99	36.7	.026
4	3.3	6.9	1	5.75	.21	1.94	28.1	.008
4	3.3	6.9	2	5.75	.31	2.07	30.0	.015
4	3.3	6.9	3	5.35	1.15	2.57	37.2	.021

1	3	6	7	8	9
Cells in Series	Impulse Current	Primary Current	Oscillograph Readings Primary	Oscillograph Readings Ratio	Oscillograph Readings Secondary
6	10.5	.22	2.10	20.0	.025
5	9.0	.18	1.84	20.5	...
4	7.6	.12	1.52	20.0	...

The following points may be noted from an examination of this table.

1. The actual current impulse in the primary coil (column 7) is only about one-third of the impulse measured by short-circuiting the batteries through the primary of the coil (column 3).

2. As the vibrator was tightened the average current consump-

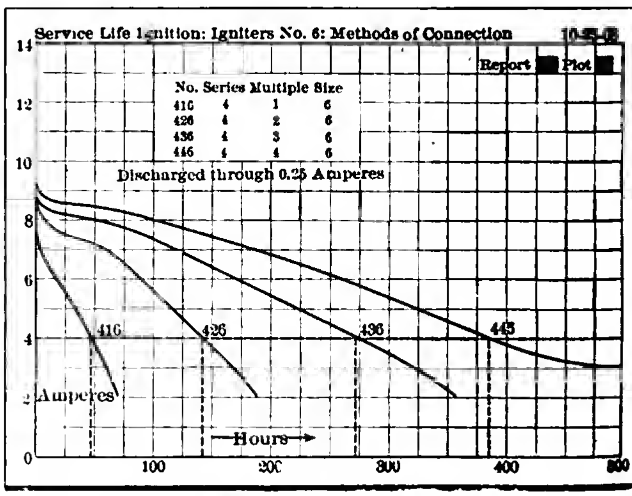


Fig. 4—Curves of varying service life with varying numbers of cells connected in multiple

tion (column 5) increased from 150% to 550%, according to the number of cells in series, while the actual impulse measured by the oscillograph increased only from 10% to 25%. This indicates that there is very little advantage to be gained by tightening the vibrator on a coil beyond a point where the current first becomes steady and even, except for the theoretical advantage that the sparks come closer together in the cylinder.

Non-Vibrating Coils Tested, as Well as Vibrating—After completing the above measurement on a vibrator a similar series was run, using the non-vibrating coil with a mechanical contact maker. The results obtained are shown in the following table, similar columns being marked in the same manner as in the previous table. Timer was revolving at about 500 revolutions when the reading was taken.

The results with this timer and coil show the following points:

1. Although the short circuit impulses (column 3) are higher than with the vibrating coil, the ratio between these impulses and the actual impulse as shown by the oscillograph (column 7) is less. This is an indication that each contact is of shorter duration than in the case of the vibrator coil.

2. The current impulse in the secondary coil is nearly as high as in the case of the vibrator coil, although the average current is very much less. This is in line with our gas engine results, which indicate that if there is current enough to ignite the mixture any excess is unnecessary, and also adds nothing to the force of the explosion.

This new field of investigation promises to give valuable results when more fully developed, but the above outline is the result of a preliminary investigation only.

By referring to Fig. 4, curves are shown indicating the discharge of batteries on ignition service when the average current with the engine running is .25 of an ampere. The vertical figures 2, 4, 6, etc., show the impulse in amperes when the batteries are short-circuited through the primary coil, and the horizontal figures marked "hours" shows the length of time they have been running when these readings were taken. The dotted line starting at 4 and running across the page indicates what is considered as the dead point of the batteries—namely, when they are no longer capable of delivering an impulse of more than 4 amperes through the coil.

The first curve shows the discharge from a single set of cells which reached the dead point at the end of 48 hours. The second curve shows the discharge of a battery composed of two sets in multiple, and these reached the dead point at the end of 140 hours. The third curve is for three sets in multiple which reached the dead point at the end of 270 hours. The fourth curve, showing four sets of cells in multiple, reached the dead point at the end of 383 hours.

Curves for Continuous Discharge—The next drawing, Fig. 5, shows a similar set of curves when the average discharge is one-half ampere continuously. Here the single set of cells runs for 20 hours; two sets in multiple for 70 hours; three sets in multiple for 114 hours, and four sets in multiple for 170 hours. The first curve represents the conditions actually obtained with an efficient ignition apparatus properly adjusted and is being duplicated every day in practice on automobile service. The second curve represents conditions met with in every-day practice when an average type of ignition apparatus with average adjustment is being used.

Another obvious advantage of the multiple connection is that batteries can be used to a much lower point when connected in multiple than when used in single series. As shown above, it is necessary for a battery to deliver an impulse of four amperes through a coil to give satisfactory service. If four sets are connected in multiple it will be necessary for each set of cells to deliver only one ampere impulse through the cell, and the battery can, therefore, be used much nearer to the point of complete exhaustion.

An interesting experiment illustrates this clearly. Forty No. 6 batteries were used in separate sets of five each until they were

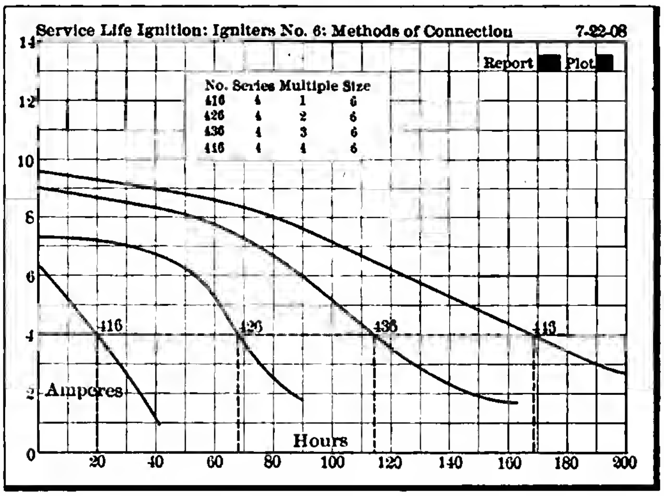


Fig. 5—Service life with a constant current output

no longer capable of running the engine. The 40 cells were then connected in single series, which, of course, gave a very high voltage, but would only run the engine for a very short space of time. We then connected the 40 cells four in series and ten sets in multiple and ran at full load for 312 hours more.

With regard to the number of cells to be used in series, it is hard to lay down a definite rule, as the voltage required depends on the type of coil used and the condition of the contact in the timer. A great many coils and timers will operate satisfactorily with four cells in series on a multiple battery and practically all of them will operate satisfactorily with five in each series when connected in multiple. By connecting three or four sets in multiple it is usually practicable to use one less in series than when used in single sets; that is, if a single set of six batteries is ordinarily used, when the multiple connection is made it would be found that five in series is sufficient.

With regard to the number of sets to be used in multiple, the object should be to provide a battery that will run from nine months to a year, and this, of course, depends on the amount of current required and the amount that the engine is run. In stationary engine practice there is a marked advantage, in the fact that the length of contact on the timer can be made just long enough to operate satisfactorily at the constant speed, and this results in a considerable saving in battery current; also changes and adjustment are apt to be less frequent, especially with make-and-break type of ignition apparatus. This means that the manufacturer or user can get a very accurate estimate of the actual amount of current required to operate the engine and can figure on the battery to give a certain amount of service.

In this class of service a multiple series battery of comparatively small size should take care of the ignition requirements from nine months to a year very satisfactorily, provided the batteries were properly protected. To insure the connections being properly made, and to provide the best protection possible, these batteries are now put up in sealed cases with all connections soldered, the cases filled with wax and only two binding posts on top of the battery to which connections are made. These cases are furnished in any size desired. This, of course, makes the battery absolutely waterproof, so that it will stand any kind of weather conditions; there is no chance of loose connections or broken ones, and unless the whole thing is short-circuited in some way, the chances of failure are practically zero. If the engine manufacturer wishes to put up batteries in this way it is perfectly practicable to do so, the main points to note being that the batteries are in proper condition when put in the box; that the connections are properly made and all tight; that the insulation between the batteries is perfect; that the wax is put in at such a temperature that a man can put his finger in it without being burned. The method of sealing, with these precautions, insures the maximum of service from the battery.

THE POSSIBILITIES OF THE LIGHT RUNABOUT

By ROLLAND C. LAURIE

BY "Light Runabout" I mean a car of ample horsepower which naturally will appeal to the man of moderate means. The present runabout of low price falls short of the ideal in horsepower, springing, and general accessibility. The method of distribution of cars need not be through intermediate agencies, but the selling can be direct from the factory to the public. A proposition like this could hardly be handled by intermediate agencies unless the sales of the car were so huge the world over in home and in foreign markets that such agencies as distributing centers could be placed. Why I would wish to emphasize this point is that the suggested design, which I put forward herewith, as to the type of runabout really required, leaves little enough profit to the manufacturer unless these cars were manufactured in very large quantities.

Making in Quantities—Now, as to this question of manufacturing in large quantities. There is not the slightest doubt that the possibilities of business on such a proposition as in an efficient $500 car are absolutely immense. From the writer's knowledge of the subject in connection with a light automobile the information of this subject that can be given to the public and trade alike is that no one at present can have any idea as to the extreme interest aroused in a proposition such as this. One concern alone received some thirty thousanl inquiries in less than one year of advertising, such advertisements not being confined to large display, and these advertisements not in any way bringing the proposition right before all the buying public, touching, as it has done, only a certain class of buyer. Another concern has had twenty thousand inquiries for one of their models of light runabout. I could cite other instances from personal knowledge of the trade; therefore the immensity of a business like this can hardly be gauged. The class of buyer to whom this car appeals is the man of moderate means, yet often a man who owns a large car already wants a smaller one for short trips. Again, we have a car which is adaptable for doctors' use, for R. F. D. carriers, and, last but not least, for our very large population of farmers who are gradually becoming interested in the automobile proposition.

As to Design—In the first place, as a general rule, present horsepower is not high enough. The engine should be at least a two or four-cylinder, 15-horsepower, water-cooled type. The water cooling could be easily of the thermo-syphon type; moreover, the simplicity and efficiency of this type of cooling is thoroughly adaptable for use in a small car. In this design of engine we could embody the long stroke, which has become so popular in England and France and has shown such success. The long-stroke engine would mean the delivery of sufficient horsepower for practically every purpose. The change speed gear could be of epicyclic or planetary type, as this design lends itself better in the light car construction than a large gear box. Another thing might be pointed out, that whatever type of change speed gear is employed, it should be strong enough to withstand hard usage. The usual type of planetary gear is frequently deficient in this respect. The final drive could be shaft or chains, just according to fancy of the designer and according to the results shown by trial on these matters.

Chain Not Defunct—It must be remembered that chain is is by no means defunct as an intermediate of power. The Panhard car designers held to the chain as long as they possibly could, for their belief in its efficiency was thorough, and, providing the chain is suitably enclosed in an oil bath gearcase, similar to the British Sunbeam, there is no reason why it should not be a perfect transmitter of power, light and yet free from complication. The shaft drive could be an alternative design, in spite of the fact of the known frictional losses in this form of transmission. The frame could be of pressed steel and the axles of suitable strength. The springs also could be improved upon, as the present day light runabout of low price is, as a rule, extremely deficient in springing. Full elliptic springs seem to give the best results, although they do not appeal to the average man as being mechanical. This is merely a matter for experiment. Probably in this design dual ignition by both battery and magneto should be included. This may sound to the uninitiated as an expensive fitting on such a car, but it can be included in such a price without the slightest doubt.

I cannot deal with the design of such a car more than by giving a rough outline, as every manufacturer has his own ideas on the subject for convenience sake. Three-inch tires should be fitted, either on wire or artillery wheels, preferably the former, of detachable pattern. In this design of car accessibility should be a leading feature, and the price should be right on the $500 mark, neither above nor below, for the car itself. There is no chimerical dream in talking of the possibilities of such a design. It can be accomplished, and the first automobile company that does really accomplish this will corner the market of the world, providing that they put a reliable machine before the public, one that will wear and in which the material is first-class throughout.

Profits Small, Returns Quick—We all know the parable of the grocery store where the profits are small but the returns are quick. In this business it is "small profits and quick returns," and the returns would be so great under the proper management that extraordinary results could be shown in less than two years' working of such a proposition. What is required is "the car for the million," yet it must be a car which can show power, efficiency, comfort, and accessibility.

Every manufacturer has his own ideas as to design of the runabout type, therefore the mere question of design, beyond leading and outstanding features which seem to be most desired, according to the general consensus of opinion from inquirers regarding the light runabout need not be touched upon. By studied standardization a clever designer can manage to produce cheaply. Every part of such a car would have to be standardized beyond doubt. Personally, in runabout design I would be more inclined to favor the sporting, semi-racing type with the seat placed far back—not *too* far, as this has a tendency to give too much vibration to the driver and passenger.

No Rumble Seat—In the first place, the sitting position is much more comfortable, and the car has a more graceful and rakish appearance; and, above this, a rumble seat cannot be fitted. Everyone knows that the runabout of to-day is abused by its owner as a general rule, as single rumble seats are fitted, frequently double rumble seats, the general impression being that as long as the engine has sufficient power to pull a load that is quite enough. Broken springs and other results of overloading do not seem to enter into the purchaser's mind at all; therefore this design of the semi-racing type has something outstanding in merit because a rumble seat cannot be fitted.

The last word which I may say on this question is that the whole matter is one of organization. First, the factory prepared to turn out a standardized car such as this would have to be of such ability that delays in deliveries would be impossible. As for the selling organization of such a factory, undoubtedly the way to place this upon the market in a practical and successful way would be for such a factory to open branches at various distributing points. There are certain cities well known to the automobile trade which form just the suitable distributing basis for such a scheme.

U. S. Automobile Imports—The monthlv summary of imports for September shows that during the month 150 automobiles, valued at $291,811, were brought into this country, as compared with 219 imported during September, 1908. For the nine months ending September the figures are: 1909, 1,208 cars, valued at $2,218,414; 1908, 956 cars, valued at $1,803,889. Of the 150 imported in September 74 came from France and 44 from Italy.

The Private Garage Problem

By Morris A. Hall

Part 5

Semi-Private Garage of Large and Exclusive Hotel, Is of Shingle and Stucco Construction

CONCRETE answers a larger proportion of the requirements for an ideal garage material than does any other. More than this, the ones which this material fills are of greater importance than those which it does not fill, or in which some other material shows a superiority. Worded otherwise, concrete not only answers the largest proportion of the essential requirements, but evaluating all of these, it has a greater total valuation than any other.

These requirements might be said to be: Low first cost, ease of erection, adaptability to architectural beauty, fire-resisting qualities, damp-resisting qualities, low cost of upkeep, great length of life, cleanliness, and low cost of foundations.

Now, cement or concrete could hardly be said to be very cheap, although, the first cost need not be high and with this medium first cost is more than offset by the fact that the life of the structure is at least twice that of wood, for instance, so the annual figure for depreciation would be but half that of the cheaper place. In addition, cement need not be painted at all, as compared with a coat of paint every other year at the longest for wood, every six months for steel, and other lengths of time for other and different materials, as brick, which should be painted about every three years, etc.

Easy Erection a Very Important Point—Probably the point which, in the case of a small garage, would carry the greatest weight in the selection of the materials would be ease of erection, for this means either less work for the man doing the work himself, or less fuss and bother by the contractor whom he hires. The latter, too, spells less expense. This point should not be borne in mind to the complete extinction of all others, for if it was, all garages would be portables. It should be given its proper value in combination with others.

Hardly anyone, even an enemy of cement, would dispute the fact that cement lends itself very well to architectural adornment, whether carried to the "beauty" point or not. Such features as ornamental corners, in imitation of cut stone, may be reproduced with practically no additional cost for materials. So, too, with details like imitation stonefaced bricks, or stones, a reproduction of field stone, in the introduction of pilasters into the walls, copings around the top edges, the construction of columns, and many other features of worth, these may be had by exercising forethought, and with little if any increase in the material cost.

As to fire and damp resisting qualities, there can be little question but that cement will hold its own. The mere fact that the floors, ceilings, and other parts are made integral with the side and end walls, the finished building being practically one structure, insures a big score for cement on the count of low cost of upkeep, particularly when taken in conjunction with the paint item as previously discussed.

Cleanliness Very Weighty in the Decision—Of all the items, none should carry greater weight than that of cleanliness. This means not alone that the place should look clean and neat when finished and ready for the car, but of greater importance, that it should clean easily afterwards, when old and easily dirtied. In this connection, it is enough to make out a case for cement, to say that the only thing needed to clean a cement garage and that, too, easily and quickly, is a hose and a source of water supply. Rubber boots will come in handy too. Of course, water can be used in the same way to clean out frame garages, stone or brick buildings with wood floors, and other kinds of motor houses, but it is by far the easiest to clean out an all-cement house, with cement floors, of course.

Cement Block Garage for One Car Is Low In Cost

Being heavy in weight, the concrete or cement place would need heavier or stronger foundation than the frame building, while the stone and brick building with cement floors stand about on a par with the all-cement house in this respect. However, even in this, the latter possesses an advantage, for the foundations are laid more readily and should

Schlesinger Private Garage, Detroit, Mich.

cost less, than in the case of the other two, to say nothing of the increased speed with which they may be laid. This latter point has not been brought up before, because the question of speed seldom if ever enters into the case. Should it ever do so, concrete scores another point. This about covers all of the important points, the discussion bringing out the finer reasons which the simple list of them would not do. As to rating them according to value, this cannot be done in a general way, since it would differ for nearly every case considered. Thus, the wealthy man would give the adaptability to architectural effect the preference over all of the others. The careful man of small means would look on fireproof qualities, combined with low cost of upkeep as of vastly greater importance to him than all of the others, while the man of moderate means would doubtless not distinguish any one in preference to any other one, giving all of them some weight.

Cement Blocks Make a Cheap House—Of all of the forms which concrete construction is susceptible to, none makes a house cost less than concrete blocks. The mold for the blocks once made, they may be poured and allowed to set, at any leisure moment. Then, when enough have been made to allow of starting on the building, they may be laid up just like bricks, using the same cement as a mortar. This method of constructing a house fits into the average man's lack of much time on any one day, but a few hours each day, so well as to fit the cement block to the low priced, owner-built garage. The mold need not present any difficulty, nor the individual block construction. The same would apply to the laying of the blocks, no tools being needed except a trowel, a straight-edge, and a spirit level. The four walls done, the roof and other parts become a very simple carpenter's job.

At the bottom of the previous page is to be found a picture of a one-car cement block garage, as photographed by the writer. This is located on the Braircliff road, some miles north of New York City. The size is very close to car size, being but 12 ft. by 18 ft. outside measurements. Since the blocks are usually made 6 in. thick, this would make the inside measurements each a foot less, or 11 ft. wide by 17 ft. long. The double door is large, and hung on three big hinges. The windows are small, and few in number—one on each side only—but in the matter of light, the door helps out, having a large window in each part of its upper half.

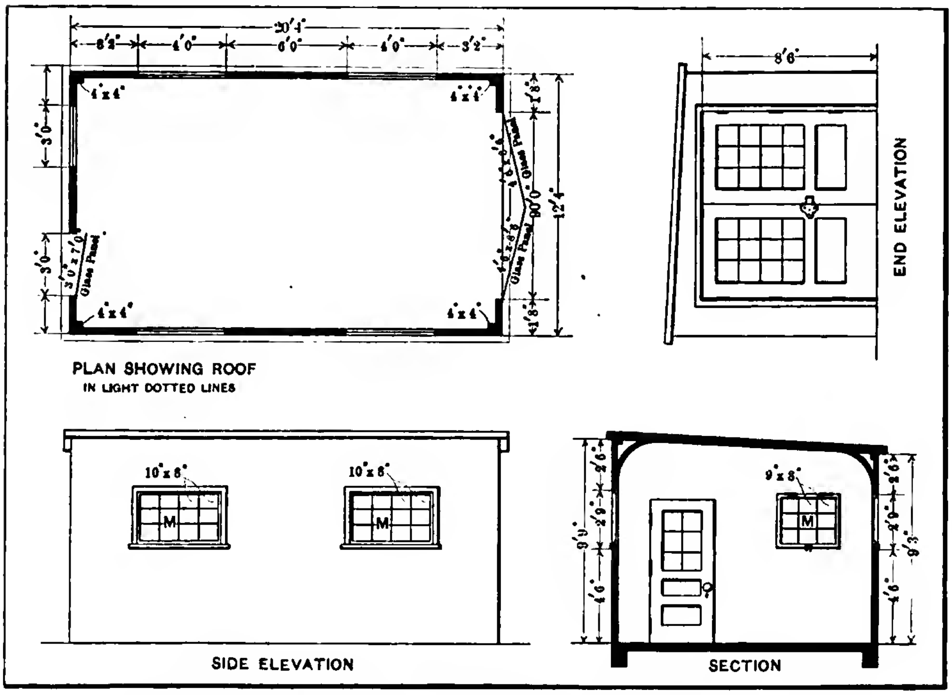
Wood forms the material of the roof, but it is covered with a light weight sheet iron, corrugated. The latter helps in the flowing down of water after a rain storm, as does, also, the rather steep pitch of the roof. Along the bottom edges, a neat gutter is placed to carry off the water in preference to letting it drip. In connection with what has been said previously about ease of ornamentation of concrete structures, attention is called to the ornamental lintels and sills for both doors and windows, as well as the watertable around the base. This latter helps very much to give this amateur attempt a finished appearance.

Elsewhere on this page is shown another small, one-car, concrete garage. This one, however, is located far from the other, being in Detroit. Not only is it located there, but it was designed in that city as well, being a Kahn job.

All Concrete, Roof and All—This garage presents many unusual features, not the least of which is the fact that the whole structure if of concrete, roof, floors, walls and all. This is what is known as reinforced concrete, metal bars or shapes being set into the concrete to give the whole more strength, and greater permanence. Considering the two materials, the thickness may be said to be 2 inches. Strange as it may seem the roof thickness is slightly greater than this.

The metal used as a base for the concrete, in this case is a special form of metal lath, known by the trade name of Hy-Rib. This is an obtruded sheet metal, the obtrusions projecting alternately to one side and then to the other. More than this, between the two are very narrow slots, which pass completely through. To use this metal, it may be nailed or tacked upon any kind of wood framework, and is then ready to have the cement applied. It is recommended by the makers that this be applied on the inside first. This feature of the material lends itself well to the construction of a garage, for with the inside completely plastered—the cement being made thin like plaster, and applied in the same manner with a trowel, or long flat smooth instrument—the outside frames may be removed.

When this has been done, and it may be done with perfect safety, as soon as the cement has set, the outside may be plastered up in the same manner. Since plastering is not a very hard, although a dirty job, anyone may do the work of erecting a garage of this kind. More than that, the skeleton framework being so very simple, any-



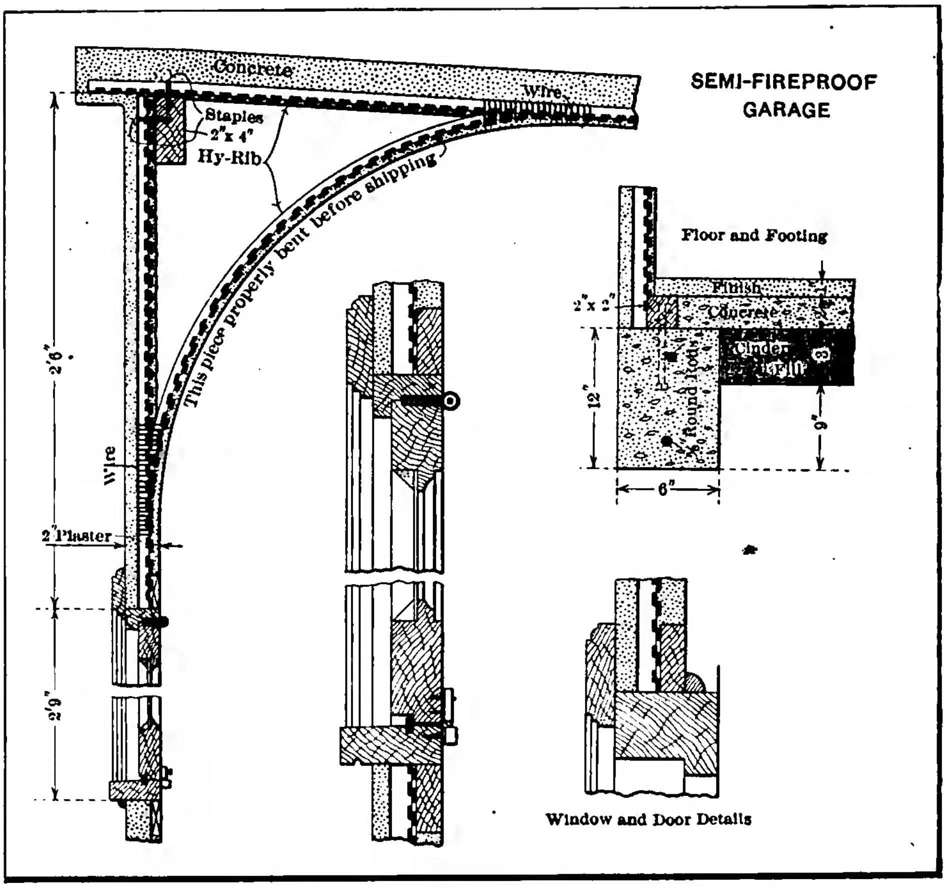
Plans from Which Schlesinger Garage Was Constructed, Slightly Changed one may do the work of erecting that, as well, if so inclined.

In the photograph, one of the long sides is shown. By consulting the plans of this garage shown on this page, it will be noticed that the shape is that of a rectangle, the long side being 20 ft. 4 in. in extent, which means just under 20 ft. inside. The short dimension is 12 ft. 4 in. outside or just under 12 ft. inside. The plans call for two windows on each of the long sides, with a window and family door at one end, and the big, double car door at the other. In the picture it will be seen that this design is susceptible to several changes, without materially altering the whole effect. Thus, the one illustrated has the family door located on the inner long side, for the simple reason that it occupied the whole width of a narrow city lot. This same reason led to the omission of the single window in the end opposite to the door. The roof, too, differs, in that it rises to a peak just like any wooden roof, while the design calls for a uniform downward slope.

Design Lends Itself to Amateur Workers—Without a doubt, this sloping roof was so designed to facilitate the work of making the garage, particularly when done by amateurs. This single continuous slope would be much easier to frame up for, to say nothing of applying the cement to. And, after all, it is hard to see that the peaked shape, aside from being conventional, has any advantages.

Above is shown a number of the details of this design. The roof, for instance, is supported from the corners by a truss-like arrangement, which consists of a circular form of the metal under framing, upon which the usual inside sheathing of cement is placed. These special shapes are bent at the factory, at very little extra expense, but must be ordered in advance. The 2 by 4, used for the framing of the corner of roof and side wall, could not be removed on account of this inside plaster isolating it, and is shown in the original position. The window framing and the method of placing the same may be noticed, as well as the enlarged detail of the same. So, too, with the door. For flooring, a bed of cinders, 3 in. deep, was laid, rolled down so as to be solid, and over this was laid a concrete flooring 2 in. thick. Finally, to complete the floor in a workmanlike manner, a 1 in. top dressing of neat cement was laid. The 6 in. by 12 in. corner section of concrete represents the foundation, at least the only foundation the house had. This is strengthened and tied together by means of round iron rods, laid longitudinally. Bolts set into this before it had set were used to bolt the corner timbers, of 2 in. by 2 in. lumber, into place. These were left in.

Concrete Garage Including Living Rooms—At the bottom of this page, still another concrete garage is shown, this one being larger to the extent of embodying a few living rooms. This one, too, has a peaked roof, but the addition of the living rooms at the back, meaning an increase in the length in that direction of about 14 ft., gives the idea of a long sloping roof. The main room, to which the whole front of the house is given up, is 25 ft. 2 in. by 28 ft. wide, the whole width of the structure. Back of this, from right to left, are: bedroom, 9 ft. by 14 ft.; living room, 8 ft. 8 in. by 14 ft.; kitchen, bathroom, and coal supply shed. The living room arrangement is very good, and the whole would make a neat little home for a chauffeur with a small family, the man-of-all-work or other domestics.



Details of Semi-Fireproof One-Car Garage, Like the Schlesinger

Aside from its size, the automobile room in front is well arranged. There is a large pit, which has three steps leading down to the bottom of it, which serve as a convenient seat on some under-the-car work, as well as a means of ingress and egress from the pit. At the bottom is a drain, while around the room are many cupboards, a sink with running water, work bench, with vises and tools, as well as other conveniences.

The sliding doors shown in the photograph of this garage make a neater construction than the two-leaf, outward-swinging form shown on the plans for the Schlesinger building, but are rather more expensive. Their use involves a lower guide or track, and an upper rail, along which the doors run on rollers. It is possible for the skilful amateur to construct these for himself.

(*To be continued.*)

[Note: Acknowledgment is due the "Horseless Age" for the drawings on pages 799 and 800, November 4, and pages 832 and 833, November 11. Their use was due to a misconception of editorial ethics by the writer of the series.—Editor "The Automobile."]

Garage in Cement, Combining Living Rooms

A FEW ASSORTED QUESTIONS

Editor THE AUTOMOBILE:

[2,087]—My tail lamp constantly jars out. Can you give me information about an oil that will burn in an ordinary kerosene lamp and not jar out, or a burner that can be used and which will not jar out?

If the stems of the valves on an automobile engine are worn so that the space between the valve stem and the valve lifter is one-eighth of an inch (1/8), what effect would this have on the power of the engine?

A mixture of gasoline and air, 1 to 5, according to a handbook, gives about the same power as a 1 to 9 mixture. If I understand this correctly, one gets more power out of the same gasoline at a weak mixture of 1 to 9 than 1 to 5, or are there other conditions that overcome this advantage?

Can you inform me if the acid used in the acid cure for tire repairs is acetic acid, and does it injure the rubber of the tire?

Would the valve stem shortage previously mentioned cause a pounding on hill climbing?

Can you give me the age which an automobile is expected to wear and run in good condition? Also, what repairs or parts are most likely to give out first and put the car in such shape that it would not be worth while to put it back into running order?

Nichols, Conn. W. T. K.

To answer your many questions in order, we have never heard of a lamp, burner or oil for an oil lamp which would not jar out as you describe under sufficient provocation. Your only hope, if you feel that you must have something different, lies in electric lights, which, properly installed upon the car, would include side lights and tail lamps as well as the more usual searchlights.

Relative to the second question, the large space between valve stem and lifter will not influence the power except indirectly, although it will make an engine very noisy. The way in which it will influence the power is this: when the adustment is used to reduce the space and with it the noise, the timing of the valves will be altered slightly, and this slight alteration may be such as to change the power. For instance, the engine might have a rather late exhaust closing, which the adjustment would make still later. This, then, would cause the motor to heat and thus lose power. Similarly, the adjustment for the inlet valves might cause them to close either too early, making the charge incomplete, or too late, so that some of the charge was lost, also making it incomplete.

As to your fifth question on the same subject, the pounding on hill climbing could only be caused by the changing of the adjustment as just described. That is, it would not result from the simple too-large space, as long as the space was left unchanged.

Your understanding of the power and economy of a weak mixture is correct, but the reason why this cannot be used at all times is that an engine will not pull up a hill in sand, broken stones or other hard going on a weak mixture. On those occasions one must use a rich mixture or the engine will quit. So it is that the economy of the 1 to 9 mixture cannot be utilized at all times. On page 750 of the October 28 issue of THE AUTOMOBILE, you will find something on the same subject which may interest you. The figures there given are in percentages, however, and for your personal use, we have reduced these percentages to ratios, as follows: 15 per cent. is a 1 to 5.66 ratio; 5.5 per cent. is 1 to 17.2; 4.0 per cent. is equal to 1 to 24.0; 1.9 per cent. is 1 to 51.6; and 2.4 per cent. is 1 to 40.6. These, however, refer to gasoline vapor, not gasoline liquid.

The acid used in the acid cure for tire repairs is not acetic acid, which is the principal constituent of vinegar. The acid used does not harm the rubber.

It is hard to say what age automobiles are supposed to reach. We can only give you some figures on ages of cars which we know to be correct. Thus, in Buffalo, N. Y., there are many old Pierce cars dating back more than five years. Of these there are quite a few of the 3 1-2 horsepower motorettes, which were built in 1902, and consequently are 7 1-2 years old. There are many of the 6 1-2 horsepower stanhopes and still more of the 8 horsepower stanhopes, built in 1903 and 1904, respectively, making them each 6 1-2 and 5 1-2 years old.

The writer has a close friend in Detroit who owns and still runs a single cylinder Packard. As this firm moved to Detroit in 1903, and built no single cylinders in the new shop, this car must date back to the Warren, O., plant, which means that it is from 6 1-2 to 7 1-2 years old. Again, the writer knows of an old two-cylinder Winton, built in 1902 or 1903, which is still doing yeoman service in Eastern Pennsylvania. This car, in fact, climbed a steep hill which automobilists ordinarily dodge, with five heavy passengers on board, without a particle of trouble. At the time this was done the car was five years old, and now is about 6 1-2 or 7 years.

As all of these cars were built early in the automobile business, before the advent of superior materials, and really before the days of very fine workmanship, it is reasonable to suppose that a good, modern, well-built car should last from ten years on up, according to the care it receives.

The repair parts necessary would also vary with the use, but, off hand, it would seem as if running gear parts and bearings would go first. Transmission and other gears see severe service and would doubtless follow the bearings, while such parts as cylinders, flywheel, crank and gear cases, frame, etc., should last indefinitely.

Of course, these cars have all had the benefit of careful driving and skilled attention whenever necessary. Such handling should be taken for granted in calculating the life, for an automobile is, after all, a piece of machinery, and should be treated as such to secure the best results. If you buy a 1910 model of reputable make, and treat it well, it should be running in 1920.

CENTRIFUGAL PUMP OUTPUT

Editor THE AUTOMOBILE:

[2,088]—In your article on radiators in the issue of October 21, speaking of centrifugal pumps, you say that in a certain test 680 r. p. m. was found to be the speed of impending delivery, and conclude that the quantity of water handled by the pump at any lower speed is negligible. However, in the cooling system of an automobile we have a closed circuit of water, and the only head to be dealt with is that due to friction, so I think it will be found that the pump handles a considerable amount of water even when the engine is running slowly. I drive a car in which the pump, of the centrifugal type, runs at about the same speed as the engine, and a vigorous circulation takes place when the engine is idling, close throttled.

EARLE A. RYDER.

Ithaca, N. Y.

Granting all that you say, because if the pump did not circulate some water at low speeds it would be dangerous to run the engine at those speeds, we still think that our remarks in the issue and article mentioned were perfectly correct. Since the lowest speed possible with a normal engine is 300 r. p. m., and in the usual case, even this is not approached, 400 being more nearly correct, it would appear as if the speed of pump previously mentioned has been closely approximated.

In this connection, we wish to call attention to the fact that not one person in a hundred can judge slow speeds of an automobile engine correctly. To prove this contention, we will cite an example. The writer knew a man engaged in automobile manufacturing, previous to two years of which he had been engaged in automobile repairing for about five years. This man built his own engine and claimed that it would run at as low a speed as 200 normally, and could be made to run at 160 if desired. The writer called his attention to the fact that the engine would not do this, and after much discussion a speed indicator was called into play. The very first time this showed 450 r. p. m. On the second trial with the engine apparently running much slower, and the manufacturer very confident, the figures were 435. The trials were continued for a whole day, and not once was this manufacturer able to go below 388, the low figure for the day's work. Yet he had been in the automobile business for about seven years.

Similarly, a driver who prided himself on the slow speed at which his engine would run, due to changes he had made in the throttle of the carbureter, was asked by the writer to run his engine as slowly as possible. When he had done so, and estimated the speed at "about 240 revolutions," the speed counter showed it to be 425. He hastened to make a few changes, and confidently asked to have it counted again, saying "it is running about 250 now." The counter figures were 410.

ANSWERED AND DISCUSSED

RELATION OF POWER: SPEED

Editor THE AUTOMOBILE:

[2,089]—I have a runabout of the high-wheel, solid-tire type, a standard make of its kind. Ordinarily it is a speedy and serviceable vehicle. It is rated 12 H. P., and by the formulas figures 13.5 H. P. Its weight is about 1,000 lbs. Recently my wife and I were crossing a bridge, and at the point of leaving the bridge there is rather a steep downgrade. At this place for a distance of two or three rods there had been spread a fresh coat of broken limestone five to eight inches deep. The stone had been spread but not rolled down. On going off the bridge down grade on the high speed, the engine stalled within a few feet of the end of the stone repair. Returning later, we took the obstruction up grade with the low speed, and with the throttle and spark as far advanced as it would bear. The machine stopped at about the middle. I had the humiliation of seeing two buggies, each drawn by one horse and each carrying two men, pass me with no great difficulty; also a cab with two horses, the driver and four passengers. With my wife at the wheel, I got out and pushed; and, although I am far from being a Hercules, we pulled up on the bridge and the trouble was over. A few minutes later the machine went up a long, steep grade on the high speed and without faltering. Now, wherein was the 12 H. P. engine at a disadvantage with the one and two actual horse-power buggies and carriage?

Columbus, O. A SUBSCRIBER.

The secret of your trouble in this case, the same as that of many other automobilists in similar cases, lies in the relation of power to speed. This sounds like a puzzle, but it is not. The torque (which is a technical name for turning force) of the motor is always the same at the same speed. This, however, is delivered to the wheels at varying speeds, and although you may not realize it you yourself appreciate that the torque is greatest at the slowest speed of the wheels. It is for this reason that you come down to low speed to climb hills or to pass through broken stone, gravel or the like, all of which are conditions that require a large torque.

Perhaps it will be more simple if put into figures. Thus, suppose that the engine develops 12 horsepower, as you say. Suppose, further, that at high speeds, equal to 12 miles per hour, the torque exerted at the wheels is 200 inch-pounds. Then suppose, further, that the low speed is just half of the high, or 6 miles per hour. At this speed of the vehicle, with the engine running just the same speed as before and developing just as much power, the torque at the wheels will have been increased to twice what it was before, or 400 inch-pounds.

Again, if it were possible to equip your car with a third, still lower speed of, say, half the present low speed, making the velocity of the vehicle at that speed 3 miles per hour, the torque at the wheels for the same engine power developed at the same engine speed would be twice the previous example, or 800 inch pounds.

This explains the failure of the machine in part to negotiate the gravel-covered road, that is, the lowest speed of the vehicle which your gearing allowed was not sufficiently low for the engine to pull the car through, as it would have done had you possessed another and still lower speed.

There is another side to this, and that is the ability of any animal to exert an unusual amount of power for a very short time, a thing which no machine, other than the electrical motor, can do without internal changes, and which very few machines can do with any kind of changes. That is to say, that machines have a fixed output, beyond which they cannot go, but the same is not true of animals.

So, it might be said with truth that the horse in question, under the urging of his driver, doubtless exerted many times the equivalent of one horsepower for the few short seconds occupied in passing through the stone pile.

The same thing is doubtless true of yourself, urged on by your humiliation, you doubtless exerted a power equivalent to several horsepower for the very few seconds in which you were pushing to help the engine along. Do not feel that this trouble is confined to your type of car alone; 40, 50 and 60 horsepower machines have been known to be stuck under similar situations, their gearing being such that under the unusually severe demands of, say, deep sand, the motor was unable to develop a torque at the wheels which was sufficient to pull the car out.

On the other hand, to gear the car down for these unusual requirements, that is, so low that no hill or sand would stop the car, would render the usual driving anything but pleasure, or else would call for a new type of gear box with five or six speeds, the last two being so low as to be practically a crawl. These would be emergency speeds, and the extra weight would have to be carried all of the time, for a possible use once a year. The question then arises, would this be worth while?

COLD WEATHER COMING

Editor THE AUTOMOBILE:

[2,090]—Will you kindly inform me whether a thin, light oil that will not congeal at zero can be used in the cooling system of an automobile having a water pump? Also, would the use of kerosene be practicable?

Boston. G. E. ROGERS.

The kerosene idea was taken up in last week's issue. We do not advise its use. Light mineral oil, of the grade known in the trade as refrigerating oil, makes a very good winter cooling medium. This is the oil used for ice-making machinery.

INJURIOUS EFFECT OF OIL

Editor THE AUTOMOBILE:

[2,091]—I have read with interest your remarks on non-freezing alcoholic mixtures for the radiators of motor cars during the cold weather. The principal and about only objection to the use of alcohol is its rapid evaporation, and I have thought that this might be overcome to some extent by putting a film of some light lubricating oil on top of the mixture in the radiator. I do not think that the oil would circulate and could therefore have no injurious effect on the rubber hose connections.

Have you any knowledge of this being tried, and would there be any objections to put a small amount of oil in the radiator as above suggested? H. L. D.

Nyack, N. Y.

As was brought out in answer to a letter last week, the principal trouble which oil in the cooling water causes is that due to reducing the radiating ability of the radiator. The oil forms a thin film over the whole surface of the radiator, and reduces the capacity of the latter to about one-third of its usual capacity. This is because oil is a poor conductor of heat, and also because of the thin layer of air which will be caught between the oil film and the metal, the latter being a non-conductor of heat. Since the cooling capacity of the radiator is figured very close so as to keep the weight down as low as possible, a reduction of two-thirds is serious.

The immediate result of this would be to make the motor heat up very quickly, since the heat could not be conducted away fast enough.

We have never heard of this being tried and certainly would not advise it.

Even if the aforementioned effect on the cooling ability of the radiator and therefore on the whole system was not as outlined above, how do you make out that the oil would not circulate and attack the various rubber connections? Certainly, even if the oil floated on the top of the water, when the latter circulated around through the water jackets the oil would not stay where you wished it to, but would circulate also, and nothing that you could do would prevent it.

MATERIALS FOR BALLOONS

Editor THE AUTOMOBILE:

[2,092]—Can you give me the address of a maker of gas bags for balloon purposes, or of materials which could be used for these things? H. J. NEWMAN.

Goshen, N. Y.

We cannot give you the name of any balloon makers, but several makers of cloth of a special weave for use in balloons and aeroplanes are available.

For this purpose, a fabric is necessary which combines strength and extreme light weight with waterproof qualities. Silk answers most of these, and so the basis of most of the special cloths is a silk. This is usually coated inside and out with a very thin coating of pure rubber.

Such a fabric is made and sold by the Continental Caoutchouc Company, the makers of the well-known Continental tires. Another maker is Glenn Curtiss, who is said to have invented a new fabric which excels all others. You can reach him at Hammondsport, N. Y.

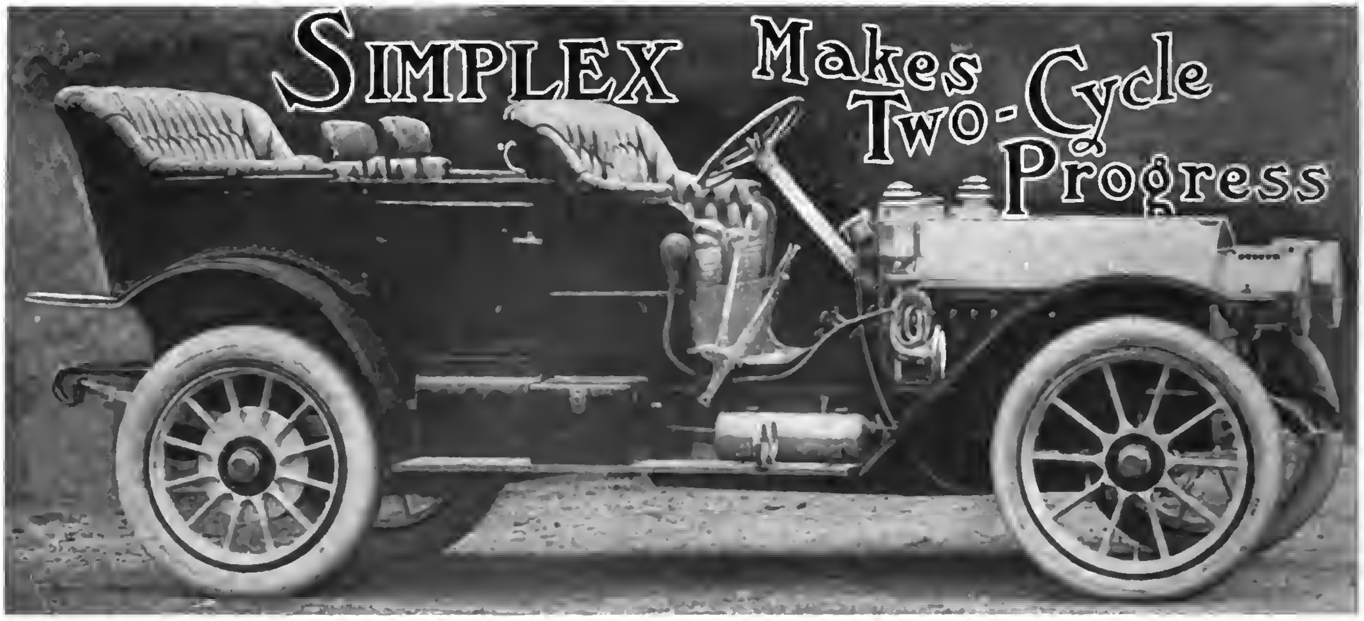


Fig. 1—Model 50 touring car with seven-passenger body, a wide entrance, flaring mud guards and a business-like get-up

MISHAWAKA, IND., Nov. 8—Differentiating between the fullest measure of success and a scant existence, so to speak, is attended by difficulties on occasions, due to a similarity of features and lack of exact knowledge. In discussing the two-cycle motor, as it is used in automobile work, this problem in differentiation becomes acute, and the only way, perhaps, to ascertain the bottom facts is to show what has been done.

It was but a few short years ago that designers were wont to claim that none but electric vehicles would ever reach a high level, and all forms of internal combustion motors were looked upon as far too complicated to be placed in the hands of average users of vehicles to use for transportation purposes. Fortunately, men who do things declined to be led by the nose, and they went right on experimenting with internal combustion motors, with the result that the success of the electric type of car was no more than assured when the gasoline type entered the race for popular favor.

Four-Cycle Motors Were Perfected First—The four-cycle type of motor offered the least resistance, and it reached a high state of perfection first. This is in spite of the added mechanical complication, which goes to show that it was not a question of mechanics at all. As might have been expected, it was easier to assure a competent firing charge in a four-cycle motor for the very reason that the mechanical displacement of the burnt charge is the surest way of scavenging.

This easy gain was a fortunate circumstance, considering the class of men who want "dividends" on efforts at once, but it was no proof of lack of ability of the two-cycle motor. As a matter of fact, the very class of men who jumped to the conclusion than only the electric would serve in the long run, repeated their short-sighted dictum when the four-cycle motor fought its way to recognition, and now that the two-cycle motor is commanding respect, these prognosticators will again have to bow to the type of man who works and struggles, the courage of sound conviction being the incentive.

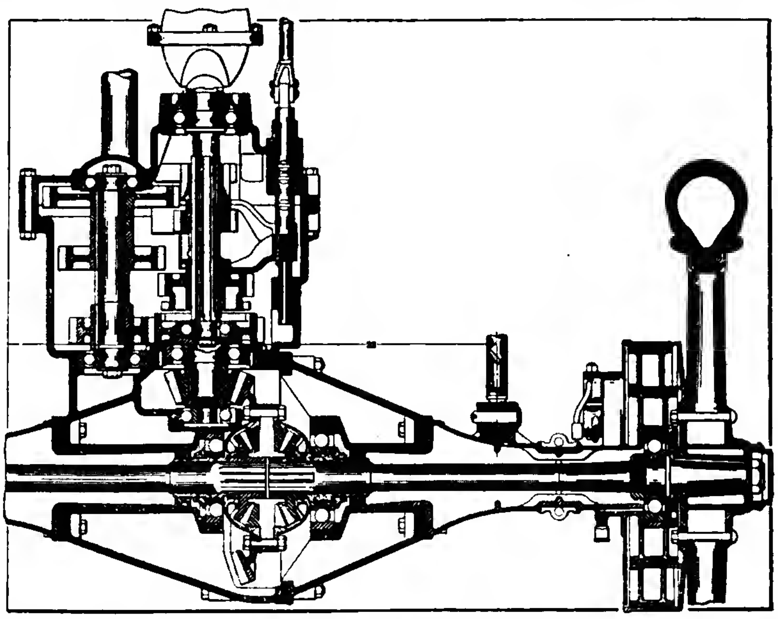


Fig. 2—Live rear axle with attached transmission, sectioned to show annular ball bearings, floating shafts, double brake drum and general details

Two-Cycle Three-Port Motor Offered Greatest Resistance—Strange to relate, the three-port type of motor, which is mechanically the most simple of all, offered by far the greatest resistance, thus again showing that mechanical problems were the least troublesome, and that the designer had to cope with many problems the nature of which were "thermodynamic," and to a vast extent speculative.

Many Failures Charged to Wrong Mechanism—When a car, as a whole, fails, the question is, what part of the car is responsible for the failure? Is it the motor, clutch, transmission, axles, wheels, tires, or does each unit contribute a quota? In the past it frequently happened that failure was due to lack of ability of the structure as a whole; each element contributed a share of the trouble, and the owner of the car, not knowing where to center responsibility, charged the whole of the failure to some one part, and why not the motor, especially if it differed from the general run of motors?

In this way many of the earlier four-cycle failures, so-called, were charged to the motor, when, in all truth, the chassis would not properly serve, even with electrical equipment for the motive power, and later on, when two-cycle efforts were made, it did not occur to any one to ascertain if the trouble was not due to inferior chassis construction, rather than for want of a good motor. These failures to discriminate as between the sources of trouble resulted in placing all of it on the relatively new unit, as the two-cycle motor, and delayed recognition of undoubted quality was a natural sequence, and to be expected.

Two-Cycle Motor Hampered by Environment—All the earlier applications of the two-cycle principle were in connection with boat propulsion, and single-cylinder motors were used in almost every case. In the single-cylinder type of motor it was not difficult to render the crankbox tight, and the primary compression which took place therein was not difficult of attainment. The little motors were so simple and they worked so well that thousands of them were designed and constructed, but, unfortunately, the class of workmanship was generally below a fitting standard, and when this class of work was put into multi-cylinder motors for use in automobiles, the motors failed, simply because they were mechanically incapable of sustaining in the more difficult service.

There is no doubt about the abstract ability of a steam engine, and yet, were many of the steam engines now being built mounted on the frame of a locomotive, they would fail in service. This illustration is apropos; failure, when it is encountered, may be due to a malapplication of a principle, rather than to the principle.

Simplex Three-Port Two-Cycle Motor—The three-port type of two-cycle motor is absolutely valveless; the mixture enters the crankbox through a third port; it is there compressed by the descending piston just as in the two-port type of two-cycle motor, and in both types of two-cycle motors, as well understood, every descending stroke of every piston (referring to a vertical type of automobile motor) is a power stroke. This cyclic relation must be appreciated to understand the reason for desiring to adopt the two-cycle principle; in a four-cycle (automobile) motor every second downward stroke is a power stroke.

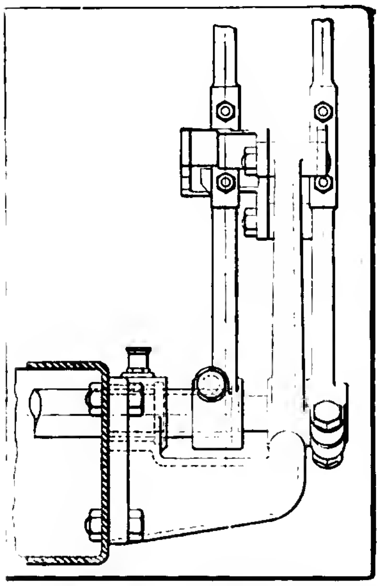


Fig. 4—Section of chassis frame just in front of side lever bracket

It will be understood, then, that a two-cycle motor, with either two or three ports, is designed to deliver twice as many power strokes per cylinder, per thousand revolutions of the crankshaft, as can be realized from a four-cycle motor of the same number of cylinders. Obviously, with the same bore and stroke of cylinder and piston, respectively, if the mean effective pressure can be made the same in the two-cycle as it is in the four-cycle type of motor, the power which can be delivered from the two-cycle motor will be double that of the other, per thousand revolutions of the crankshaft, in common time. To accomplish this has always been the aim of the two-cycle designer, and an immense amount of energy has been expended on the subject by innumerable inventors.

It has never been shown that the two-cycle type of motor is capable of delivering double the power realized from its cousin, the four; the mean effective pressure is not the same in both, and it is even a question if some of the inferior designs of two-cycle motors are capable of delivering as much power as is usually realized from average designs of four-cycle motors.

Taking the motor as made at the plant of the Simplex Motor Car Company, at Mishawaka, Ind., as an example, it will be possible to discuss the subject further, and with this concrete example at hand, determine with far greater certainty the facts

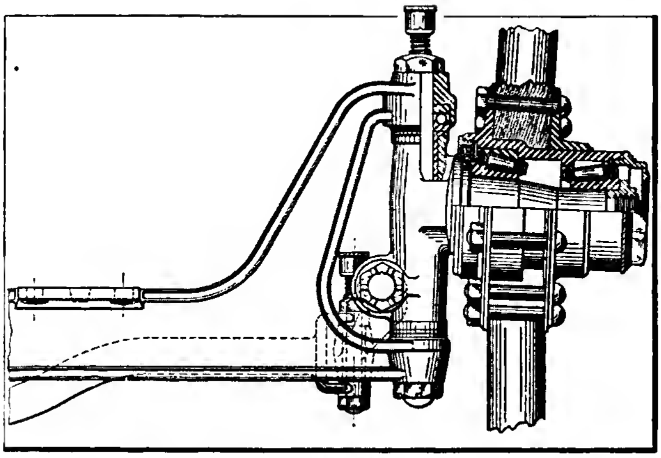


Fig. 3—I-section front axle, looking at the front, cut away to illustrate Timken roller bearings in front wheel hub and ball bearing knuckles

and the trend. The car, as made by this company, is shown in Fig. 1, the specifications of which are as follows:

SPECIFICATIONS OF AMERICAN SIMPLEX AUTOMOBILE

Data of the Motor	
Number of cylinders	4
Bore	5-in.
Stroke	5-in.
Normal speed (revolutions per minute)	900
Rated horse power	50
Ignition	Dual
Principal source of electricity	Magneto
Emergency source of elecricity	Storage battery
Carburetion	Automatic
Cooling (centrifugal pump)	Water
Lubrication	Force and splash
Cylinders	Gray iron
Crankcase	Aluminum
Data of the Chassis	
Wheelbase (touring)	117-in.
Wheels (wood)	Artillery
Tires (front)	36 x 4 in.
Tires (rear)	36 x 5 in.
Chassis frame	Channel steel
Steering gear	Gemmer
Springs, front and rear	Semi-elliptic
Front axle	I section
Rear axle	Live
Front wheel bearings	Timken
Rear wheel bearings (D.W.F.)	Hess-Bright
Transmission	Shaft drive
Speeds	3 forward; 1 reverse
Location of transmission gear	Suspended from rear axle
Clutch	Disc
Clutch facings	Steel on gray iron
Clutch location	In flywheel
Brakes; two sets (constricting)	Drums on rear wheels
Muffler	Special design
Spark and throttle levers	On steering wheel

Note—The specifications as above given, while they apply to the touring car, are, with slight exception, applicable to the several other models, as close-couple, limousine, and touring roadster.

Separate the Chassis from the Motor—An intelligent discussion of the merits of the valveless two-cycle motor will not be possible unless it can first be shown that the chassis and the remaining units are competent, free from trouble, and by a system of elimination bring all troubles home to the motor, if such there are.

Since the live rear axle and the transmission are important members, capable of inducing a deal of trouble if they are not rightly made, it is proposed to present reproductions of working drawings and, to the greatest

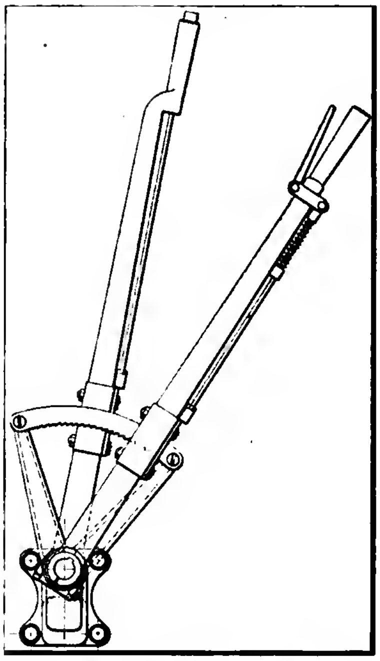


Fig. 5—Plan of side levers, quadrant, and details of design

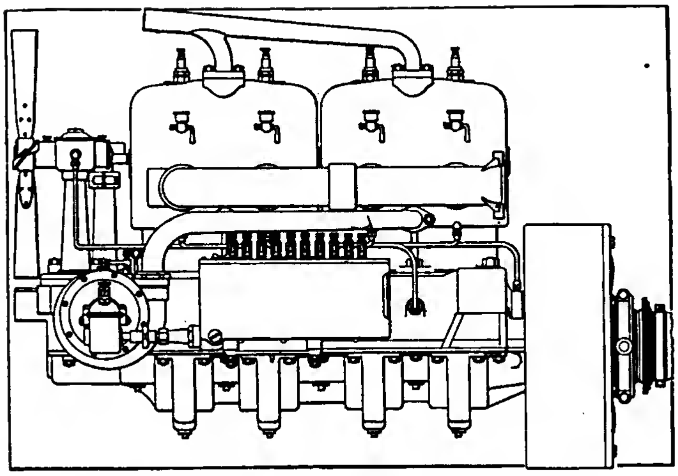


Fig. 6—Elevation of the two-cycle three-port motor with oiler exposed, fan in place and flywheel covering the clutch

possible extent, show that trouble from this source is scarcely a remote contingency. Fig. 2 shows these important members in section, with the left wheel and part of the axle broken away, since both sides are symmetrical, and the reproduction will be on a larger scale, hence more clear. The live shaft floats on Hess-Bright ball bearings; the hub of the wheel is drawn up on a taper, and the termination in the differential gear for each shaft is enlarged and fluted, thus assuring competence and ease of assembling. The wheel is prevented from floating off by the closure ring of the large annular type bearing, just inside of the hub of the wheel, on each side, nested within the drum of the brakes.

The wheels are made with large section spokes, of which there are twelve, and the brake-drums are bolted to the hub-flanges, provided with mud excluders, and each set of brakes is provided with individual flanges. The spring perches rotate on bearings, hence there is no binding tendency when the springs

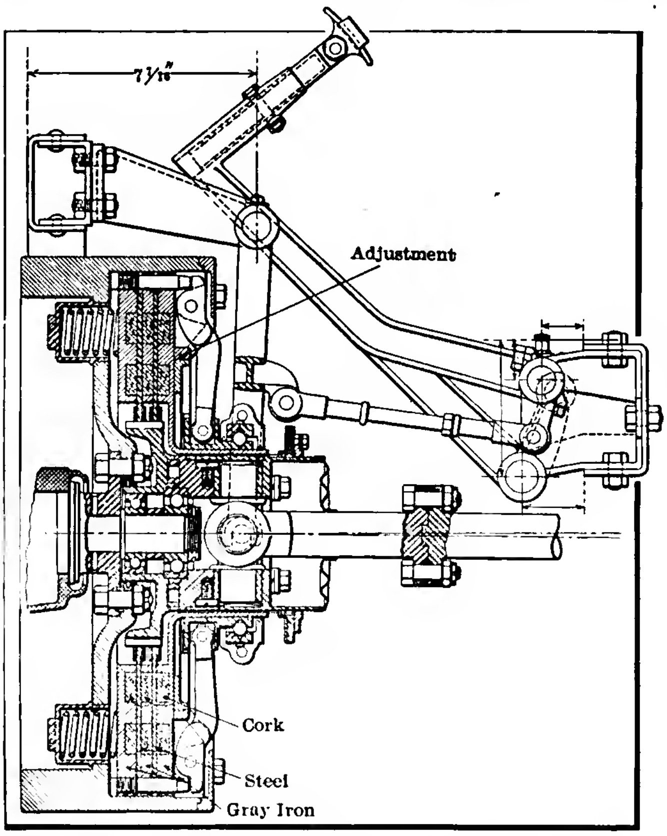


Fig. 7—Sectional view of flywheel and clutch, illustrating multiple disc clutch, controlling mechanism and details

deflect, and inside of the springs, at a point of vantage, the radius rods are anchored, they being of nickel-steel tubing, and the bearings at the anchorage are provided with ample surface.

The differential gears are of the bevel type, made of special (low metalloid) 15 carbon steel, cemented and hardened. The differential gears and housing are provided with liberal bearings, and the bevel drive, the gear of which is bolted to the housing, is of liberal proportions, with annular ball bearings at every point, including an outboard bearing for the pinion. Closure rings, with three grooves, prevent lubricant from migrating out, and silt of the road is debarred from entering.

Transmission Gears of Great Strength—The aluminum housing for the transmission gears engages the housing of the live rear axle in such a way as to form an integral part thereof, and short shafts, of liberal diameter (drive and lay), are suspended in annular ball bearings. The direct drive is worked out in a manner to be commended, a 24-teeth internal gear being used for the purpose, and a No. 406 Hess-Bright ball bearing is placed at the end of the shaft, within the gear, to take the load. The materials used are of the best obtainable in alloy steel.

Front Axle Up to a Fitting Standard—Referring to Fig. 3, it will be observed that the front axle is of the I-section, forged in one piece, and the knuckles are also die forgings of special steel, annealed and accurately machined. The knuckles are long, provided with liberal bearings, and the thrust is taken on a ball bearing at the top. The front road wheels are of special design, with liberal spokes, and, like the rear wheels, the wood is second-growth hickory, seasoned and selected with a view to casting out "bastard" and defective wood. Timken roller bearings are used in the front road wheels, it being the desire to thus provide for thrust.

The steering links are of nickel-steel tubing; balls for ball and socket joints are large, securely placed and adjustable. The steering arm attaches to the knuckle in a secure and proper manner, and the shape is such that the links are nested above and to the rear, out of harm's way.

Other Substantial Chassis Evidences—The chassis frame, as shown in section in Fig. 4, is 5 x 2 x 3-16 inches, of a special selection of material, and affords a wealth of rigidity for the intended purpose. Despite this ample frame, the machinery is securely mounted and universal joints are placed to take the effect of road inequalities at every point, one of which is shown at the end of the shaft in Fig. 2.

Referring again to Fig. 4, it will be observed that the side levers are securely related to the frame, an ample bracket (made of a steel casting) being used for the purpose. The levers, which are of a nice design, are depicted to better advantage in Fig. 5. These levers are of die-forged steel, fashioned to enhance the general appearance of the car, as well as to serve for sliding the gears and applying the emergency brakes. It would be possible to show, by means of additional working drawings, that the chassis and its relating units are quite up to the most fitting requirement, and since the whole car is made at the most Simplex plant, under the direction of the one corps of engineers, uniformity is a reasonable expectation.

Motor Is Not Handicapped—Any further discussion of the motor will be with the understanding that it is not required to shoulder the blame of an incompetent chassis, and under such conditions if it fails to perform in a satisfactory manner it is the motor that will have to serve for the explanation.

The general design of the motor is shown in Fig. 6, and owing to the entire absence of valves, it looks quite different from motors in general. The flywheel is rather large as it shows, but glancing at Fig. 7 will suffice to indicate the reason. The clutch, which is housed in the flywheel, is of the multiple disc type, with steel discs, of which there are two, pressed by means of four springs against cork inserts in gray-iron mates. The maximum spring pressure is about 200 pounds, and by means of an adjustment, as shown, the discs may be brought into more intimate relation if, perchance, wear creeps in.

A universal joint is placed within a shell in front of an assembling joint in the shaft, and a distance rod takes all pressure when the foot pedal is pressed to relieve the clutch. The whole mechanism is housed in the flywheel, and the face of the same is more than usual on this account, although the actual weight of the flywheel is well within the realm of good practice.

Fan and Starting Crank Details—At the front end of the motor the fan used to draw cool air through the radiator is fashioned in conjunction with a pedestal, which also serves to house the fanshaft, which engages a lateral shaft through a spiral gear, thus eliminating the belt as ordinarily used to drive the fan. The fan rotates on ball bearings, is placed horizontal, and a bevel drive makes the right-angle transmission. The starting crank emerges from the casing, and the driving jaws are enclosed in the housing. The crank is broken off, but the detail is sufficiently clear to indicate care in the designing, and that the two-cycle principle is not harassed at this end of the motor.

How the Accessories Are Arranged—Glancing at Fig. 9, the cross-shaft previously referred to will be seen, and the accessories are driven through this shaft, which takes its rotative ability from the crankshaft by means of a spiral gear system, with one member keyed on to the crankshaft as indicated. The water circulation pump is of the centrifugal type, and its shaft passes in through the wall of the housing and engages a safety (flexible) joint, through which the power is obtained.

The timer passes up, is driven by a bevel gear set, and is in an accessible position when the power plant is placed in the chassis. The magneto drive is shown to the left, and a sliding (floating) shaft, equipped with a bevel drive at the magneto end, engages with the spark advancing mechanism, a section of which is clearly given. The whole equipment is suitably enclosed, grease cups are provided at all points and, in view of the methods employed, noiselessness of performance is a normal expectation.

Crankshaft Tells Its Own Tale—Referring to the crankshaft, Fig. 10, it is to note that it is relatively light, is drilled out with 7-8-inch holes, with an outside diameter (uniformly) of two inches. The cheeks are quite thin, 11-16 inches, and the arrangement of the cranks is that of a pair of two cylinder crankshafts (rotated 180 degrees) with an angular displacement of 90 degrees between the pair. The firing order is 1-3-2-4, and in view of the unbalanced arrangement of the cranks, balancing discs are placed over the throws.

The use of balancing weights may seem to be disadvantageous, but it must be remembered that the crankcase compression must be maintained as high as possible (about seven pounds in this motor), and the weights are used to fill up the crankbox, as well as to balance the crankshaft, it being the experience that the crankshaft is not sufficiently out of balance to give any trouble at all at the best power speed of the motor.

The crankbox compression is brought up to the high point named by having the space quite completely filled, and tightness, which is difficult to attain, is brought about by means of split, mitered, packing rings, with springs behind them, and since they are ground, and press against ground faces of the cheeks of the crankshaft, they are not only tight, but experience has shown that they will stay so.

To afford bearing surface for the packing rings, the cheeks of the crankshaft are made thin and wide, and in view of the continuous but relatively smooth series of twisting moments afforded by the motor, the crankshaft, as designed, serves the purpose perfectly, and of the considerable number now in use a failure is as yet to be recorded.

In this very crankshaft construction is to be found a large part of the success of the motor; it has long been known that two-cycle motors can be made to work if the crankbox compression is maintained,

(A) At or near seven pounds per square inch;

(B) The same in every chamber of the crankbox;

(C) Despite the inroads of service long continued.

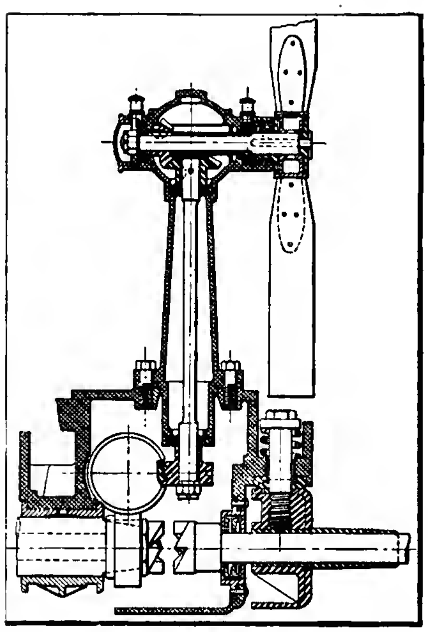


Fig. 8—Section of front end of motor and fan, presenting method of driving and details of the starting crank

Power Delivered Is Very Satisfactory—The A. L. A. M. rating of a 5 x 5-inch, bore and stroke respectively, four-cylinder, water-cooled, four-cycle motor is determined as follows, remembering that this is approximate, for comparison:

$$\text{Horsepower} = \frac{d^2 N}{2.5} = \frac{5^2 \times 4}{2.5} = 40$$

The above is about all that can be expected from a motor of the conventional order, and, taking the average of motors, it is too much to say that all will do so well.

The two-cycle motor, as here described, claims the distinction of delivering (under the same conditions of test) between 50 and 65 horsepower; it is better to consider a range of the delivery figures, perhaps, than to state the maximum.

All that has been shown so far is that the design is on a high plane, the workmanship is that of a well-equipped shop, and a single, well-directed corps of engineers has the whole situation in hand.

One of the points to be taken cognizance of is the high compression of the cylinders, it being about 90 pounds per square inch, absolute. All the cylinders are ground, even over the domes, which are flat, in order to assure equality of compression in the respective cylinders. Then, the pistons are provided with deflectors that could only have been arrived at after much experimenting. The ports, of which there are four for the inlet and exhaust, are wide and about 1 1-4 inch in depth, and the radius of

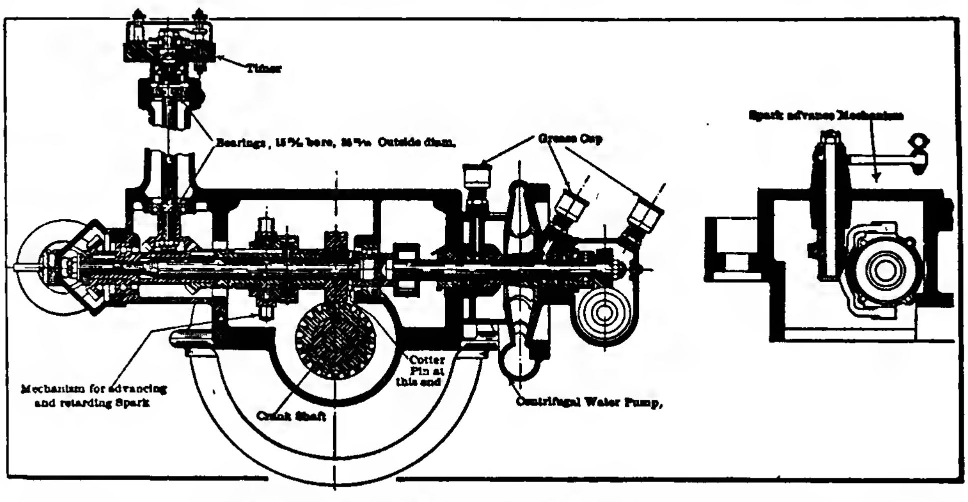


Fig. 9—Section of crankcase at lateral shaft, depicting water pump in section, drive for magneto and method of advancing the spark

the deflector, as it sweeps away from the cylinder wall, is about 1 1-2 inch.

Between each port there is a baffle fin on the deflector, the function of which is to prevent the incoming mixture from sneaking around over the surface of the piston head and mingling with the escaping exhaust. The baffle is on the inlet side, and the exhaust ports are about half of the depth of the inlet ports wider, so that the exhaust opens early, and the terminal pressure is very much reduced when the inlet ports are uncovered by the piston.

The inertia of the exhaust under the given conditions of escape is sufficient to prevent crankbox fouling, and the bridges between the exhaust ports are water cooled. The piston rings are about of the same dimensions as those used in good water-cooled motors of the four-cycle type, and it has been determined that they are less likely to fall into the ports than they would be were they as wide as the ports. The bridges serve to guide the rings by the ports, and it cannot be discovered that there is any trouble attached to this detail.

The transfer ports are much restricted, it being a matter of skill to fix upon the minimum possible cubical volume of them; any excess would serve as a detriment, since the crankbox compression would be reduced thereby.

Other Details Contribute to Success—The idea involved in maintaining a high compression is to make the mixture as inflammable as possible, taking into account the possibility of incomplete scavenging, due to the short time the gas has to pass out, especially when the speed of the motor is high, it having been determined that even 1,800 revolutions per minute is well within the range of practice. Even if the mixture is contaminated, if the compression is increased to match, it will burn readily. To add to this assurance, the spark is so contrived that it may be advanced as much as 60 degrees; in four-cycle work the spark is rarely advanced more than 38 degrees.

In order to be able to advance the spark fully 60 degrees, the mechanism, as shown in Fig. 9, was contrived, and it offers the advantage of bringing the armature of the magneto in the position of maximum energy at all points in the range.

Some Conclusions to Be Reached—Instead of following in the beaten path of four-cycle designers, if success is to reward two-cycle efforts it seems to be necessary to depart from them sufficiently to satisfy a series of modifications of the laws which govern the situation, among which the following is a resumé:

(A) The crankbox compression must be maintained with great precision between the respective chambers.

(B) The cylinder compression must be high enough to assure that even an inferior mixture will ignite and burn with sufficient speed to deliver its energy to the receding piston before it reaches the end of the stroke.

(C) The ignition system must be contrived with a considerable increase of the range of spark advance, in order to ignite slow-burning mixtures in time to take advantage of the energy component.

(D) The carbureter, especially in three-port motors, must be particularly capable, and in the case in point it was necessary to utilize the automatic principle and divers modifications of common practice.

A Fallacy Seems to Be Disclosed—Just because there are no valves required on a two-cycle motor, many embryo autoists came to the conclusion that it would cost next to nothing to build a good automobile; they failed to remember that the motor represents only about 25 per cent. of the whole undertaking, and it did not occur to them that motors are quite well behaved, as a rule.

In going into the matter with this idea of simplicity, they made the chassis, transmission, and other parts so simple that they failed to work, and then, not being capable of analyzing the trouble, it was a simple thing to apply the faults of construction to the motor and to relieve their pent-up feelings, cry it from the housetops. In the meantime, with a well-designed and constructed chassis, capable of serving with any kind of a motor that will deliver enough power, it has been found that a two-cycle motor, without any valves at all, is capable of doing the work reliably, and since there are double the number of twisting moments in a given time (comparing with a four-cycle motor), the power is delivered with the facility of a continuous flow, and the actual fiber strain of the members of the motor and the chassis is reduced.

Great Southern Incorporates—Articles of incorporation have been filed by the Great Southern Automobile Company, of Birmingham, Ala., which will erect a plant and manufacture cars at Ensley, near that city. The authorized capital stock is $100,000, of which $93,000 is subscribed. The officers are E. F. Enslen, president; Ike Adler, vice-president; John Kyser, secretary and treasurer, and E. F. Enslen, Jr., general manager.

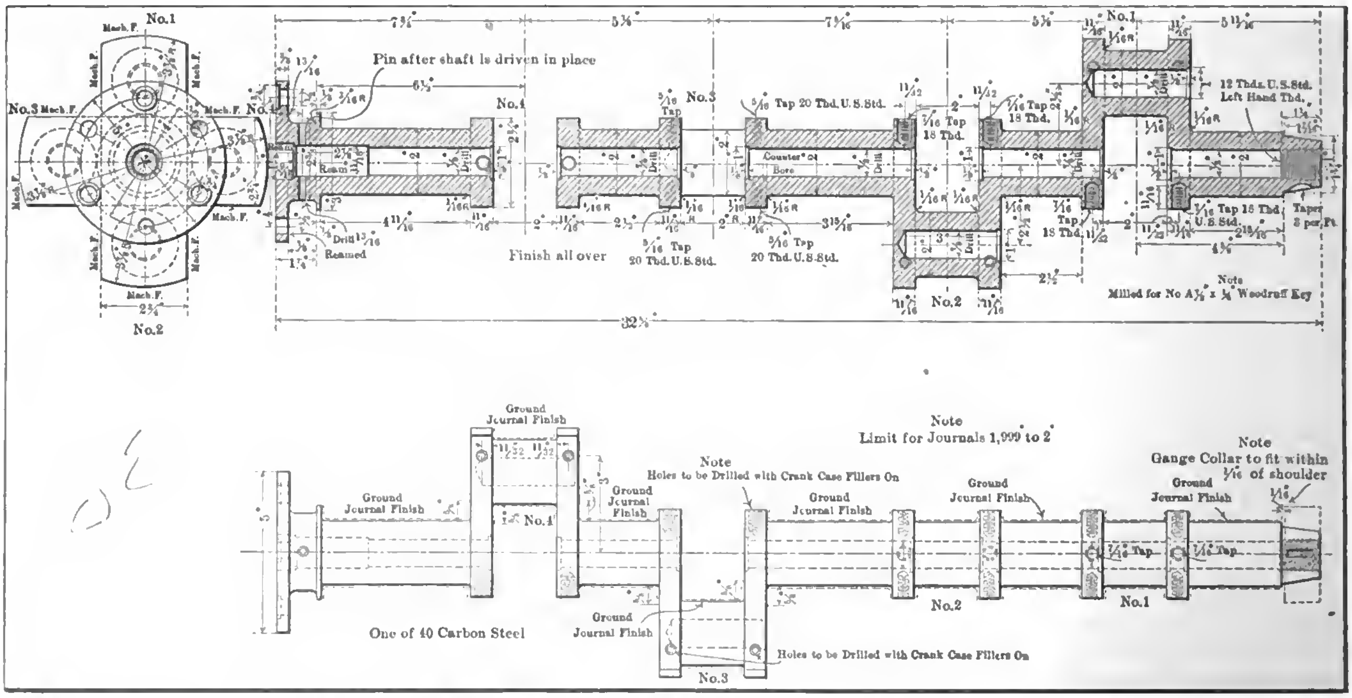


Fig. 10—Section of crankshaft, showing arrangement of cranks, amount of metal eliminated by drilling and all dimensions

ROAD SIGNS in Europe

By *Francis Miltoun*

CROSS ROADS

THANK-YOU-MA'AMS

GRADE CROSSING

DANGEROUS TURNS

PARIS, Nov. 12—The Touring Club de France, ever in the fore with innovations for the benefit of "le tourisme" in general and touring in France in particular, has already put out a number of the new "Signals for Road Obstacles" adopted by the recent "Conference Internationale de la Route" held in Paris.

Certainly the good work done by the Touring Club de France in the past shows no falling off in the legibility and accessibility of these really readable danger signals which are already being put into place at the right of the road, mounted on posts ten feet in height, and placed 250 meters before the obstacles. The automobilist who runs may read, and not be obliged to slow down and even shin up a pole to read the rather dim and altogether inefficient cast-iron governmental signboards in France.

These governmental sign-boards have in many cases already been supplemented by still more legible ones erected by the care and at the expense of the Touring Club de France on most of the international highways leading from Paris to the frontiers. They give primarily the termini of the route, as Paris—Geneve, and the distance from either end; then, in the largest letters of all, the name of the town near which it is placed, and, finally, the nearest large town in either direction. Of all useful and readable signboards to be found in any land these recently erected by the omnific T. C. F. are certainly the best planned and the most useful.

There is another class of sign-boards frequently met with in France that visiting automobiles often ignore and those are the "Octroi" signs at the entrance to all cities, and most towns and villages. In most cases a stop is compulsory, and to refuse to do so, when hailed by the official, is a misdemeanor, for which one pays in hard cash. It is an annoyance, to be sure, and many times ridiculous, but it is the law. Usually one declares that he has nothing on which to pay, though if you are a resident of the town, and are bringing home a dozen eggs from some friend's country place, a chicken, a rabbit, or even a bottle of wine, you give up a franc or more so that the dealers in that particular town who might have sold you the same merchandise are not put to a disadvantage. The French government is paternal in all things, but the very minute care which it bestows upon certain classes of its citizens make other classes mad neverthcless, and justly.

When one is held up at the gates of Paris and made to pay a tax on the gasoline and oil which he has in the reservoirs of his automobile a protest is justifiable. But you pay just the same, even if you are only a stranger going through.

Another road sign in France that one had best observe is that which holds the speed of automobiles down to a paltry twelve, ten, or even eight kilometers an hour through some crowded bailiwick. If you are a stranger, without a French residence, you may be held up on the spot for a "Contravention" and made to pay up. The fine will perhaps be comparatively small, but you will be kept in limbo, or your automobile will, which is the same thing, while the wheel of the law turns slowly on its axis and twenty-four or forty-eight hours spent in some dull little French town—seven of you, perhaps, in your big touring car—will make the cost come high, to say nothing of the fact that you will have to smoke the ordinary "Caporal," which is about the only tobacco purveyed in the small town, and drink warm, sticky, varnishy drinks on the café terrace half eaten up with flies while you are waiting.

There is another class of welcome signs which one sees distributed all over France, those of the Touring Club and the Automobile Club denoting hotels affiliated therewith, and again there are the signs of the big tire companies, which at the risk of being accused of giving a free advertisement, a couple of examples are given here, and very welcome the sight of one or the other of them may be on occasion. You all know that!

"Route Barré" is another sign not so welcome, but as it usually comes about half a mile before you find a new-made road, with its rough stones unrolled, you have time to prepare for the worst and are not on top of it without warning, as frequently happens in England. In general the road-makers in France work most intelligently and are not supposed to cover all the roadway at one time but leave a part of the road open for traffic. This is due to the energetic campaign which has been carried on by the Touring Club de France, and the Ponts et Chaussés, who has the road-making in charge, has sent strict orders abroad that the rule is to leave a part of the road open while another portion is being remade. Is there another country in the world where so

Two Road Signs Good to See in La Belle France

TWO SUBURBAN PARIS KILOMETRE STONES

much is being done, in the actual making and caring of roads, to make the automobilist happy? The writer thinks not.

Just now there is a new project on foot to make a new mountain highway to run from Lake Geneva to the Mediterranean, and as sponsor we learn that the Touring Club de France is back of it. There's a public-spirited body for you! Why is there not a similar institution in America, national in spirit, patriotic in a general, not a local, sense, and wealthy enough to endow any project for the benefit of touring with the funds necessary to set the ball a-rolling. After that it's easy; then local bodies come in and give their aid; some great resort en route may contribute a good round sum for the benefits that will accrue, the local automobile clubs can co-operate, and mayhap some Roi de Petrole or Prince d'Acier may endow the project as they have universities and institutions. The thing is worth looking into by all Americans who believe the new locomotion has come to stay—and who does not, save the aeroplanists?

FRENCH GOVERNMENT TOURING OFFICE

Paris, Nov. 3—France realizes that touring, by automobile or otherwise, is worth encouraging as a business proposition. Possessing good roads, natural beauty and historical sites in abundance, it is worth while to make them known and to encourage visitors both from home and abroad. With this object in view, Minister of Public Works Millerand has announced his intention of forming a government touring office, of which he will be the president, with a board of directors composed of the leaders of automobile and touring associations, representatives of hotel proprietors, railroad companies and financiers.

The object of the touring office, which will have government funds and yet be self-contained, will be to encourage touring by all possible means. Contrary to what might at first be expected, there will be no clashing with the work of the Touring Club of France or the touring department of the Automobile Club of France. On the contrary, it will be possible for these two bodies to extend their field of usefulness, for whereas formerly their effort was limited, owing to their inability to interfere with government departments, they have now a special branch of the government to carry through improvement schemes which they may formulate. An example of this is found in an improved system of mileposts which it was desired to adopt in France. The touring department of the Automobile Club of France worked the scheme out, it met with the approvement of all, including the government, but could not be put into use owing to the inertia of the particular government department involved. There are many other schemes that have been devised by the Touring Club of France for the benefit of all tourists and road travelers which will be carried to completion now that there is a government department to help.

NEW TAXICAB REGULATIONS IN PARIS

Paris, Nov. 3—Heavy fines and imprisonment no longer threaten Paris taxicab drivers who run with a smoky exhaust, or allow their rear light to be blown out. Drivers in the French metropolis have long been unfettered by a speed limit, the police recognizing that all the public needed was protection from the reckless driver, and not a stereotyped rate of speed, regardless of conditions.

Automobilists, and especially taxicab drivers, have been specially troubled, however, by the regulation making it an offense to emit smoke from the exhaust pipe and to run without a rear light. The first offense meant a fine, the second ditto, and the third a day in jail. For some time taxicab drivers have been kicking, and have kicked so effectively that special instructions have now been given to the police. The sergent de ville can stop any vehicle emitting smoke and, if without passengers, request the driver to draw off the excess oil causing a dirty exhaust. If there are passengers the driver can remedy the smoke nuisance on obtaining their permission to stop for this purpose. If the oil can be drawn off immediately and the smoking stopped, no summons will be issued. If the driver refuses to stop his engine smoking, or if the passengers refuse to allow him to stop for this purpose, a fine will almost certainly follow.

Instead of just jotting down the number of a car without a rear light, the Parisian policeman will first of all request that it be lighted. If the driver refuses to do this, police court proceedings will be the outcome. It is no longer allowed to take a car number and issue a summons for any offense without at the same time calling upon the driver to stop. If the driver refuses to hear the police whistle, his employer will be communicated with and the man called upon to give an explanation before proceedings are taken. This will make it impossible for summonses to be issued on wrong numbers, as so frequently happens.

Despite the changes, Paris taxicab drivers are not altogether satisfied. They maintain that imprisonment should be abolished entirely for the mere breaking of road regulations not coming under the criminal code. Unless this is done within a very brief period, they threaten to get up a huge demonstration. They have already given proof of their ability in this direction by serenading Judge Hamelin, who has passed most of the sentences of imprisonment, with the noise of several hundred hooters and the boom of the open exhaust. The outburst led to wholesale arrests, but as none were maintained it is evident that a higher authority than Judge Hamelin had interfered.

When horseflesh was in its glory, a certain number of individuals earned a livelihood by watching the cab horses while their drivers were in the shelter or eating a meal in a nearby restaurant. Since the introduction of the taxicab the horse tender has had to learn a new business. At every stand in the city is now stationed an ex-horse tender, whose business it is to close up the line as cabs move away, to trim lamps and generally make himself useful. If the ground is level or on a downgrade, the tender merely releases the brake and pushes the vehicle along until the line is closed up. If it is on a slope, however, he starts the engine and slips in the low gear without taking out clutch, runs alongside, stops, and puts into neutral again.

DARRACQ MAKES A LOW-PRICED FOUR

Paris, Nov. 3—The old firm of Darracq & Cie. has brought out its long-expected four-cylinder 14-16-horsepower car, selling at $1,100. One of the most interesting features of the car is its frame, which is stamped from a single sheet of steel, passing under the motor and gear-box. The side channels are of inverted-U section, with flanges along the lower outer edge on which the body rests. The motor has its four cylinders, 3.35 by 3.94 inches, cast *en bloc*. The carbureter consists merely of the float chamber, into an extension of which the jet is screwed; a suction pipe comes down to the top of the jet. The extra air valve chamber and the throttle are cast with the cylinder block.

Roads Building News From All Over The Country

WISCONSIN LAW COMPELS TOWNS TO POST SIGNS

MILWAUKEE, WIS., Nov. 13—The new law requiring town boards in Wisconsin to erect and maintain signs at important crossroads, is being complied with more fully now that the penalty clause has gone into effect. The towns were given until November 1 to erect the signs, but few did so within the limit. No persecutions have been brought, as the town boards pleaded that the farmers have been so busy with crops that they could not get to work on the signs sooner.

James T. Drought, secretary of the Wisconsin State A. A., has dropped his suit for damages against the township of Black Wolf, Winnebago county, under the statute making it a misdemeanor to place bumps and obstructions on the public highway. The town board has removed the obstructions that caused the trouble and promises to be good in the future. Mr. Drought brought the suit simply to test the law and make the boards responsible for the obstructions realize their positions.

The city of Milwaukee has purchased 100,000 gallons of asphaltum oil to be used in sprinkling the streets next summer. All new and resurfaced macadam pavements will be treated first. Twice this amount, however, will be necessary to treat all the streets, and it is expected that a repeat order will be given soon. As one application of the oil, costing the property owners $1 for every 30 feet street front, is expected to last the entire season, the oil will be cheaper than water sprinkling, which costs from 80 cents to $1.50 a season for the same area.

LANCASTER COUNTY, PA., STOPS ROAD IMPROVEMENT

WITMER, PA., Nov. 13—The road supervisors of East Lampeter Township, Lancaster County, Pa., believe that the chief duty of their office is to prevent the roads from being improved, even by an individual at his own expense. So firm are they in this belief that in the December session of court they will apply for an injunction restraining Dr. Donald McCaskey, of Witmer, from improving the roads in the vicinity.

The trouble began last May. Dr. McCaskey, after failing to get the supervisors to fix a dangerous half-mile of yellow clay road, known as the Witmer road, began in despair to make improvements himself. He made a King split-log drag, hired horses from the farmers, and got busy. After fifteen hours of labor, distributed after rains during two months, the neglected part was transformed into a substantial roadway.

The road supervisors began to be censured for their laziness when the neighborhood saw the result of Dr. McCaskey's work, and apparently out of petty spite, obtained an injunction against him. Since then they have been compelled by public opinion to use the split-log drag on fifty miles of dirt roads.

AUTOISTS BOOM GOOD ROADS ADVOCATE FOR GOVERNOR

ALLENTOWN, PA., Nov. 15—At the annual election and banquet of the Lehigh Valley Motor Club held recently, the boom for State Senator W. C. Sproul for next Governor was given a decided boost by J. H. Weeks, president of the Automobile Club of Delaware County, Pa., who incidentally criticised Governor Stuart for his veto of the Philadelphia-Pittsburg highway bill, and assured his hearers that Mr. Sproul, if elected, would accord proper treatment to all good roads legislation.

The following officers were elected to serve during the coming twelvemonth: President, Charles Mosser; vice-president, H. J. Lerch; treasurer, F. H. Sterner; secretary, R. L. Stuart; board of governors, M. H. Strauss, William Erdell and W. D. Schantz.

HOW AUTOISTS HELP KEEP ROADS IN REPAIR

PHILADELPHIA, Nov. 15—Frank Hardart, Sr., is an automobilist 24 hours a day, every day, even though he has large business interests of Philadelphia and other cities. He is also a member of the common council of the Quaker City, but even so he finds time to enter every endurance, reliability, and sociability run held within a hundred miles of his home. He is a prominent official and hard worker in the Quaker City Motor Club, and when he moves to his summer home at Glen Loch he transfers his activities there and wakes up the natives. Recently the East Whiteland Township committee met at his home on the Lancaster pike, when it was shown that $3,400 had been spent during the past year in resurfacing the four miles of that famous old highway that bisects the township. Then the committee censured the authorities of the Borough of Malvern for failure to keep pace with them in keeping "the pike" in good shape in their particular bailiwick, and urged the Malvernites to wake up and realize what they are losing by failing to maintain their roads in good condition. Automobilists of Hardart's caliber are a credit to the cult.

DELAWARE CAPITAL CELEBRATES NEW PAVEMENTS

WILMINGTON, DEL., Nov. 13—Having spent $75,000 in the improvement of streets this year, and having laid the first new pavement in the town, Dover, the capital of the State, is planning a celebration of the event for Thanksgiving, and it is proposed to have as one of the features an automobile parade over the paved streets. Many of the Wilmington autoists will take part.

An arrangement has been made whereby the Delaware Automobile Association is to provide signs to be placed by the Grangers at dangerous road intersections in Brandywine Hundred, and by the city park commissioners on the park drives.

OHIO WITHOUT PROVISION FOR ROAD MAINTENANCE

COLUMBUS, O., Nov. 13—By the decision of the Ohio Supreme Court recently handed down, improved highways in the Buckeye State are left without any provision for their care and maintenance. Conflicting special laws which provided for the care of pikes for a score of years were swept away. The case came up from Gallia County, and simply carries out the opinion of Attorney General Denman, given some time ago. The General Assembly will be called on to enact a law to fill the void.

MARYLAND STATE COMMISSION AND CLUB CONFER

BALTIMORE, Nov. 13—It has been at last arranged for the Maryland Automobile Commission, headed by Governor Crothers, and the Automobile Club of Maryland to get together within the next week and come to some agreement on the automobile bill which the commission wishes to present to the next Assembly. The tax feature is the chief bone of contention, and it is probable that the present law will be changed in this section, as the result of the meeting.

NATIONAL ASSOCIATION MEETS IN SUNFLOWER STATE

TOPEKA, KAN., Nov. 13—The National Good Roads Association will hold its tenth annual session on December 14 and 15 at Topeka. Arrangements for the entertainment of delegates will be made by the Kansas Good Roads Association. The motto proposed for the association is "Work for National and State aid."

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RACING ON SPECIAL TRACKS

Automobile racing, as an amusement proposition, has often proved its profitableness. As a popular attraction it ranks with horse racing, bathing beaches, and the Streets of Cairo. In certain events of the past summer it showed ability to take that place in the esteem of the masses which in Roman days was filled by the gladiatorial contests. Naturally its value to the industry fell in proportion to its popularity. The maker learns nothing of the weak points of his car if the car is smashed and the driver killed. The sales manager, too, is likely to find such exhibitions the reverse of good advertising.

Racing on special tracks is devoid of many of the popular—so-called—features, and likewise regains to a considerable degree the engineering value of the races in the early days of the industry. Now the term "special track" appears to require definition. Many people believe that if a defunct horse-track is caught before being cut up into building lots, and is treated with liberal applications of advertising, it becomes *ipso facto* a "motordrome." This idea must be severely discouraged. A special track is a track built specially for automobiles, with due regard to their weight, speed, and destructive effect on the surface.

England has a shining example in the Brooklands track. This big concrete oval is the most valuable asset of the British automobile industry. It provides an amusement which, if it has not so strong a hold on the gladiatorial element, appeals all the more to prospective buyers. At the same time it affords an opportunity for really scientific tests of cars at speed. As an example may be mentioned the experiments on air resistance conducted by the indefatigable S. F. Edge.

The Atlanta track comes the nearest to the value of a Brooklands of anything on this side of the Atlantic. The big racer which Nazzaro drove at 120 miles an hour on Brooklands made but 95 miles an hour on the Atlanta course; and without discussing the merits of Nazzaro and Strang as drivers, it appears that Brooklands has considerably the better of it.

This of course is largely due to the perfect banking of the English course. The degree of banking is figured out by a very simple formula, depending on the speed and the radius of the curve. For a speed of 120 miles an hour, on a thousand-foot radius, the banking should be at an angle of about 44 degrees from horizontal. Brooklands, by providing the right degree of banking, makes the speed reasonably safe for any experienced driver. No other track in the world does so. Moreover, their failure to provide the banking makes it impossible to attain such speeds on them.

On special tracks automobile racing becomes once more a safe and useful sport, beneficial to the industry and still not without profit to the promoters. Atlanta's track has shown great speed, with reasonable safety insured its users; that of Indianapolis, newly surfaced, will live down its disastrous opening; but the highest reward, both financial and otherwise, awaits the man who will give this country a Brooklands.

"FOR MEN OF MODERATE MEANS"

More and more the automobile manufacturers are heeding the demands of that indefinite but powerful class known as "the men of moderate means." By good fortune it happens that what these men want is exactly what is best for the manufacturers, even though some of these latter have not yet recognized the fact. Simplicity and economy are the qualities most desirable in every machine, and the automobile is no exception.

The demands of this class have added to the designer's repertory the block cylinder casting, thermo-syphon cooling, magneto ignition with fixed spark timing, the circulating system of lubrication and the pressed-steel live axle. They have called the designer from the making of road locomotives, and have showed him that greater possibilities and problems even more worthy of the solving lay in the light four, and even in the humble "one-lunger." Any man of moderate skill and some experience can design a fairly satisfactory 40-horsepower car; but the small car calls for original and inventive talent.

To the man of moderate means we must look for much future progress in design. We can already build cars of a speed which must be close to the limits of human endurance; and the reliability of the present automobile compares favorably with that of any other piece of machinery. Were it a question of speed alone, we might well rest on our laurels; but first cost can always be reduced, and running expense and maintenance lightened. These are the directions which future improvement must take; and the industry owes a debt to the men of moderate means for awakening it to this fact.

FRENCH MAKERS NOT ENTHUSIASTIC FOR THE GRAND PRIX

PARIS, Nov. 10—A big query must be placed after the Grand Prix of the Automobile Club of France for the year 1910. The club has announced the race, the conditions are absolute liberty regarding dimensions, horsepower and weight; the distance 500 miles, and the probable date the first week in July. There is a proviso, however, in the nature of the rule that 45 entries must be received by November 30 or no race will be held.

While a fortnight ago it looked as if the 45 could easily be obtained, for the racing board having voted the speed test is comprised of the leaders of all the leading factories, it now appears that the business managers and board of directors do not share the sporting enthusiasm of the Commission Sportive. Thus we have the sight of René de Knyff, chairman of the racing board, being in favor of a speed test, while the Panhard company, of which he is an important unit, shrugs its paternal shoulders in indifference. Louis Renault, as a member of the racing board, votes for a sporting event, but his factory at Billancourt will not produce a speed monster. Brasier rubs his hands and looks wise when a no-limit rule is proposed, but his board of directors shout an emphatic "No." Altogether there are eight French firms, comprising Panhard, Darracq, Charron, Renault, Unic, Peugeot, Motobloc and Dietrich, having come to a common agreement not to race. The foreigners who will abstain are Mercedes and Minerva. Their reasons for refusing to take part in the A. C. F. sporting event are that this year there was no race and business did not suffer, and there is no reason why they should go to the expense of a speed test next season.

The club has made a close enquiry among constructors with the result that it has obtained a promise of 34 cars. No money has been paid, however, and there is always a possibility that some of these will not produce the necessary cash. The willing ones are De Dion-Bouton, one of the few big firms having never previously taken part in a speed test; Mors, Rolland-Pilain, Sizaire-Naudin, Gregoire, Delage and Guillemin; Italy will have Fiat; Germany Benz and probably Opel; Spain Hispano-Suiza; England an Austin team; and either America or England a Mitchell team—for it does not appear to be clear to the club which Mitchell company has made a promise.

The odds are that the race will not be held, but as it only needs 11 more cars to complete the list it is not safe to prophesy. In any case, the race will not have the importance of previous events, for only two leading French firms are entered, the others being voiturette specialists not having made a previous attempt at a big racer.

FURNITURE CITY PLANS ROAD RACE IN 1910

GRAND RAPIDS, MICH., Nov. 13—The automobile club of this city decided at a special meeting to promote an automobile road race next summer, and a committee has been appointed to work out the details. The course chosen is south of the city, about 14 miles in length, and rectangular. It is planned to expend $16,000 in improving this stretch of sandy road and in meeting other expenses.

The committee consists of Albert Stickney, chairman; M. R. Bissell, roads and guards; Benjamin S. Hanchett, funds and privileges; Fred Z. Pantlind, grandstand and parking; W. S. Farrant, officials; A. H. Vandenburg, publicity, and F. C. Warnshuis, entries and prizes. Mr. Stickley, the chairman, into whose hands will fall the general supervision of the event, is one of the leading manufacturers of the city. Mr. Hanchett is general manager of the street railway system. The other members are all prominent in the club's affairs.

ALREADY PLANNING NEXT FAIRMOUNT RACE

PHILADELPHIA, Nov. 15—The Quaker City Motor Club is already at work on the details of the third annual Fairmount Park stock chassis race. It has been practically decided to double the prize money, making the winner's end an even $5,000, with $2,500 for the second car, $1,500 to the third, and $1,000 to the fourth. The success of the race last month was such that no trouble will be experienced in getting the consent of the Fairmount Park Commission to grant again the use of the roads.

The immediate attention of the contest committee, however, is directed to the annual New Year's endurance run, December 29 and 30, which will probably have some Southern city for its objective. Although some of the members are a trifle sore over the rather cavalier treatment the club received from the A. A. A., and some fear that the usual number of entries will not be forthcoming, the pathfinders will start out early next month. Entry blanks will be issued as soon as the route is definitely decided on.

ANNUAL MEETING OF THE A. A. A., NOVEMBER 30

ANNUAL meeting of the board of directors of the American Automobile Association has been called for November 30 at the Hotel Belmont, New York City. At that time the annual reports of the officers and chairman of the various boards will be made, and from the nature of the work accomplished during the past year, these reports are expected to cover a wider field toward illustrating the automobile progress of the country than ever before. The first meeting of tbe new board of directors for the election of officers for the coming year will be held on the following day, December 1.

Strong Western Clubs Join A. A. A.

The Automobile Club of St. Louis, which withdrew from the American Automobile Association about two years ago, has returned to membership in the national organization. The Detroit Motor Club, another of the large and energetic clubs in the West, has applied for membership. Still a third evidence of growth and willingness to co-operate with the association in its efforts for good roads, good laws and favorable touring conditions in all parts of the country, comes from the Pacific Coast, where the latest reports from the California State Association show that the membership has jumped from a few hundred a couple of months ago to over 1,500 at the present time.

Coming on the eve of the annual meeting of the A. A. A. these evidences of increasing growth and membership are particularly encouraging as attesting to the readiness of automobile owners in all parts of the country to work together for the best interests of motoring.

The Automobile Club of St. Louis has a membership of nearly 450. At the recent meeting of its board of directors, when the action to renew its affiliation with the A. A. A. was unanimously adopted, President Samuel D. Capen spoke of the benefits likely to accrue to Missouri in the movement for good roads in view of the fact that the third annual A. A. A. Good Roads Convention will be held at St. Louis next year. President Capen has conferred with President W. W. Cowen, of the Kansas City Automobile Club, toward organizing a strong State association in Missouri. The latter club has nearly 350 members, and other clubs eligible to join are those of Springfield, Joplin and St. Joseph.

NEW AUDITORIUM FOR MILWAUKEE SHOW

MILWAUKEE, WIS., Nov. 13—The Milwaukee Automobile Club has definitely decided to hold the second annual Milwaukee show on February 22 to 27, inclusive, in the new $500,000 Auditorium. The only objection to this date was that it is the same as that of the Kansas City, Mo., show, but it is not thought that the two will conflict seriously. Both were held on the same date last March.

Clarke S. Drake, president of the M. A. C., has been chosen to manage the show. He has already received applications for space. Drawing for reservations will take place January 26. This year, with the advantage of the new location, a definite plan of arrangement can be carried out, giving a separate department for the exhibits of pleasure and commercial cars, motorcycles and accessories. The Auditorium is located at State, Cedar, Fifth and Sixth streets, near what is called Milwaukee's auto-automobile row. In addition to its central location, the Auditorium has the further advantage of being surrounded by wide streets paved with asphalt.

FLAG-TO-FLAG CONTEST POSTPONED

DENVER, Nov. 15—The flag-to-flag endurance and reliability contest for automobiles from Denver to the City of Mexico will be held next Summer instead of this month, as originally planned. The official announcement of the change was made today. It is planned to hold the contest in June or July, during the centennial celebration at the Mexican capital.

NEW YORK UP-STATERS PLAN MARCH SHOW

SYRACUSE, N. Y., Nov. 13—The Automobile Dealers' Association held a meeting at the Yates Hotel last night to discuss the date of the 1910 show. The association would like to have it directly after the Boston show, which opens March 12, but the exact date has not yet been decided. In order to provide ample room for the exhibits that are expected, it is planned to secure the New York State cavalry armory, in addition to that of Company C, which was used last winter. An effort will be made to secure permission to cut a door between the two armories, which adjoin each other, so that visitors will not be obliged to go outdoors to get from one to the other. The members of the various show committees will be named at a future meeting.

COLUMBUS SHOW SPACE ALL ALLOTTED

COLUMBUS, O., Nov. 13—All the space set apart for automobile exhibits in the show to be held under the auspices of the Columbus Automobile Club December 25 to January 1 has been sold. A number of automobile accessories will also be exhibited, and applications for space from accessory makers are numerous. Perin B. Monypeny, Northern Hotel Building, is chairman of the committee in charge of space allotments. It is planned to make one night a society occasion; a special entertainment will be given at the price of a double admission. Sterling Welsh, of Cleveland, is in charge of the decorations, which will be appropriate to the holiday season. About fifty makes of cars will be exhibited.

EXCELLENT COURSE LAID OUT FOR FORT LEE CLIMB

NEW YORK, Nov. 15—A number of New York autoists went over to Fort Lee last Sunday to test the course on which the Edgewater-Fort Lee hill climb is to be held on Thanksgiving Day. The road has been greatly improved, and was found in excellent condition. The Edgewater-Fort Lee Automobile Association, which was formally organized last week, had a committee go over the course with a surveyor to determine the starting and finishing points. Because of sewer construction beyond the crest of the hill, the course had to be cut a little short. Ample space has been left in which to slow down. The start of the climb will be at the gate of Watkins Park, one mile from the finish, and the timing instruments and officials will be located on a bluff overlooking the road. All starts will be standing, as the starting point is on a slight down grade.

The illustrations depict the course being tried out by local trade representatives. The picture on the left is the Velie being driven by E. R. Strobel, of the Garland Auto Company, and the right-hand view shows a Lancia, with Harry Fosdick, of the Hol-Tan Company, at the wheel. The course is easily accessible via the Fort Lee ferry from the foot of Manhattan street (West 130th). New York dealers are well pleased with the course and the attendance possibilities, and their support has assured a representative entry list.

Laying Out the Course for the Climb

What the Clubs Are Doing These Days

GREEN MOUNTAIN CLUB CONFERS ON STATE LAWS

MONTPELIER, VT., Nov. 15—The annual meeting and election of the Automobile Club of Vermont resulted in the choice of the following officers: W. W. Brown, president; James M. Boutwell, first vice-president; Dr. J. Holmes Jackson, second vice-president; S. S. Ballard, secretary and treasurer, and G. H. Morrill, director. The date of the annual meeting was changed from the third Thursday in October to the first Saturday in September.

A vote of thanks was tendered C. W. Gates, the State highway commissioner, for the efficient manner in which he has conducted improvements during the past year. During this time the State received $27,000 in automobile license fees, which is to be expended on the roads. The club voted to continue its campaign for the erection of signs marking both danger points and crossroads. It is expected that the towns will co-operate in the placing of the latter.

Guy W. Bailey, Secretary of State, who became a member at this meeting, addressed the club on the working of the new State law, and expressed the willingness of his department to recommend such modifications as the club might find desirable. James M. Boutwell, J. W. Gordon and J. G. Brown were appointed a committee to confer with Mr. Bailey on this subject. It is the prevailing opinion of the members that the present license fee of $1 for each horsepower is too high. Mr. Bailey said nothing about this tax, but suggested other improvements.

MILWAUKEE CLUB'S SPORT AND BUSINESS

MILWAUKEE, WIS., Nov. 12—The Milwaukee Automobile Club will hold an informal club run on Saturday, November 13, from Milwaukee to Madison, about 80 miles, to see the Wisconsin-Minnesota football game for the Western conference championship. James T. Drought, of the touring board, is an alumnus of Wisconsin, and the club numbers among its members many graduates of both institutions. Parking space has been provided for members.

An imposing committee on legislation has been appointed, consisting of Alonzo Burt, State Senator Julius E. Roehr, Emil O. Hoffman and George A. West, with James T. Drought as chairman. Other committees are those of racing, good roads and runs and tours, presided over by Dr. J. F. Schreiber, Faustin Prinz and M. C. Moore, respectively.

SIGN-BOARDING PLANS IN THE FLOUR CITY

MINNEAPOLIS, MINN., Nov. 13—The Minnesota State Automobile Association is getting a nice profit out of the issue of its annual tour book for the Northwest, and the club officers are working on a plan to divide this profit among the 32 clubs of the association for application to sign-boarding work. Outside of Hennepin County, which boasts of some 200 signs, tbe State is largely destitute of guides to the tourist. Under these conditions it is likely that the plans to state a general movement in this direction will meet with great favor.

HARTFORD CLUB HAS DISTANCE CHART OF TOWNS

HARTFORD, CONN., Nov. 15—William T. Plimpton, assistant secretary of the local club, is working on a chart which, when completed, will show the exact distance between every city in the State of Connecticut. There are sometbing like 275 towns included. The chart should prove of considerable assistance to visiting tourists. Charles D. Rice, chairman of the good roads and sign-boards committee, has presented the club with a large wall map of the State, showing all the main highways.

HARTFORD STILL BOTHERED BY THE TURNPIKE

HARTFORD, CONN., Nov. 13—At the last meeting of the club C. H. Gillette was re-elected a director in the American Automobile Association. F. W. Stickle, Walter S. Schultz, R. D. Britton and S. C. Doty were appointed a grievance committee, and all complaints will in the future be referred to them. The report of the treasurer showed that the organization is in good financial condition. According to figures recently issued by the A. A. A., the Automobile Club of Hartford is eleventh on the list of affiliated organizations in membership. The club has made a considerable gain since the opening of the new quarters. The present membership is 352, and several applications are on file.

Complaints are still being made of excessive speeding on the new Berlin turnpike. The State highway commissioner has threatened to have the stretch patrolled if this is not stopped.

PHILADELPHIANS NEAR THE 1,000 MEMBERSHIP MARK

PHILADELPHIA, Nov. 16—Twenty-eight new members admitted at last week's meeting have brought the membership total of the Automobile Club of Philadelphia up to 980, and a determined effort is being made to reach the thousand mark before tbe December meeting. When that "dead line" is attained the limit allowed by the by-laws will have been reached, and a waiting list be in order.

A recent and highly commendable convenience inaugurated by the club management is the keeping of an up-to-date "chauffeurs' list," on which will be recorded the names of all qualified experts who desire to file their names with the club and are willing to have their records verified. Quite a number of local wheel handlers have already put their names on the list, and the innovation promises to pan out successfully.

NORTH WILDWOOD'S CLUB GETS BACK TO TOWN

PHILADELPHIA, Nov. 16—The North Wildwood Automobile Club, which in the good old wintertime transfers its operations to the Quaker City, will open its social season next Monday night with a "gasoline night" in the Bohemia Hall of the Pen and Pencil Club, at 1026 Walnut Street. Despite the fact that no sanction for the affair has been granted by the A. A. A., the preliminary announcement predicts that in view of the fact that the speed limit has been done away with, many records will be broken. The club is composed largely of Philadelphia automobile tradesmen and news writers.

QUAKER CITY CLUB WILL BANQUET, JANUARY 6

PHILADELPHIA, Nov. 16—Tbe members of the Quaker City Motor Club are evidently in earnest to acquire a clubhouse of their own. Amendments to the by-laws have been introduced providing for an increase in dues, and options have been secured on several sites in the immediate vicinity of Broad and Walnut streets. The committee on annual banquet has selected the evening of Thursday, January 6, for that symposium, when it is expected that prominent local and State officials and well-known national automobile celebrities will be present.

SUNFLOWER STATERS ENJOY SOCIABILITY RUN

MARYSVILLE, KAN., Nov. 13—Despite threatening weather, forty-two of the fifty entries made their appearance for the "sociability run" of the local club, and were not disappointed. The route of the trip, eighty miles in length, lay through the southern half of Marshall county.

MAXWELL-BRISCOE INCREASES PRICES

The Maxwell-Briscoe Motor Company, of Tarrytown, N. Y., has increased the prices of its two small cars, the 12-horsepower and the 22-horsepower; instead of selling at $550 and $850, as heretofore, the prices will now be $600 and $900, respectively. The price of the 30-horsepower model remains the same, $1,500.

The reason for this advance, as stated by the Maxwell company, is the constant increase in the price of raw material. Crude rubber has advanced to such a degree that a set of tires costs to-day from $30 to $60 more than a few years ago. The manufacturer feels this advance even more keenly than the user, because all special prices to manufacturers on quantity orders have been withdrawn or greatly curtailed.

In connection with the advance, the Maxwell company says that among large automobile manufacturers the profit per machine is probably lower than that obtained in making any other class of machinery. For example, in the stationary engine business a 10-horsepower engine selling at $450 gives the manufacturer $100 profit; whereas it is affirmed that the small Maxwell runabout, at the new price of $600, yields but $73 profit.

ANNUAL MEETING OF THE A. S. M. E.

The thirtieth annual meeting of the society will be held in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, December 7 to 10. The social entertainment will be in charge of the members resident in and about New York City, under the immediate direction of a committee of which William D. Hoxie is chairman.

For the afternoon of Wednesday, December 8, an excursion is planned which members and guests will be asked to attend in a body. During the rest of the period there will be opportunities for smaller bodies to visit places of interest. In the evening of the 8th there will be a lecture on agricultural machinery.

The professional papers assigned for the meeting are as follows: "Tests on a Venturi Meter for Boiler Feed," Chas. M. Allen; "The Pitot Tube as a Steam Meter," Geo. F. Gebhardt; "An Electric Gas Meter," C. C. Thomas; "Testing Suction-Gas Producers with a Koerting Ejector," C. M. Garland and A. P. Kratz; "Bituminous Gas Producers," J. R. Bibbins; "Lineshaft Efficiency, Mechanical and Economic," Henry Hess; "Pump Valves and Valve Areas," and a "Report on Cast-Iron Test Bars," A. F. Nagle.

BOOKS FOR THE AUTOMOBILIST

"Automobile Troubles, and How to Remedy Them," by Charles P. Root, is a book for the new driver, repair shark and owners desiring to know what to do in emergencies other than hiring a horse to pull the car home. It is of pocket size, bound in flexible leather covers and consists of two parts. The first, 166 pages in extent, is devoted to troubles and their remedies, starting with a tabular compilation of the more common troubles, which should be very handy. Following that, the rest of the 220 pages is devoted to overhauling the car, such as would be done on putting it away for the winter and general repairs. Not all of the matter is new, but all of it is good. The illustrations are good and illustrate clearly the desired points, but the small number of them used leaves much to be desired in this line. The beginning of the book has the trouble heads arranged alphabetically, but, unfortunately, this arrangement is not carried out through the whole work. It is published by the Charles C. Thompson Company, Chicago.

"The Conquest of the Air"—A. Lawrence Rotch, professor of meteorology at Harvard University, and director of the Blue Hill Meteorological Observatory, writes of aerial navigation from a new point of view. He looks on the air as an ocean of vapor, and similar to the aqueous ocean in its disturbance by tides and currents. The study of these tides and currents has been Professor Rotch's life work, and his knowledge of them has found universal recognition. Such knowledge is invaluable in the direction of free balloons, and of no mean importance to the operators of dirigibles and aeroplanes. The currents of the air move so rapidly in proportion to the speed of the craft which must contend with them that the location of a favorable current is always of great advantage. Until the science of aerodynamics has made far greater progress than the most enthusiastic has yet dared to predict, Professor Rotch's first chapter on "The Ocean of Air" must remain an invaluable guide to aeronauts.

The four remaining chapters of the work, which is modest in size, treat respectively of "The History of Aerostation," "The Dirigible Balloon," "The Flying Machine" and "The Future of Aerial Navigation." They are of particular value as a historical view of the work in this field; no attempt is made to enter into the technical side of aerodynamics. The volume is published by Moffat, Yard & Company, as one of its series of "Present-Day Primers."

THE AUTOMOBILE CALENDAR

AMERICAN

Shows, Meetings, Etc.

Dec. 25-Jan. 1....Columbus, O., Automobile Show, Columbus Automobile Club.

Dec. 31-Jan. 7....New York City, Grand Central Palace. Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Jan. 17-22........Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows Building.

Jan. 24-29........Detroit, Wayne Hotel Gardens, Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19........Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dai H. Lewis, Manager, 760 Main Street.

Feb. 19-26........Newark, N. J., Essex Troop Armory, Automobile Show. New Jersey Exhibition Company.

Feb. 24-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 22-27........Milwaukee, Wis., Auditorium, Second Annual Automobile Show, Milwaukee Automobile Club.

Feb. 22-26........Kansas City, Mo., Convention Hall, Fourth Annual Automobile Show.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

March 19-26......Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show. D. H. Lewis, Manager.

FOREIGN

Nov. 12-20........London, Olympia, Eighth Annual International Automobile Show, Society of Motor Manufacturers and Traders.

AMERICAN

Races, Hill Climbs, Etc.

Nov. 19-25........Redlands, Cal., Hill Climb, Mile High Hill Climb Association.

Nov. 20-21........New Orleans. Annual Fall Meet, New Orleans Automobile Club. Homer C. George, Secretary.

Dec. 22-39........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

Feb. 4-6..........New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.

INDIANAPOLIS IS A BUSY AUTO-MAKING TOWN

INDIANAPOLIS, Nov. 10—Wheeler & Schebler, makers of the Schebler carbureter, are now melting down about two car loads of ingot copper per month, not counting other ingredients as lead, tin and spelter, in the production of carbureters, and not a few shipments are being made in carload lots (approximating 5,000) to individual companies. The plant is in full swing, and ground will soon be broken for a new addition, which will add 59,750 square feet of floor space, of which 8,000 square feet will be in the new foundry. The power plant, using gas engines and producer gas, will have a 250-horsepower engine in the new acquisition.

The Diamond Chain Company, besides the regular line of sprocket chains as used in automobile work, is handling a wide line of chains, and, contrary to the usual expectation, chain work is increasing with such rapid strides that the company is hard pressed in the matter of handling all the trade it is offered. New additions of machinery are being made as rapidly as possible, and many improvements are being added. A new garage has been built for the officers of the company, and the electrical equipment of the plant includes a complete charging equipment of the latest and best design to handle electric vehicles.

D. M. Parry, of the Parry Auto Company, is banking on the permanence of the automobile, and among other interests is making every preparation to manufacture cars on a large basis. The Parry cars, of which there are two models (roadster and touring car), are being pushed out with the idea that the serial number 5,000 will show up on the production dial before the end of the 1909-'10 period. Besides the large plant now available, the company is adding much more floor space by way of new buildings.

Nordyke & Marmon, in their well equipped plant, are making their own cylinders, aluminum castings, brass, bronze and in fine everything of moment. The new models are well in hand; cars are being put out at a rapid rate, and the quality of the work being done is up to the well-known standard of the company. The engineering office is practically through with 1910 designing, and the able "staff" is now in a position to carefully check up on every detail of the work as it comes through.

Charles Blizzard, general manager, and Bruce Ford, engineer, of the Electric Storage Battery Company, Philadelphia, reached Indianapolis, having done Chicago, a few days ago. It is the settled policy of the company to look well after the users of Exide batteries, and the management seems to understand the value of personal calls on the trade.

F. W. Spracke Machine Company, parts maker, is doing a vast amount of work for automobile makers throughout the country, and when the representative of THE AUTOMOBILE called he was entertained in a most interesting way, having had the pleasure of seeing more kinds of grinders doing accurate work than is usually found under one roof. F. W. Spracke, himself a tool designer of wide reputation, recently perfected a grinder which will grind (all over) such irregular shapes as cams for integral camshafts, thus saving much time and doing the work far more accurately than seems to be possible in any other way.

George Schebler, of Wheeler & Schebler, recently completed a twelve-cylinder motor, and having placed it in a chassis of suitable design, started on a jaunt overland. The motor, which is of the water-cooled V type, performs extremely well, and the compactness of the power plant is one of the wonders of Indianapolis.

The Indianapolis Speedway is now being brick-paved, and the entire undertaking will be completed in about three weeks. The banking is scientifically done and the tangents are as level as any road can be. The representative of the AUTOMOBILE was unable to discover a spot over the surface that falls outside of the specifications of 3-8-inch depression in twelve feet. The paving brick used are of a superior grade, and the grouting is done with the utmost care. A 15-foot sweep to the sides of the paved way is being prepared so that if a car does run wild it will have ample room to play in.

TWELVE AUTO MAKERS IN INDIANAPOLIS

INDIANAPOLIS, IND., Nov. 15—Apparently the only limit to building automobiles in this city next season will be the ability to get sufficient parts. Present estimates base next year's production of local factories at 25,000 cars.

Another new company has just been added to the list, making twelve concerns in the city now making automobiles. The new company is the Star Motor Car Company, which has an authorized capitalization of $100,000, of which $75,000 is paid in. A plant will be built at once and a line of runabouts and touring cars to sell at about $1,000 will be made, together with delivery wagons and trucks.

In addition to this, there will be three other practically new local companies in the field during the 1910 season. These are the Cole Motor Car Company, organized from the motor buggy business of the Cole Carriage Company; the Parry Automobile Company, which will build 5,000 cars, and the Empire Motor Car Company.

TIRETOWN NEWS TELLS OF BIG GOODYEAR CONTRACT

AKRON, O., Nov. 14—The Goodyear Tire & Rubber Company has applied to the city council for the vacation of a part of an East Akron street for the purpose, if the request is granted, of adding to its plant two factory buildings, five stories high, aggregating 500 feet in length and affording 150,000 square feet of floor space; the establishment of a reclaiming plant with a capacity of ten tons a day; and the employment of 600 to 800 additional men inside of 90 days. The closing of contracts by the company to furnish automobile tires for Buick, Cadillac, Welch, Oldsmobile, Oakland, Reliance, and Rapid, the concerns constituting the General Motors Company, has necessitated a large increase in the capacity of the plant, and the company is compelled to enlarge or go elsewhere.

Though a story has been current that the Goodyear Company was about to be absorbed by the General Motors Company, President F. A. Seiberling positively denies any such intention. It is well understood, however, that the offer to move the plant to Detroit traces back to the big contract for tires with the General Motors Company, but the Goodyear officers refuse to discuss this phase of the situation.

The Palmer-Hawkins Company of this city has equipped a motor truck with a set of its sectional tires 36" x 10", claimed to be the largest set of solid rubber tires ever manufactured or applied in the United States, if not in the world. The truck will be used in Florida, where the sandy roads render the use of ordinary tires impossible.

The Motz Clincher Tire & Rubber Company began an action in the Federal Court at Cleveland, November 13, against the Swinehart Clincher Tire & Rubber Company, alleging infringement of a patent covering its twin-tread and webbed-side tire, which it claims is also manufactured by the Swinehart Company. An injunction and damages are asked. A number of similar suits against the same company will follow, the Motz company says.

Chalmers-Detroit Ambulance for Nassau Hospital

This ambulance, which was built by Carl H. Page & Company, New York representatives of the Chalmers-Detroit Motor Company, for the Nassau Hospital, is reputed to be one of the finest specimens of its type in the metropolitan district. The body is mounted on a "Forty" chassis, and is fitted with every convenience for the patient that the medical fraternity could suggest.

FRENCH TYPE RUNABOUT FROM LONG ISLAND

Single-cylinder runabouts of the type familiarized by the French voiturette races are to be built in this country by a recently organized concern known as The Only Car Company, Inc., located at Port Jefferson, L. I. The company is capitalized at $300,000. At present work on sample cars is being pushed in temporary quarters, but a concrete building having 16,000 square feet of floor space has been planned and will be erected soon.

The single-cylinder motor is to be of the long-stroke type, resembling the Sizaire-Naudin, Lion-Peugeot and other French types. The racing cars of these companies develop 20 horsepower from a single-cylinder motor of 4 inches bore. The cars at present under construction are of the roadster type, and will be entered in races in the spring. They will sell at $700, with a guaranteed speed of 60 miles an hour. Long wheelbase, a large hood, straight-line shaft drive, imported ball bearings, and liberally designed steering knuckles and gear are some of the features mentioned.

The chief engineer of the company is François Richard, who will be remembered as the designer and builder for A. G. Vanderbilt of an eight-cylinder car which was intended to compete in one of the meets at Ormond Beach several years ago.

Plans for the future include the production, in addition to the roadster type, of a five-passenger model, together with taxicabs and light delivery wagons. The simplicity and economy of the modern single-cylinder engine should open a wide field for cars of this type, and although popular prejudice must be overcome, they should find extensive use.

1910 JACKSON "MUD HEN" ON ITS 1909 RUN

Starting November 16 from Jackson, Mich., with a letter from the mayor of that city to the mayor of Bangor, Me., E. P. Blake, of Boston, and Charles G. Percival, of New York, accompanied by a mechanic, will attempt to lower the 1,600-mile non-stop record which they made one year ago in the snow, rain and mud, thereby earning for themselves and the car the name of the Jackson "Mud Hen." This year's trip will be three weeks later in the season, and the "Mud Hen" expects to encounter even worse weather than a year ago, when the drive was day and night to Bangor without stopping the engine once. The only stops again this time will be for the purpose of taking on oil and gasoline, and for food. A relay of newspaper representatives will accompany the car for the purpose of checking, and the route will take in Detroit, Toledo, Cleveland, Buffalo, Rochester, Albany, Springfield, Boston, Portland and Bangor. The car, which is a 40-horsepower Jackson, has for its ignition a U. & H. magneto and is equipped with Goodyear tires.

WHAT IS GOING ON AT SOUTH BEND

South Bend, Ind., Nov. 15—The Studebaker Automobile Company, which has been doing quite a large business in electric vehicles, has decided that it will go into this branch of the work on a larger scale, and with that in mind has separated the electric from the other parts of the work and placed C. H. Tyler, formerly connected with the Chicago branch, in charge. The new idea is to take advantage of the experience gained, build cars in accordance with the dictates of this experience and place the whole matter on an independent footing, holding a department head responsible for the result. Mr. Tyler has taken hold of the work and is making every effort count in the production of electric vehicles. The headquarters of the company has been transfered from Cleveland, Ohio, to this city. Hayden Eames is in charge as general manager.

The addition which is being erected to the plant of the Simplex Motor Car Company, of Mishawaka, is nearing completion. The company is now turning out a car a day. The company has just finished three seven-passenger touring cars, which were shipped to Los Angeles.

Teagarden & Putt, of Goshen, have enlarged their salesroom and garage by the leasing of the first floor in the Kohler Block on North Main Street. They intend to add an electric charging plant and be able in a short time to do all kinds of repairing.

N. L. Otis, of this city, has just been appointed agent here for the Reo and the Rauch & Lang electric.

Charles G. Doriot, of Colombia City, has been appointed representative in that city for the Buick and Oakland, and expects to install a garage and salesroom in a short time.

The Oswald Motor Company, of Goshen, has increased its capital stock. The company recently took over the building which it now occupies, and is doing a thriving business.

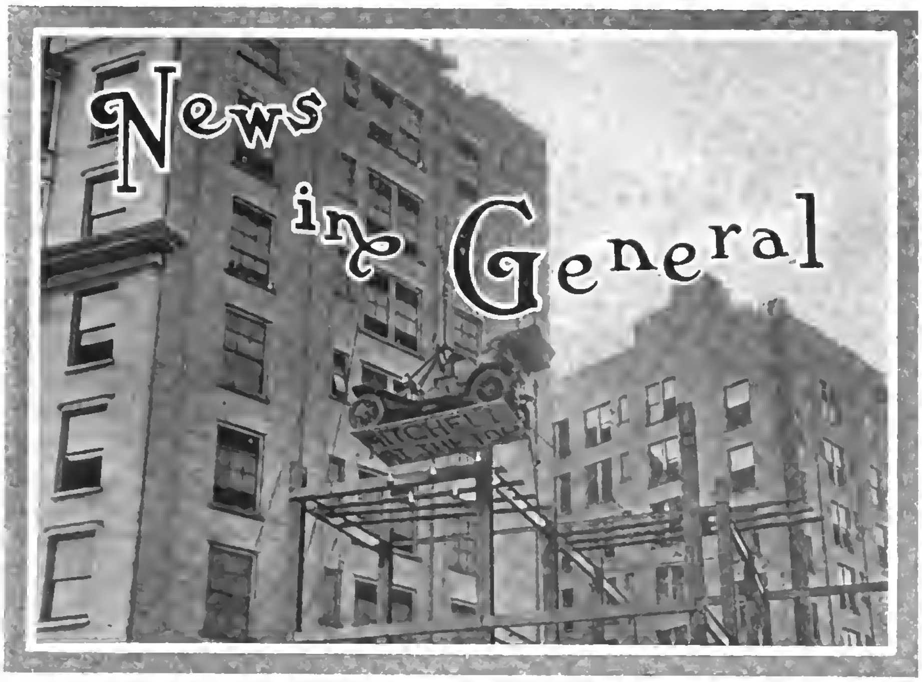
"CARBURETER" SCHEBLER'S 12-CYLINDER

Indianapolis, Ind., Nov. 15—After several months of experimenting, George Schebler, of the Wheeler-Schebler Company, has completed an automobile equipped with a twelve-cylinder motor. The cylinders are cast singly and are 3 1-2 by 4 inches. They are arranged at an angle of thirty degrees, six on a side. By an original coupling arrangement, six of the cylinders can be cut out or cut in without changing gears. The chassis is of the Marion type, with the exception of the motor.

Mr. Schebler has driven the car about 200 miles with satisfactory results. It is said to be especially powerful for hill climbing, but its speed has not been thoroughly tested. It is of about 75-horsepower. Mr. Schebler built the car merely to try out some ideas he has fostered for some time.

President Frank Briscoe in His Latest Brush Runabout

The well-known president of the Brush Runabout Company, of Detroit, is an expert at the wheel, and the photograph shows him trying out one of the little roadsters the company is producing for the 1910 market.



Mitchell, Official Pacemaker, Climbs an Atlanta Sky Scraper

Arriving in Atlanta ahead of the reliability run that blazed the national highway from New York City to the Gate City of the South, the Mitchell pacemaker, at the instance of its enterprising Southern representative, Robert C. Howard, was raised to the top of a building undergoing construction, and swung over Peachtree street, where during the Atlanta automobile show it was illuminated at night by a cluster of electric lights. The novel exhibit attracted the attention of thousands.

Lloyds Wouldn't Insure Pierce—It is the general impression that the organization of insurance men who are known both in New York and London as Lloyds will issue insurance of any kind. The New York Lloyds has been known to insure promoters against loss by rain on days set for outdoor contests, and everyone knows of the election insurances which they frequently make. The Pierce-Arrow Company now says that before the Glidden Tour this year it wrote to both the New York and London Lloyds asking if they would insure the Pierce-Arrows against losing the trophy. Two policies were proposed, one covering the winning of the trophies by Pierce-Arrow cars and the other that at least one of the four cars of that make entered would get a perfect score. Both the New York and London Lloyds decided it was a matter they did not care to handle.

Big Rapid Factory Additions—These are strenuous days around the big plant of the Rapid Motor Vehicle Company, at Pontiac, Mich. Large additions are in progress of erection, and an army of workmen are working day and night. The new buildings under construction are all of the Kahn system of reinforced concrete and will be modern in equipment in every detail. The additions to the plant consist of one building 640x60 feet, three stories high; two buildings 300x100 feet, each three stories high, and a power house 119x120 feet. With the completion of these new structures the factories of the Rapid will cover an area of 16 acres.

Liggett Buys Hatcher Company—The factory and plant of the Hatcher Auto-Parts Company, of Cleveland, has been purchased by the Liggett Spring & Axle Company, of Pittsburg. The specialties which have been manufactured by the Hatcher people will be continued at the Cleveland plant, and Wm. A. Cluff, who has been manager of the Hatcher works for the past five years, will remain in charge. In addition the Liggett Company will continue to turn out from its works at Monongahela, Pa., all types of high-grade automobile springs and axles. The company is also making roller bearings of an improved type.

Supplementary Spring Suit—The St. Louis Supplementary Spiral Spring Company, of St. Louis, has filed suit in the New York Circuit Court against the Supplementary Spiral Spring Company, 1876 Broadway, New York, for infringement of the Furmidge patent, No. 807,612, which the St. Louis company holds. The St. Louis company quotes in its favor the judgment rendered by the Patent Office October 30, 1909, on the interference between the application dated December 19, 1907, of J. H. Graham of the New York company, and the Furmidge patent.

New Power House for Kissel—The Kissel Motor Car Company, of Hartford, Wis., will on December 1 occupy its new power house, built to replace the structure destroyed by fire early in September. The equipment includes a 400-500-horsepower tandem compound condenser engine, with one 160-kw. and one 165-kw. direct-current generator. All machines and tools will be operated by individual motors. The power house is 44 x 30 feet in size and of reinforced concrete and brick construction.

Mutual Benefit Prospering—The Mutual Benefit Association of the Pope Mfg. Co., Hartford, Conn., recently elected W. J. Murray president, R. B. Wright vice-president, A. G. Hedstrom secretary and H. S. Seymour treasurer. R. B. Wright, J. H. Cudworth and P. Foley were elected auditors. Reports showed that the association has a membership in excess of three hundred and a balance of $1,594.75 in the treasury. During the past year the association paid out $769 in sick benefits to members.

What Would Have Happened if the motor of Count de Lambert's aeroplane had stopped when he made his remarkable flight from Juvisy to Paris and around the Eiffel Tower? Answer: He would have glided to the ground with perfect ease. Lavalette & Company asks the question, but seems to have overlooked the answer. That oversight, however, does not lessen the importance of the reliable ignition furnished Count de Lambert on his flight by the Eisemann magneto.

Rambler Output Is Conservative—In giving an estimate of their probable output for 1910, Thomas B. Jeffery & Company, Kenosha, Wis., makers of the Rambler, announce that they will build only 2,500 cars, a figure likely to cause some astonishment to those who are aware of the immensity of the Jeffery plant. The conservatism of the company's plans as far as quantity is concerned is officially stated, however, and the above number will represent the actual output.

Franklin Lumber Yards—To assure a supply of properly seasoned wood for the manufacture of the laminated wood chassis frames of the Franklin cars, the H. H. Franklin Mfg. Co. keeps in stock about 150 miles of lumber, some of which is kept as long as two years. A recent inventory showed 701,626 feet, sufficient for two years' consumption. The wood used is white ash, which comes from several districts in New York State and Pennsylvania.

Japanese Buys Baker Electric—During the recent visit of the Japanese Industrial Commission to Cleveland, the Hon. Sakutaro Satake, M. P., president of the Tokio Electric Light Company, inspected the plant of the Baker Motor Vehicle Company and finally placed an order for a Baker victoria for his personal use in Tokio. The car will be taken to Japan on the "Chiyo Maru," on which the commissioners will sail.

Some of Grabowsky's Orders—About a year ago the Acme White Lead and Color Works, of Detroit, Mich., purchased a Grabowsky truck, which was found so satisfactory that it recently ordered another. The Stroh Brewery Company, of the same city, after using a Grabowsky for a few months, also obtained such good results that it purchased another.

Learning to Fly Aeroplanes—The Curtiss aeroplane belonging to A. P. Warner, of the Warner Instrument Company, has been at Beloit several days for practice flights. This is the machine that was on exhibition at Madison Square Garden, New York City, and at St. Louis recently. Mr. Warner has made several short flights and has attained a height of about 50 feet.

IN AND ABOUT THE AGENCIES

Palmer-Singer Agencies—Fred J. Titus, assistant sales manager of the Palmer & Singer Mfg. Co., is touring New England and New York in a 1910 Palmer-Singer 6-60, laying out agencies en route. The following have been established: The Holcomb Company, New Haven, Conn.; Mr. Livingston, of Hotchkiss & Livingston, Waterbury, Conn.; Andrews & Coleman, Providence, R. I., and Herbert Dike, Boston. Before starting a contract was made with Terry Brothers, of Glenridge, N. J., who will open a salesroom in Newark. Mr. Titus is on his way to Buffalo, N. Y., and will return by way of Binghamton.

American Truck and Hart-Kraft, Birmingham, Ala.—The Commercial Motor Truck Company, 738 Brown-Marx Building, has taken the agencies for the American truck and the Hart-Kraft delivery wagons for this district, handling commercial cars exclusively.

Oldsmobile and Oakland, Houston, Tex.—On November 1 the Houston Motor Car Company took over the representation for the Oldsmobile and Oakland. The Olds-Oakland Company will devote itself to the wholesale end of the business.

Great Western, Detroit—The Great Western Automobile Company, of Peru, Ind., opened a sales agency November 15 at 878 Woodward avenue, Detroit, under the name of the Great Western Automobile Company of Detroit.

Thomas, Lynn, Mass.—The E. R. Thomas Motor-Branch Company, of Boston, which distributes Thomas cars in New England, has contracted with C. E. Whitten to handle the cars in Lynn.

Parry, St. Louis—The Petrie-Phillips Automobile Company, which has been appointed local agent for the Parry Automobile Company, of Indianaoplis, has opened a salesroom at 1127 Olive street.

Overland, Brooklyn, N. Y.—C. I. Silver has been appointed agent for the Overland and until his new building is completed will be at 71 Flatbush avenue.

Continental Tires, Portland, Ore.—The Continental Caoutchouc Company announces that it has appointed the Goodyear Rubber Company agent for Continental tires and rims in that district.

Palmer-Singer, Newark, N. J.—R. M. Terry, Palmer-Singer agent in Newark, has taken a long lease on 38 William street, at the corner of Halsey, where he is occupying a large fireproof building.

Overland, Atlanta, Ga.—The Overland Southern Automobile Company has moved into its new quarters in the Peachtree Auditorium Garage, where it has accommodations for 150 cars.

Apperson, Atlanta, Ga.—Alfred Austell has been appointed Apperson agent in this city and will open a garage and salesroom on Auburn avenue shortly.

Ford, Portland, Ore.—The Standard Motor Car Company, of 86 Tenth street, has been organized here to look after the interests of the Ford car.

Isotta, Los Angeles, Cal.—The Motor Car Import Company has been organized to take the Southern California agency for the Isotta cars.

PERSONAL TRADE MENTION

John Gillespie, who has just been elected secretary of the Detroit Motor Club, will be remembered by participants in the Glidden Tour last summer as the secretary of the Detroit Automobile Dealers' Association. He was largely responsible for the excellent arrangements provided in Detroit for the reception of the visitors and the successful start of the tour.

Will Soules, the well-known driver, who formerly piloted Pope-Toledo racers, is now in charge of the testing department of the Croxton-Keeton Motor Company, at Massillon, O.

Charles Waterman, formerly with the Maxwell-Briscoe Company at New Castle, Ind., has been appointed superintendent of the Southern Motor Works, at Jackson, Tenn.

FRAYER-MILLER DEVELOPMENTS

Columbus, O., Nov. 13—Columbus stockholders in the Oscar Lear Automobile Company, of Springfield, O., have received word that E. S. Kelly, of Springfield, has purchased a controlling interest in the concern and will reorganize it with a capital of $500,000. Recently the General Motors Company bought the holdings of William Miller, of Columbus. Mr. Kelly purchased this block and also that of Oscar Lear, giving him control. Charles L. Bauer, at present receiver of the company, will be made general manager after the reorganization. The company now manufactures commercial vehicles exclusively.

OBITUARY

George William Hoffman, the well-known manufacturer of U. S. Metal Polish and other specialties, died at his home in Indianapolis on Friday, October 22, after a brief illness. The business will henceforth be managed by his widow, Mrs. Hoffman, without change in policy.

RECENT TRADE PUBLICATIONS

The Metz Company, Waltham, Mass.—This company has adopted the policy of selling all the necessary component parts of an automobile, with full instructions, thereby allowing the buyer to save the expense of having them assembled at the factory. Also the buyer acquires a knowledge of his car, by assembling it himself, that is likely to prove of material aid to him. The Metz catalog consists of eleven loose sheets in an artistic cover, describing the car and explaining the Metz idea of construction. Men of any mechanical talent will find much in it to interest them, and even those of no pretensions in this line may take heart on the reading of it.

The Electric Storage Battery Company, Philadelphia—This pamphlet hardly comes under the head of a catalog, as it makes no claims for the "Exide" batteries manufactured by the company which brings it out. Rather it should rate as a book of instruction on the care of storage batteries of whatever kind. The text is from a paper read by H. M. Beck, an engineer of the Electric Storage Battery Company, at the meeting of the Society of Automobile Engineers, August, 1909. The principles of the chemical and electrical action in a storage battery, and the use, care and troubles of such batteries are concisely set forth in the compass of seven closely printed pages.

DeHymel, in Stoddard-Dayton, Winning Five-Mile Texas State Championship

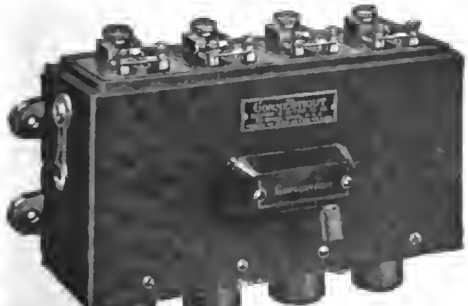
At the recent Texas State Fair, at Dallas, the Stoddard-Dayton, entered by the Alamo Auto Company, of that city, and driven by DeHymel, scored a notable victory in the five-mile State championship, beating out two noted competitors. The car also established a new State record for the track mile of :51 3-5.

Information for Auto Users

New Connecticut Coils—The Connecticut Telephone & Electric Company, of Meriden, Conn., has brought out for 1910 an entirely new model of spark coil with master vibrator, a departure from its previous practice. With the ordinary type of coil, each unit of which has its own vibrator, it is necessary to adjust

CONNECTICUT MASTER VIBRATOR COIL

each separately—an operation which takes no mean degree of skill, if creditable results are to be obtained. Take for example a four-cylinder engine with this type of coil. The vibrator of No. 1 cylinder may be adjusted to draw one-half ampere, firing that cylinder exactly on dead center; No. 2 coil may be taking one ampere, with the result that its cylinder is firing two or three degrees past center; No. 3 may be taking two or three amperes, and firing five or ten degrees beyond the center; No. 4 may be taking one-quarter ampere, and firing before center. Naturally the performance of the engine is poor.



CONNECTICUT SPARK COIL, TYPE X

This state of affairs is impossible in the master-vibrator type, as the single vibrator acts for all the coils. Each coil unit must draw exactly the same amount of current, and fire its cylinder at exactly the same point. It is said that the difference in the running of the engine can often be detected by the ear.

The Connecticut master-vibrator coil is made on the unit-coil principle, licensed by the Unit Coil Company, and each coil has a cut-out button for testing purposes. Each unit also has a patented shield which prevents induction between coils.

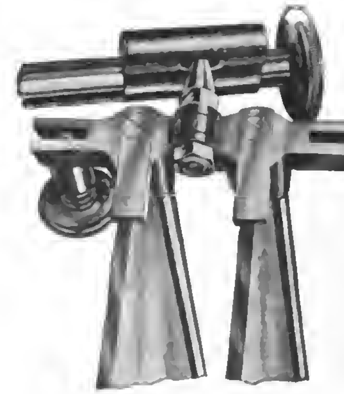
Another new Connecticut model is the "Type X," of the ordinary design, intended to fill the demand for a less expensive coil than the regular Connecticut makes. It is considerably smaller than the standard coil, though built on the unit system, and sells at a very reasonable price.

1910 Banker Wind Shields—Four different styles of shields will be made by the Banker Wind Shield Company, of Pittsburg, during the coming season, and these will present no radical changes. They will be known as types 1, 2, 4 and 5. Type 1 is a single glass, fitted into a 3-8-inch channel in a 7-8-inch 16-gauge brass tube frame. No. 2 is of the divided

BANKER DOUBLE-FOLD SHIELD, NO. 2

folding variety. The proportions are such that when the upper half is folded down the entire shield is below the driver's line of vision. When not in use the entire shield folds down forward over the hood.

No. 4 is made in response to the demand for a low-priced shield. Workmanship and material are of the same grade as in the others, but the construction is simplified by attaching the lower



HINGE USED ON 1910 BANKER WIND SHIELDS

half rigidly to the dash, only the upper half being hinged. By doing away with the side arms and brackets and the telescoping rods the price is reduced.

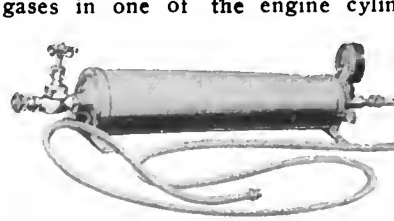
No. 5 shield is made expressly for racing-type runabouts, in which the front seat is set further back from the dash than usual. In such cases the ordinary design of shield is often practically useless. No. 5 has its lower half attached to the dash at an angle of 60 degrees, bringing the upper half back into a useful position.

"All-in-One" Spark Plug—This plug has all the features of the usual plug, with the addition of a compression-relief and priming cup. With the approach of cold weather the latter becomes especially valuable, for many engines which start with difficulty in cold weather may be aroused by pouring a few drops of gasoline directly into the cylinder. The "All-in-One" spark plug provides the priming cup, when one is not regularly fitted to each cylinder; and the cup in connection with the spark plug has the additional merit that the gasoline is introduced into the most favorable place, and nearest to the spark. The maker, the Comet Electrical Mfg. Co., claims that by first priming the cylinders, any engine will start on a single turn of the crank in almost arctic temperatures.

"ALL-IN-ONE" SPARK PLUG

The combination of spark plug and compression-relief provides an easy method of cleaning the plug without removing it. The relief opening communicates with the space around the insulation of the plug, so that if the cocks are opened while the engine is running all soot and dirt is blown off the plug. These plugs are sold only by mail.

H. & C. Tire Inflator—"Let the engine do the work," says the H. & C. Tire Inflator Company, of Dayton, O. The device made by this company is intended to provide a simple means whereby tires may be inflated by utilizing the burnt gases in one of the engine cylinders.



H. & C. TIRE INFLATOR

These gases, for the most part carbon dioxide and nitrogen, are not injurious to rubber. The device consists mainly of a suitable filter, which cools off the gas and prevents oil and other unsuitable substances from entering the tire. As the gases are delivered cool, the tire need only be inflated by the desired pressure, as shown by the indicator, there being no cooling off and consequent reduction of pressure after completion.

The filter has a body formed from a piece of brass tubing 2⅝ by 10½ inches, with brass cap ends; it carries the pressure gauge and shut-off valve. A check valve, to be screwed into one cylinder in place of the compression cock, is connected to this filter by copper tubing.

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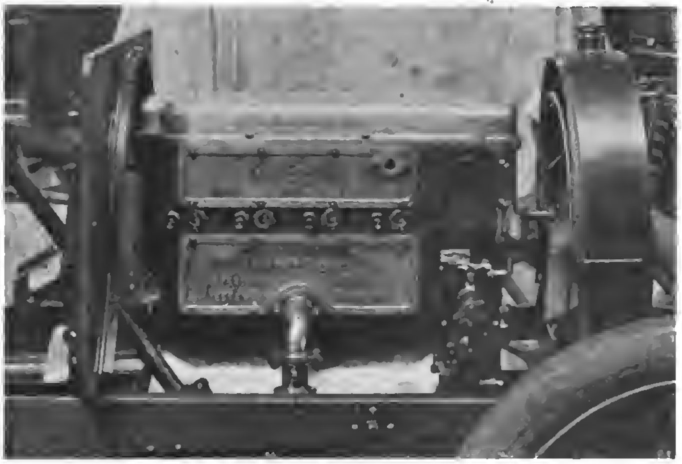
THE AUTOMOBILE

LONDON HOLDS EUROPE'S AUTO SHOW

By Basil Weston

LONDON, Nov. 15—All roads now lead to Olympia—as far as European automobilists are concerned—for this mammoth building opened its doors Saturday to disclose the only big automobile exhibition which is to be held in Europe this Winter. And a tour of inspection shows that the display at Olympia does ample justice to the occasion, for, both as regards extent and variety, the exhibits surpass anything that has been witnessed on this side before. Certainly the artistic surroundings of the Paris Salon are conspicuous by their absence, but, then, the British buyer pays but little attention to mere meretricious display, and prefers to concentrate his thoughts on the exhibits themselves, so that the businesslike appearance of the interior of the building is easily and satisfactorily explained.

So great was the demand for space, when it became definitely known that there would be no shows in Paris and Berlin, that the promoters—the Society of Motor Manufacturers and Traders—caused extensive alterations to be made, so that the added space has enabled a total of over 300 firms to find room for their stands. Even this was not sufficient, for over twenty car manu-



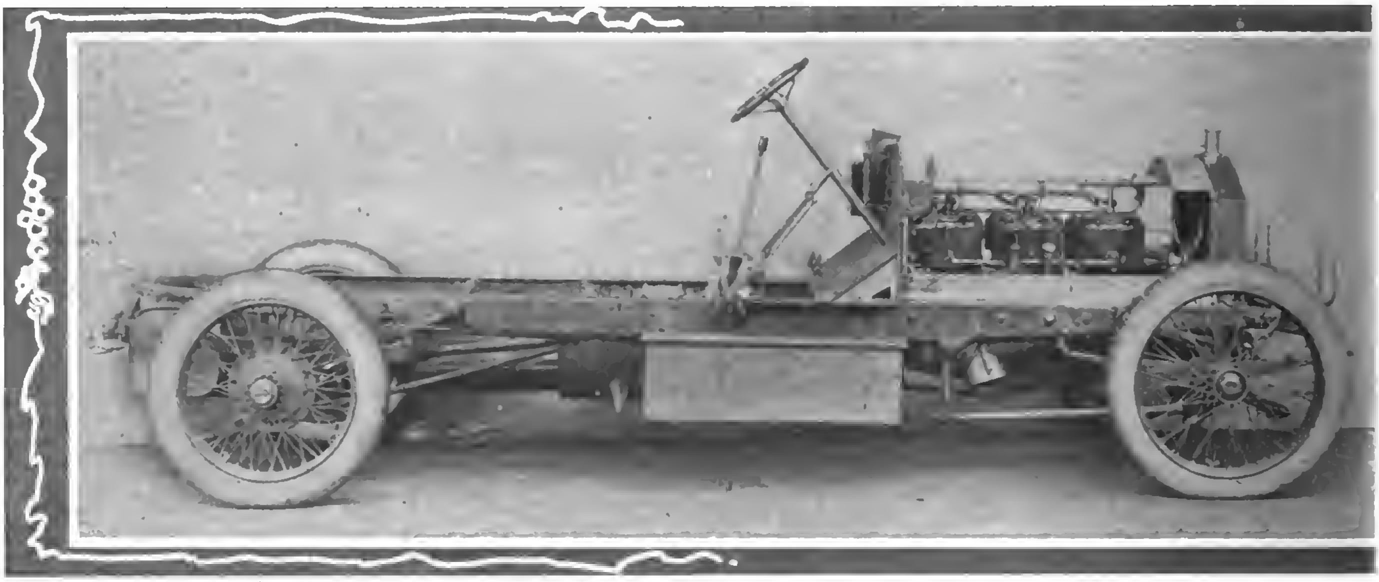
Bentall & Company's New Silent Piston Valve Engine

facturing firms have been unable to secure space. Among these unfortunates must be numbered the agents of the Mercedes, who, owing to reconstruction of their company, were not in a position to put in an application till too late. Other than Mercedes no firm of any standing is unrepresented, and hence it may be rightly stated that a more complete exhibition than Olympia would be quite an impossibility.

Opening Marked by Readiness of Exhibitors—A sign which augured well for the success of the show was the fact that at 10 o'clock Saturday morning, when the doors were opened without any official ceremony, every car was staged in position so that the salesmen and attendants were not unprepared when the flood of visitors poured in. Such a crowd on the opening day has not been recorded at any previous exhibition, and from the number of orders and promising inquiries that have already been in evidence, all the leading exhibitors are beginning to conjure up visions of a thoroughly good year's business. A remarkable feature, too, is the number of foreigners that are at the show. French, German, Belgian and Italian motorists are everywhere to be seen, volubly discussing the various features of note, and obviously impressed with the extent and quality of the British exhibits.

There is a curious absence of what might be called artificial attractions—such as racing cars or vehicles of historical interest—artificial because such productions bear little, if any, relation to the ordinary productions of the exhibiting firms and are obviously staged merely to attract the crowd. Not a racing car is to be found, while of the second category mentioned above, the sole example is the Arrol-Johnston car which accompanied Lieutenant—now Sir—Ernest Shackleton on his recent South Polar expedition. Instead, all the cars are honest examples of the firms' productions and are staged as such.

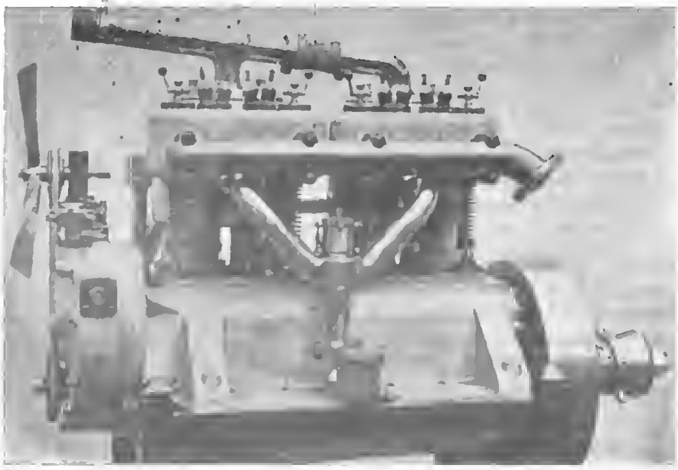
A detailed inspection of the cars reveals many tendencies of design—many features of interest—which previously may have been used on one or two cars, but which are now becoming general practice. It may be of interest to have these features noted down before the individual cars are dealt with.



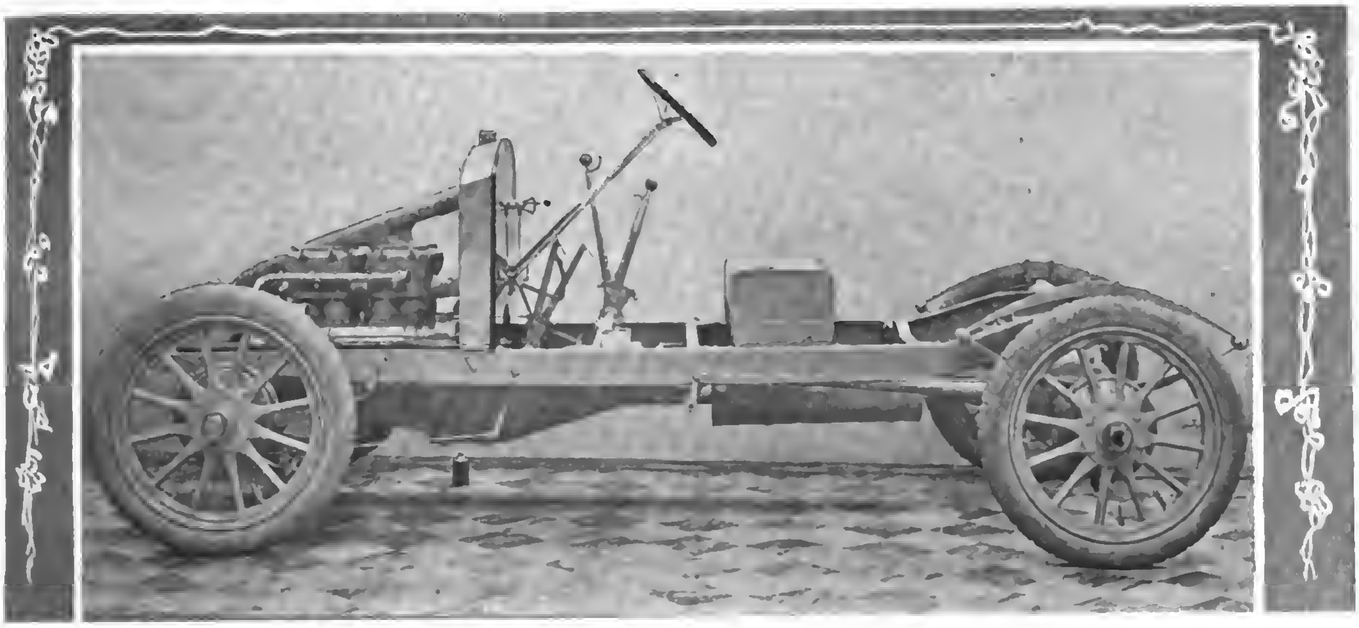
45-Horsepower Napier Exhibited at Olympia Show—Note Governor Opposite Cylinder No. 4, and Rear Spring Attachment

Lower Powers Now the Thing—In the first place there is a marked decrease in the average power of the cars. The high efficiency of the present-day engine and transmission enables the car of medium power to set up standards of performance which, a few years ago, could not have been surpassed by the biggest touring car made.

Both this fact, and also the general increase in taxation, in this country and in France and Germany, have made manufacturers turn their attention to the small car as something for which there is a growing demand from all classes, and the result is the 15-horsepower model which is to be found everywhere—Napier, Daimler, Fiat Itala, Austin (Mercedes also, though not exhibited), and a host of others. There are the other cars, of course, of lower and higher powers, but this 15-horsepower model is evidently considered to be a type for which there will be a very large sale. The average 15-horsepower engine has a bore and stroke of 80 x 120 mm, though the stroke might even average more than this amount. The cylinder dimensions constitute the only point of agreement, for the methods of construction differ in every imaginable way. The cylinders are cast in

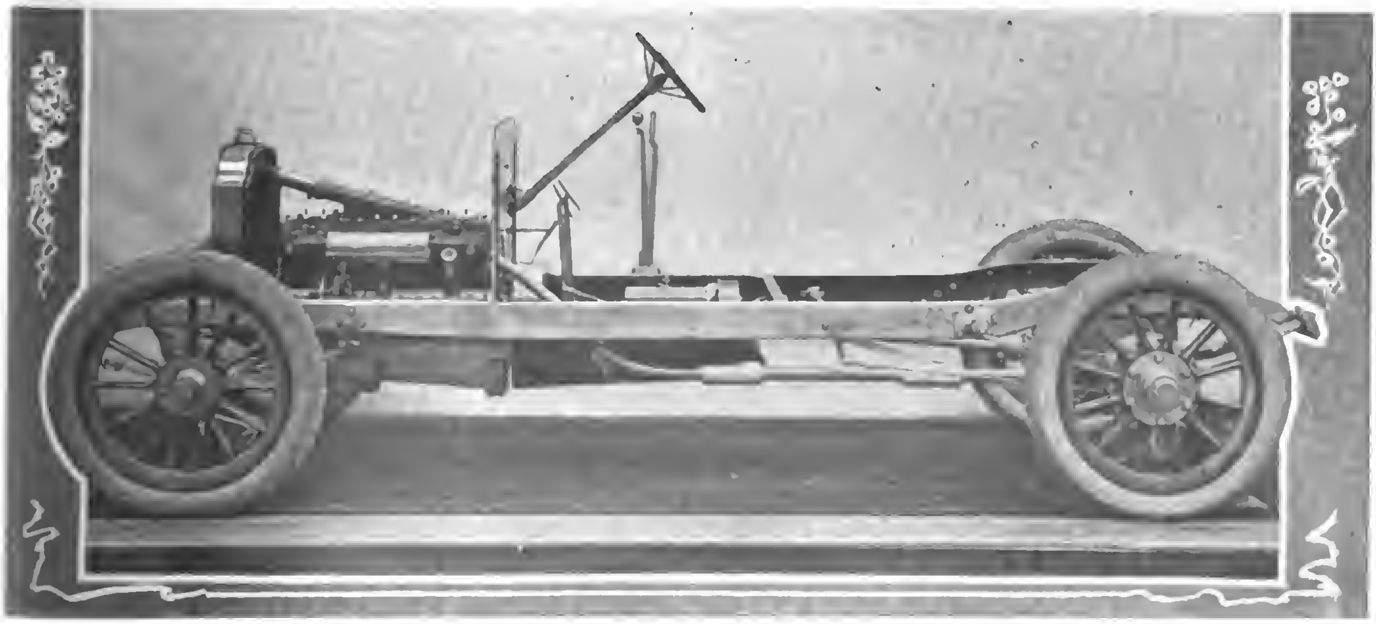


Engine of an Argyll, Showing Many New Features



Chassis of 15-Horsepower Arrol-Johnston with Radiator Located on Dashboard, a la Renault

40-50-Horsepower Wolseley with 6 Cylinders Cast in a Block and Applied Sheet Metal Jackets



27-Horsepower 6-Cylinder Vauxhall Has Unusually Large Rear Brake Drums

Bayard-Clement Light-Car Left-Hand Control

Pedals on Left, Gear Box, and Direct Control

Bayard-Clement 4-Cylinder Monobloc Engine

singles, pairs and fours, with perhaps a balance in favor of this last type.

Some of the castings, which frequently include the top half of the crankcase, are truly wonderful examples of the molder's art. The inlet and exhaust passages (the latter being equipped with radiating fins) are included in the castings, and the resultant simplicity is such that, until a close inspection has been made, one inclines to the belief that some parts have been intentionally omitted.

Many Unit Power Plants Seen—This construction makes a very neat engine, and the pleasing effect is increased when, as is the case with half a dozen cars of this type, the crankcase is connected by side arms to the gearbox casting, so that the engine and gearbox are combined to form a single unit. The Star, Imperia and Napier 15-horsepower cars are built on this plan, while the last named has its flywheel at the front of the engine, with the result that the connecting arms need not be cranked outward.

The rate of increase in the number of six-cylinder cars has not been maintained, and it would be difficult to mention any new firm which has taken up this type. Many of the leading makers show a high-powered car with six-cylinder engine, as usual, while the only concern which confines its attention solely to this type is Rolls-Royce, whose 40-50-horsepower car, of long-distance trial fame, is staged almost without alteration. Six-cylinder engines are usually found with cylinders in pairs, though Rolls-Royce and Delaunay-Belleville have two sets of three cylinders and the Wolseley has a single casting for the six cylinders. In the case of this last, the water jacket is made of sheet steel screwed to the casting in the same way as employed on this firm's successful aero engines. The new eight-cylinder 35-horsepower De Dion is staged, but this is, of course, alone in its class.

More Bearings on Crankshafts—Regarding the further engine features (dealing with all types) there is a tendency to provide the crankshaft with the full number of bearings whenever possible—five bearings in the case of the four-cylinder engine, instead of the three frequently used in previous years. Ball bearings have disappeared from the crankshaft except in the case of the smallest fours, which in this case have but two bearings for the four-throw crankshaft. Both these changes are doubtless caused by the fact that the present-day engine parts have to withstand much more shock and hard work than ever before on account of the lighter construction and the higher compression employed—85 to 90 pounds being the pressure for some of the medium-sized engines.

When the subject of valves is mentioned, sufficient matter is at hand to fill pages. The success of the Knight sliding-sleeve engine (which is only shown on the Daimler and Minerva stands, for the Panhard company have not yet completed their first cars with this engine) has turned the efforts of all designers in this direction, and it is an open secret that the majority of the well-known firms have been experimenting with sliding valves during the past year. Apparently their efforts have not been rewarded with success, for but two new engines have appeared—the Hewitt and the Benthall—both with piston valves working in cylinders communicating with the main combustion chamber. These engines will be described later. There are several examples of two-cycle engines, but this type does not yet become popular, though it is by no means unlikely that the next show will reveal a big advance in this construction.

Larger Valve Sizes Noticeable—The poppet valves of the usual type have been considerably increased in size so that in many cases the valves have now to be placed on opposite sides of the cylinder. The provision of a cover plate in front of the valve stems finds much favor.

Accessibility is a matter which has clearly been kept prominently in the mind of the designer—not only with regard to the engine, but also the other parts of the car. Quite the standard practice now is to fit a cross-shaft at the front of the engine, driving the pump at the one end and the magneto at the other. Usually this shaft is operated by spiral gears so that the noise set up by the latter after continued use may be obviated. Both pumps and magneto are easily detachable.

Lubrication is a matter that has received the amount of attention which it merits, and the result is that, instead of the completely forced system, which was introduced largely at last year's show, there is a tendency to adopt a semiautomatic system which requires no attention on the part of the driver, and yet avoids the method of drilling the crankshaft and other parts inevitable with the forced system. Daimler, Wolseley, Minerva and many more have the oil splashed to the bearings from troughs into which the ends of the connecting rods dip, and which are kept supplied by a pump situated at the bottom of the base chamber. As the troughs have only a limited capacity, it is impossible for excess of oil to reach the pistons, and so to cause a smoky exhaust, while at the same time the troughs will always be kept filled as long as there is sufficient oil in the engine to fill the pump.

High-Tension Magnetos Almost Universal—Regarding ignition, high-tension magnetos are, of course, all but universal, and it is noticeable that the magnetos are much smaller in size than hitherto. The Albion and Lanchester still pin their faith to the low-tension magneto, with make-and-break on the engine, and some of the high-powered Italian cars have low-tension magneto, the special magnetic plugs. The small Italian cars, however, have high-tension magneto, usually without provision for advance or retard of the contact-breaker. With British cars, on the other hand, it is usual to fit a lever to actuate the magneto advance.

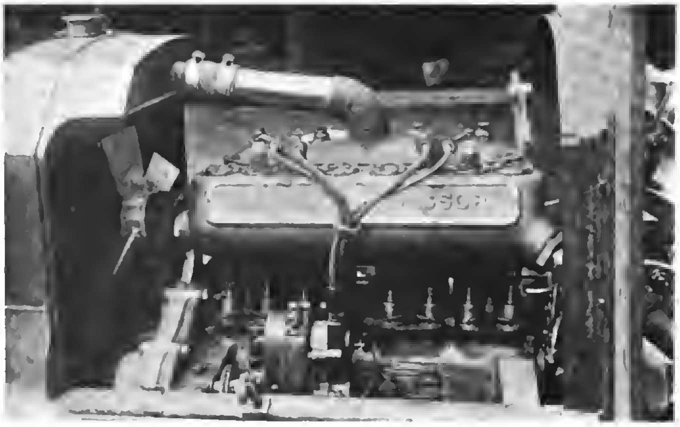
Quite a number of makers have abandoned the use of separate ignition systems—magneto and battery with coil—and instead have favored one or the other of the many dual magneto systems, in which the magneto distributor and the single set of sparking plugs are used for both ignitions. This was tried half a dozen years ago, but at that time neither the magneto nor the plugs were so reliable that it was safe to dispense with a second ignition system as a stand-by.

Two Sparks Created Simultaneously—One car—the Hobson—has adopted the double-pole plugs which have been introduced lately, so that two sparks are obtained at separate plugs from the single magneto. A distinct increase of power is said to result from this arrangement—particularly at high speeds.

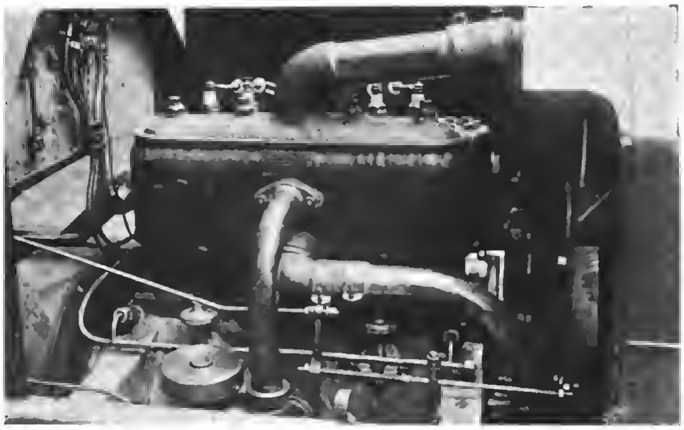
This point is worthy of investigation, for the tendency, at the present time, is certainly toward the use of high engine speeds. Due to this increased speed more attention has had to be paid to the matter of carburetion, with the result that, in addition to the use of air instead of exhaust pressure for the fuel feed to the carbureter, the latter is either of the mutiple-jet type or else has been equipped with an automatic air valve of such construction that the engine is not starved at high speeds.

For the cooling, thermosyphon circulation is growing in favor. When a pump is fitted this is almost always of the centrifugal variety, which is more quiet in action than the gear type. The piping, too, is much better arranged than has been the case in the past, when U-bends were frequent sources of air locks and overheating troubles. There are fewer radiators of the gilled-tube type, flat copper tubes being used instead. Experiments have clearly shown that the latter are more efficient, besides being lighter in weight. Fans are still of all shapes—some being made merely of flat pieces of steel, while others are aluminum castings of approved propeller form. In many cases the fan is driven by spiral gearing, from the pump and magneto cross-shaft, thus enabling the troublesome leather belt to be dispensed with.

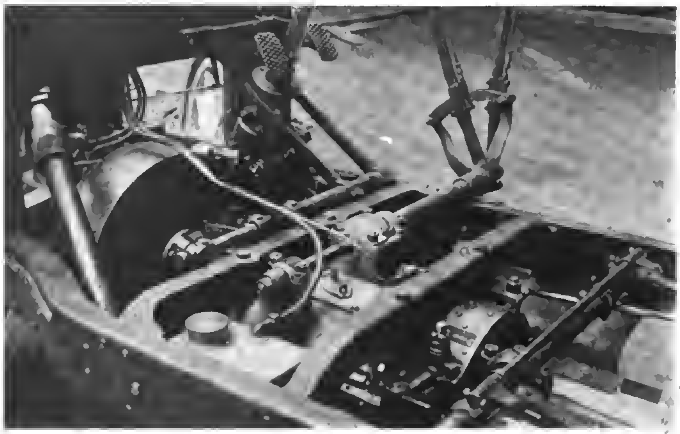
Leather Cone Clutches on the Gain—Leaving the engine, a review of types of transmission gear may be given. The increased flexibility of the engine calls for less work from the clutch, so that the simpler leather cone form is maintaining its position. Disc clutches are not increasing in numbers, but there are several new cars with the contracting-band type. As usual, there is a clutch of the hydraulic type which is said to be very efficient and to enable the gearbox to be omitted, but it has yet to prove its claims.



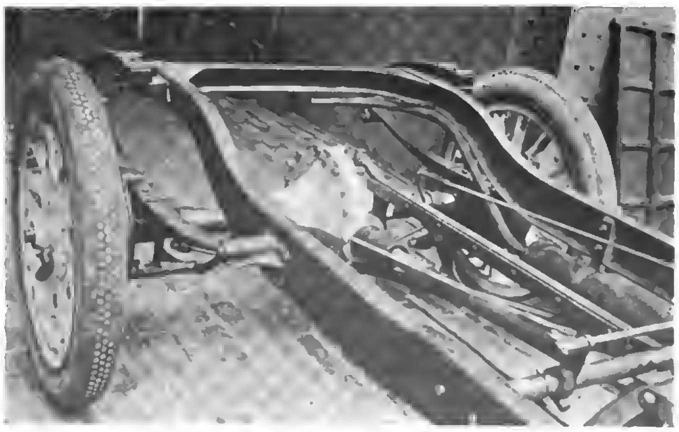
Panhard 12-H.P. Monobloc, Valve and Magneto Side



Panhard 12-H.P. Monobloc Engine, Carbureter Side



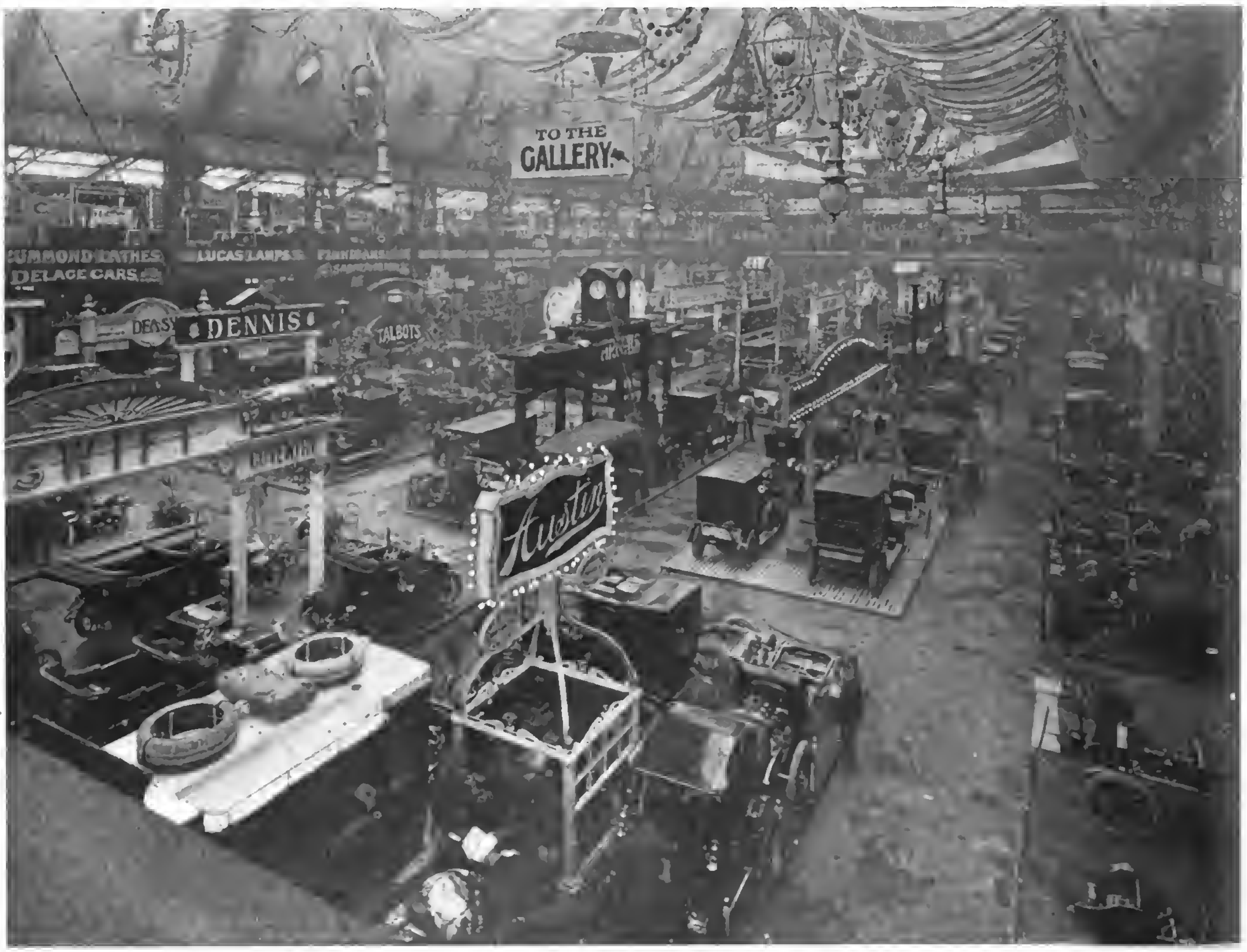
Clutch and Gear Box of Panhard 12-H.P. 4-Cylinder



Rear Axle of Panhard 4-Cylinder Shaft-Driven Car

The engine improvement is also the reason why on many cars there are now only three speeds instead of four. Where four speeds are provided, the third is usually direct drive, and the fourth geared up for fast running. The gate change is all but universal, examination revealing only the Renault and Delaunay-Belleville with the old quadrant type. At the rear axle worm driving is rapidly becoming popular, quite a dozen cars being so equipped. Opinion seems evenly divided as to whether the worm should be above or below the worm wheel, the latter giving better lubrication, but at the expense of reducing the road clearance. Chain drive is all but extinct.

Torque and radius rods are likewise a matter upon which there is much diversity of opinion. Many firms—such as the Itala, Hotchkiss, and Daimler—have no fittings of this kind. relying on the rear springs to take the drive, while other firms of equal standing—Fiat, Renault, and Napier—invariably fit torque rods. The tendency, if any, seems to be in the direction of dispensing with all rods.



General View of the Olympia Automobile Show, Which Excelled All Former British Exhibitions

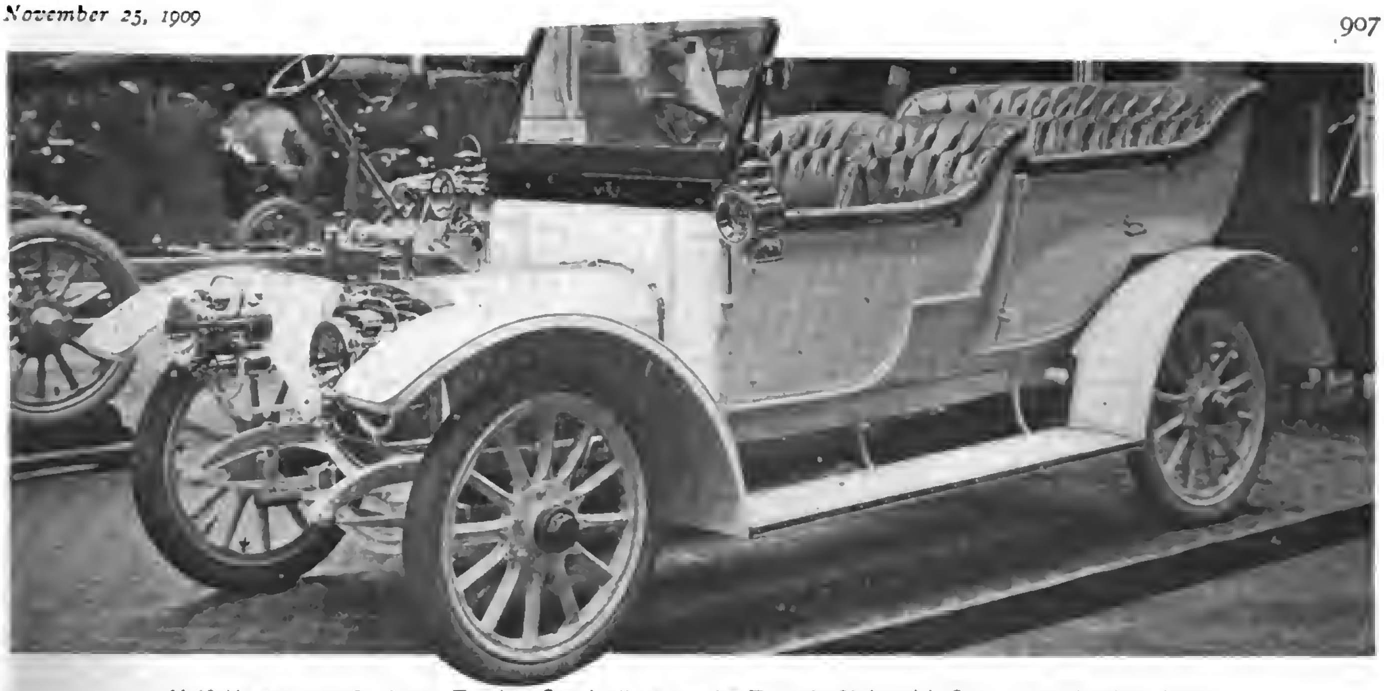
Wire Wheels Growing More Popular Daily—Wheels of the wire type are growing greatly in popularity, while half a dozen forms of detachable wheel are to be found. Similarly front wheel brakes seem likely to come into general use, for such firms as Arrol-Johnston, Crossley, Motobloc, and Sheffield-Simplex fit this type on all cars. On other cars a band brake is fitted on the propeller shaft and internal-expanding brakes at the rear hubs. In some cases the latter are actuated by the foot pedal, reversing the customary arrangements.

To deal finally with completed cars, there has been an extraordinary craze for torpedo bodies. Examples of various designs are to be found on almost every stand, but there are few that could be called pleasing in appearance. This body seems to suit the Renault bonnet best. Several British cars—the Deasy, Arrol-Johnston, and Sheffield-Simplex—have adopted Renault lines, so that there must evidently be a demand for cars of that appearance. Covered bodies of many types are staged, but these will be dealt with later.

AMERICANS TOUR IN AMERICAN CARS

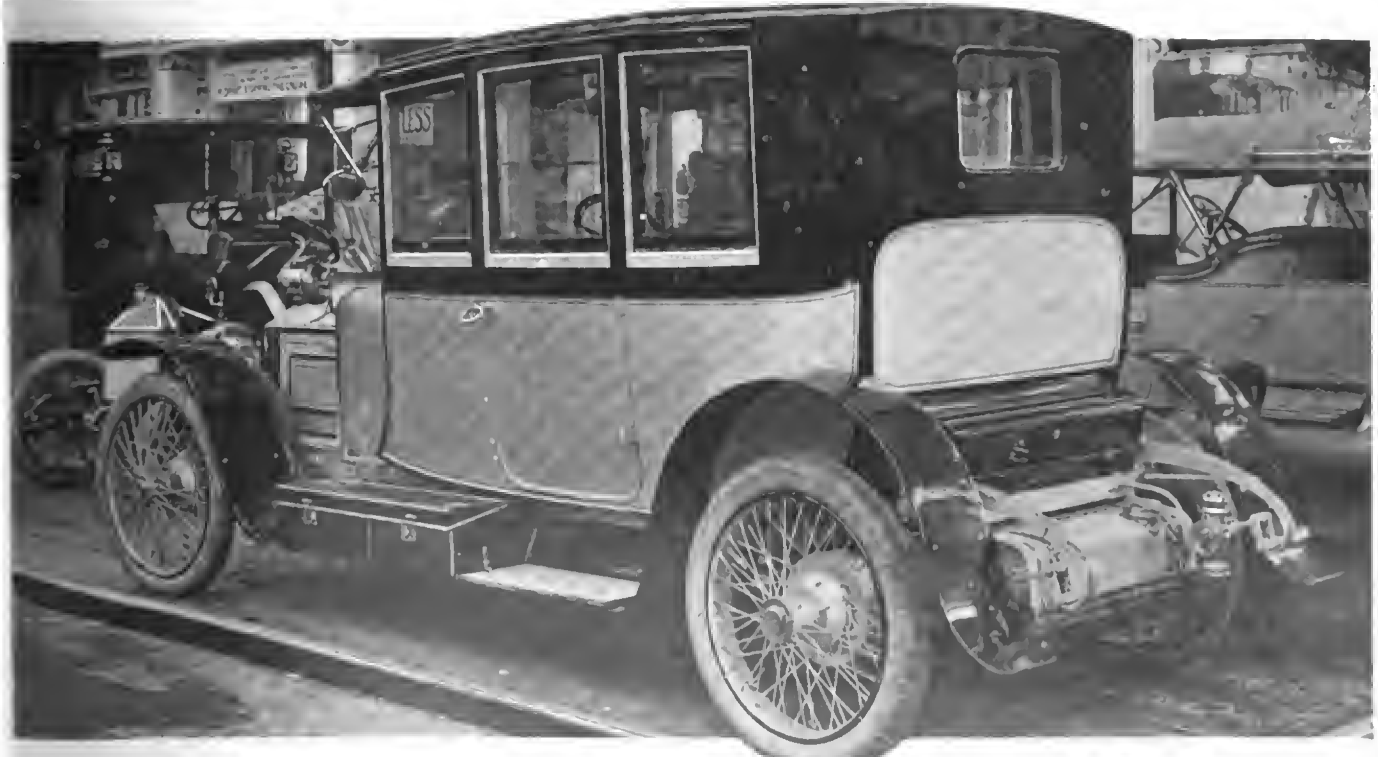
A feature of the development of foreign touring is the number of Americans who now visit Europe in American automobiles. Everything has been made so simple by the various touring associations that the American automobilist plans for a tour through Europe with as little fear of difficulties as if he were about to make a run through the Berkshires. This is largely due to the establishment of European branches by American manufacturers, keeping in stock all the repair parts.

The extent of this movement is shown by the fact that three leading factories have opened Paris touring bureaus in the last two years. N. S. Goodsill, in charge of the Pierce-Arrow Motor Car Company's Paris branch, reports 112 automobiles of that make in the first nine months of the year and an estimate of 125 for the whole year. "The greater number of automobiles are the large six-cylinder models, carrying five to seven persons," he states. "They usually remain in Europe from six weeks to two months, visiting France, Germany, Italy, and England principally. Intending tourists should obtain membership in the Touring Club of France before leaving New York, and at the same time secure a triptych for passing the French, Italian, or German customs if they land in one of those countries.



14-16-Horsepower Sunbeam Touring Car Inclines to the Torpedo Style with Curves and Straight Lines

Exhibit of 10-12-Horsepower Humber, Which Also Shows the Torpedo Influence, but Is All Curves



26-Horsepower Sporting Metallurgique Has the Driver Enclosed, the Single Door Being in the Middle

WHAT M. C. A. RECOMMENDS TO INTERNATIONAL CONFERENCE

THE Manufacturers' Contest Association wherein are represented all those American makers who are concerned in competitive events, has supplied the Automobile Club of America (which serves as the spokesman for this country in the international conference) with a definite consensus of opinion of what is desired in the way of international racing rules for 1910. The recommendations call for the participation of stock cars or stock chassis only, in international events, same to be classified according to piston displacement and minimum weight.

This logical and advantageous classification has given excellent satisfaction in this country, and the ideas of the American makers will be presented by William S. Hogan, the A. C. A. delegate, at the meeting to be held December 7 in Paris. These are the recommendations of the M. C. A.:

First: That only bona fide stock cars or stock chassis be eligible for entry in international events.

Second: That cars entered in international events be classified as follows:

Open to any chassis which is in accordance with the definition of a "Stock Chassis" and in accordance with the following table of piston displacement and minimum chassis weights:

Division	Cu. In. Piston Displ.	Minimum Weight in Lbs.
1	160 and under	1,200
2	161 to 230	1,500
3	231 to 300	1,800
4	301 to 450	2,100
5	451 to 600	2,400
6	601 and over	2,600

No car shall compete in any class above that to which its weight entitles it.

These recommendations are along the lines which will govern automobile competition in America for the coming year, with the possible exception of the larger classes. As the American manufacturers will no doubt build "stock cars" up to the limit of each of these piston displacement classes, should a similar classification be adopted internationally, it would enable foreign and American cars to compete on even terms and should serve to stimulate international competitions.

HEMERY'S REMARKABLE WORLD'S RECORDS AT BROOKLANDS

LONDON, Nov. 15—In view of the approach of Olympia, several makers worked hard at Brooklands in the endeavor to set up new records. Two performances, in particular, are very creditable. A stripped 60-horsepower, six-cylinder Thames chassis was driven by Smith on Friday last with an eye to the long-distance records. The car ran well throughout, and only one stop was made, to change a rear tire, was occasioned during the 300-mile run. The new records are as follows:

50 miles	34:02	88.1 m.p.h.
1 hour	89½ miles	89.5 m.p.h.
100 miles	1:06:54	89.7 m.p.h.
2 hours	173¼ miles	86.7 m.p.h.
200 miles	2:17:56	87.1 m.p.h.
3 hours	261⅞ miles	87.3 m.p.h.
300 miles	3:30:18	86.0 m.p.h.

Probably the most noticeable thing about these new figures is the remarkable evenness of the running, the average in miles per hour differing but little for three consecutive hours. Thus, for the first hour, the average of 89.5 differs from the figure for the second 60 minutes by but 2.8 miles. During the course of an additional hour's driving the rate of speed was so improved as to bring this up to 87.3 miles, a raise of .6 miles, and reducing the difference between the multiple hour figure and the first hour figure to 2.2. Whatever else it may be called, this is remarkably consistent driving, and redounds to the credit of the driver, who is practically unknown outside of this country. The new records, too, are to the credit of a car which is little known outside of the home country and the colonies, the name being a stranger to the Continent and America.

On the same day Hemery ran his 85-horsepower Benz for the short records, but deferred his final attempt for Monday. On this day he met with more success and succeeded in lowering all existing figures, beating the flying kilometer record, which has stood to the credit of Marriott since the Ormond-Daytona meet of 1906. Hemery's official times are:

Half-mile, flying start	14.08 secs	127.84 m.p.h.
Kilometer, flying start	17.76 secs	125.94 m.p.h.
Half-mile, standing start	25.57 secs	70.41 m.p.h.
Kilometer, standing start	31.32 secs	71.42 m.p.h.
Mile, standing start	41.47 secs	87.24 m.p.h.

A noteworthy thing about both attempts at the flying start records is that the longer distance record is at a higher speed than the shorter one. In this the flying German did not entirely outdo the American, for the average speed of the latter for the mile, made on the same day and at the same time and place as the now-broken kilometer record, was at the rate of 127.65, which Hemery just barely changed. The latter was the official fastest rate of speed, surpassing even the mark made by Demogeot, when the latter won the speed crown. The figure made then was but 123.3 miles per hour, so that Hemery now not only holds the distance, but the average speed record as well.

BIG THINGS EXPECTED AT INDIANAPOLIS SPEEDWAY

INDIANAPOLIS, Nov. 22—A race meet over the new brick surface of the Indianapolis Motor Speedway probably will be held on December 11. The course is now about half paved, and it is believed it will be completed about December 5. The meet will include everything from one-mile trials to establish a new track record, to a 1,000-mile race.

Ernest A. Moross, director of contests, has been induced to withdraw his resignation, which was to have become effective on November 15. He is now at work preparing the program for the proposed meet. As soon as he was in a position do so, the dates for the coming meet, the first on the brick surface, were announced. The first meet is scheduled for either December 10 or 11, to be decided within a day or two, and depending partly upon the ability of the paving contractor to finish the brick paving.

It is said that the services of all the record breakers at Atlanta and New Orleans have been secured for this meet, at which nearly every record mark from the quarter mile up to the 1,000-mile will be tried for. The competitors will be divided into the usual classes, 1, 2, 3, 4 and 5, as well as the free-for-all. In the shorter events, up to 50 miles, the free-for-all competitors will be started first, and followed by the class cars. In the longer events large fields are figured on, up to 15 cars per event. In all of these events no entry fee will be charged, the expense of holding the meet being met wholly by the grandstand admissions.

When interviewed relative to the coming record-fest, Mr. Moross was very confident of a speed of two miles per minute for the new track, not alone for a mile or two, but maintained for many successive miles. He has just returned from Atlanta, which track he admitted was very fast, much faster than the old Speedway surface, but not as fast as the new brick covering.

MARMON STARS IN NEW ORLEANS GOOD ROADS RACE MEET

NEW ORLEANS, LA., Nov. 21—Ray Harroun, in his Marmon stock car, proved the bright particular star of the Good Roads meet of the New Orleans Automobile Club. He won two firsts and two seconds in the four events which he entered on the first day, and one first and two thirds in three events of the second day.

The first day's racing had a slight scarcity of entrants, due to the non-arrival of a carload of machines, belonging to Barney Oldfield and other prospective competitors, which had been shipped from San Antonio. However, the weather was ideal, and a fairly large crowd turned out. The track seemed in good condition, but did not produce quite the speed expected, as no records were broken.

The feature of the afternoon was the second event, a 20-mile race for stock cars, in which the principals were the Marmon, Aitken's National, and Basle's Renault. Mile after mile these three cars were bunched, many times passing the grandstand wheel and wheel. Harroun finally moved into the lead, winning by two lengths from Aitken.

The 50-mile race started out in the same fashion, but tire trouble and minor accidents soon put many of the contestants out of the running, and spread out the others. Harroun finshed with 10 miles to spare in 54:00 3-5. He ran a consistent race, without a single stop. Summaries:

FIVE-MILE MATCH RACE

Pos.	Car	Driver	Time
1	Chalmers-Detroit	Cowell	7:12
2	Oldsmobile	Benzie	

TWENTY-MILE STOCK CHASSIS, A. A. A. (Class 2, Piston Displacement 301 to 450)

1	Marmon	Harroun	21:28 2-5
2	National	Aitken	
3	Renault	Basle	

FOUR-MILE LOUISIANA CHAMPIONSHIP

Open to Equipped Cars Owned by Citizens of Louisiana; Prize, Gov. J. Y. Sanders' Trophy.

1	Buick	Walker	6:48 2-5
2	Ford	Murphy	

TEN-MILE HANDICAP FREE-FOR-ALL

1	Renault	Basle (30 sec.)	10:52
2	Marmon	Harroun (scratch)	
3	National	Aitken (scratch)	

FIVE-MILE FREE-FOR-ALL

1	National	Aitken	5:25 1-5
2	Marmon	Harroun	
3	Renault	Basle	

FIFTY-MILE, TWO CLASSES (Class 2, Piston Displacement 301 to 450; Class 4, Piston Displacement 161 to 230)

Prizes, $50 to Winner; $25 to First in Each Class.

Class 2:

1	Marmon	Harroun	54:00 3-5
2	Renault	Basle	

Class 4:

1	Marmon	Harroun	54:00 3-5
2	Chalmers-Detroit	Cowell	

Oldfield Appeared the Second Day—The missing carload of racers appeared late Saturday afternoon, and were quickly put in condition to participate. Barney Oldfield brought out his big Benz and attacked the one-mile record for the track, held by Ralph De Palma at 0:54 1-5. Barney's dash around the oval clipped off the superfluous fraction and set a new record at 0:54 flat. In an effort to lower the 50-mile record the Benz blew out a tire on the eighteenth mile, and the trial was declared off. The first 15 miles were covered in 14:04.

Kirscher, driving W. H. Pickens' Darracq, won the 10-mile handicap from Harroun and Aitken in 10:35, and lost a five-mile match race with Oldfield only by about the "thickness of a tire." The time was 5:17 3-5. Kirscher made the fastest 10 miles of the day in the free-for-all handicap, his time being 10:16 3-5. He finished second to Basle, the latter having 1:15 handicap.

In the last event of the afternoon, the 100-mile race, Harroun came into his own again. Aitken held the lead for 80 miles, having a lap on Harroun at that distance, but he had ignition trouble and was forced to withdraw. Summaries:

TEN-MILE HANDICAP

Pos.	Car	Driver	Time
1	Darracq	Kirscher (scratch)	10:55
2	National	Aitken (25 sec.)	
3	Marmon	Harroun (scratch)	

FIVE-MILE SOUTHERN CHAMPIONSHIP (Amateurs or Chauffeurs)

1	National	Speer	5:30
2	Marmon	Swoboda	
3	Buick	Walker	

MILE TRIAL FOR TRACK RECORD (Held by DePalma, 0:54 1-5)

Benz	Oldfield	0:54

TEN-MILE FREE-FOR-ALL HANDICAP

1	Renault	Basle (1:15)	11:21
2	Darracq	Kirscher (scratch)	
3	Marmon	Harroun (40 sec.)	

Oldfield of Early Days in Ford "999" Record-Breaker

FIVE-MILE NEW ORLEANS CHAMPIONSHIP

1	Buick	Walker	6.15

FIVE-MILE SPECIAL MATCH RACE

1	Benz	Oldfield	5:17 3-5
2	Darracq	Kirscher	

ONE HUNDRED MILES

1	Marmon	Harroun	1:47:14
2	Renault	Basle	
3	Chalmers-Detroit	Cowell	

MANY ACCIDENTS MAR SAN ANTONIO RACES

SAN ANTONIO, TEX., Nov. 20—While the automobile races held here this week were very exciting, and a high grade of sport was furnished the spectators, the sport was much marred by the accidents, which not only were dangerous to the competitors, but by narrowing the field, reduced the fierceness of the competition.

Robert Burman had a very narrow escape in the six-hour race when his Buick overturned. The car turned a complete somersault, but, fortunately, "Bobbie" was not injured. Barney Oldfield started at the wheel of a Knox, but a broken connecting rod soon put him out of the running. One of the Stoddard-Daytons broke a front wheel, and a Jackson, which had been following too closely, had to be driven over the banking to escape another collision. The six-hour race was won by Benjamin Johnson.

CHARLESTON, S. C. WANTS CONNECTION WITH SOUTHERN NATIONAL HIGHWAY

By M. B. Paine, Jr.

Historic City of the South.

CHARLESTON, S. C., Nov. 22—Among the most attractive cities in the South, and one that should not be missed by motorists, is Charleston, S. C., which, with its historic interest and natural beauty of situation and surrounding, holds a position not to be surpassed by any of the other cities. Due to a lack of interest in obtaining better roads, the development of automobiling has perhaps been a little bit slower here than elsewhere, but an entirely new era is dawning which promises to put the "City by the Sea" in the foremost ranks of good roads and motoring enthusiasm. Inspired and encouraged by the enthusiastic good roads campaign now in force through the South, the Charleston Automobile Club is taking active steps to secure the cooperation of other towns and cities to build a highway connecting this city with the New York-Atlanta highway, through Columbia, S. C., and thus to open up the shortest way for Northern auto-tourists wishing to go by road to Florida by way of Charleston and Savannah, Ga.

On the Road to Summerville.

Local good roads work is under the supervision of the Charleston and Summerville Highway Commission, and the Sanitary and Drainage Commission, in both of which Col. James Cosgrove is an active member. The efforts of these two commissions have resulted in building fine cement gravel highways extending in two directions from the city. The road to Summerville, the famous Winter resort in the pinelands, is the most popular and will be part of the projected highway connecting this city with the New York-Atlanta route.

Leaving the western part of the city over the Ashley River bridge, the other highway will pass through the largest truck-farming districts in the United States, where vegetables and fruit are shipped by hundreds of carloads all over the Eastern and Middle States. This road, after crossing five rivers, leads to Savannah, Ga., a distance of about 130 miles from this city, paralleling most of the way the tracks of the A. C. L. R. R., over which the entire Northern tourist travel goes to Florida. The working up of this highway will be due to the continued efforts of the Savannah Auto Club and the local club.

Another roadway which in time will be taken up for improvement is the one leading out of the city over Cooper River by the ferryboat of the Charleston Consolidated Light & Power Company, to the mainland known as Mount Pleasant. This road skirts the eastern coast of the State, passing through many beautiful old plantations, where rice and cotton are plentiful; through many Winter homes, including the famous reserve of the Santee Hunting Club, where the finest duck-shooting is enjoyed; through many small towns and seacoast ports,—McClellanville, Georgetown, Conway, and across Carolina to Wilmington.

During the tourist season, probably the most popular run is to Magnolia-on-the-Ashley, usually called Magnolia Gardens, known to nearly all tourists in the South as the most unique and beautiful display of azaleas of every hue in America. The road to this place runs west from the city over the Ashley River bridge, following the river for about fourteen miles, passing the gates of many beautiful Winter homes, with their long straight avenues of moss-covered oaks. This is also a popular run to Summerville, being a more beautiful, though longer road than the official highway, making a circuit with the latter of about 52 miles.

Over this Ashley River road was held probably the first endurance run in the South, four years ago, to Summerville. The good results of this run are shown in the greatly improved condition of the road. In the city itself the attractive points both historic and modern are numerous enough to bring every year a constantly increasing number of visitors and tourists. Fort Sumter,

Convicts Build Roads in S. C.

Built Before the War

situated on a small island in the centre of the finest harbor along the coast, no doubt represents the most historic interest, while in the U. S. navy-yard on Cooper River, and the forts and batteries on the islands surrounding the harbor, the visitor sees the vast amount of attention Uncle Sam is giving to this city, showing its great importance.

Many beautiful old residences and churches offer to those interested, types of architecture and methods of building not seen anywhere else in America. Although the city has been through many misfortunes, due both to man and to nature, it still possesses fine examples of houses built from material brought from England before the American Revolution. The surrounding islands also offer many fine beaches for those fond of racing, the best example being the Isle of Palms with a nine-mile beach fully equal to Ormond-Daytona. Two meets have been held on this beach, the times showing it to be very speedy.

The automobile situation is very good considering the reserved and conservative nature of the people who, though comparatively wealthy, are not ostentatious. Over two hundred cars have been sold and registered here, ninety per cent of this number in the last year and a half. Most of the machines are of the popular-priced touring variety, and there are no foreign cars at all. Four or five garages and repair shops represent the business end of the industry in motor cars—The Motor Supply Company, 161 Meeting street, Overland cars; The Urmy Cycle Mfg. Company, 130 Meeting street, Buick and E-M-F; the Automobile & Marine Motor Company, 249 Meeting street, Ford, Mitchell, Chalmers-Detroit; M. B. Paine, Sr., 47 Meeting street, White cars.

The recent forming of the Charleston Automobile Club promises to enliven the interest very much, and increase the number of cars used. The club is planning its initial run for Thanksgiving Day, probably to Summerville, to enjoy the cordial hospitality of the Pine Forest Inn, well known to all who tour through the South.

FLORIDA'S WEST COAST ON AUTO MAP

St. Petersburg, Fla., Nov. 20—The cities of this section of Florida have taken up the combined automobile-good roads movement with great enthusiasm, and are busily engaged in "discovering" each other by the newest form of transportation.

Last week a party composed of Ed. T. Lewis, with a Cadillac; Horace Williams, with an E.M.F., and Will Ramm, with a Mitchell, left this city bound for Clearwater. The St. Petersburg-Tampa road was followed until the macadam road from Clearwater to Green Springs was reached; then the three mamachines ran into Clearwater, and thence to Dunedin over the fine macadam road from Large to that city. The stretch of road from Clearwater to Dunedin is probably the finest five miles of macadam in the State, and with but one sharp turn makes an ideal speedway. All the way the road runs parallel to the beach, not more than a hundred yards from the water. The gulf is always in plain sight beyond the keys that mark off Clearwater harbor.

The automobile owners of the city have formed the St. Petersburg and West Coast Automobile Club. By-laws have been adopted, and the following officers elected: Dr. F. W. Wilcox, president; Ed. T. Lewis, vice-president; A. W. Fisher, secretary; Horace Williams, treasurer. A board of governors was also chosen, consisting of George Presstman and Drs. Hume, Rouse, Turner and Brown. A committee headed by Mr. Lewis has conferred with the county commissioners in Tampa, and received much encouragement from their attitude regarding road improvement on the West Coast.

A Southern Home of to-day "The Oaks"

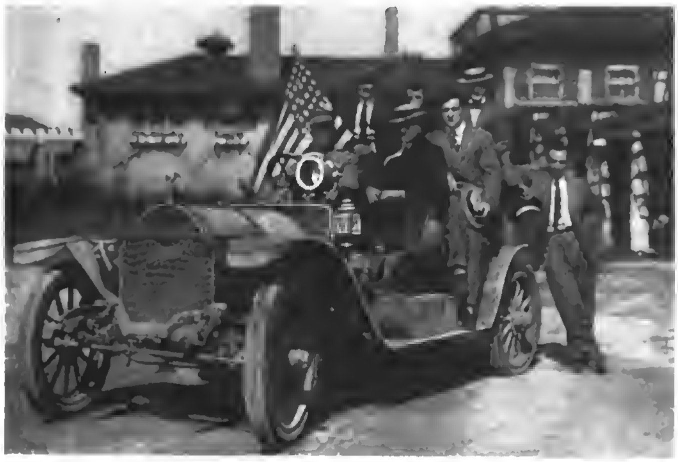
A Home near the Santee

What the Clubs Are Doing These Days

BALTIMORE AERO CLUB AFFILIATED WITH AERO C. A.

BALTIMORE, Nov. 21—President Jerome H. Joyce, of the Aero Club of Baltimore, has received from the Aero Club of America articles of affiliation of the local club, together with a letter from the national body requesting that the papers, which were sent in duplicate, be signed and returned to the national body. These will be forwarded to New York within a few days by the local club and, with favorable action by the national organization, the Baltimore Club will have become an active factor in the International Aeronautic Federation.

Members of the Aero Club of Baltimore are hustling to raise the $50,000 fund which this city is expected to contribute toward the project to bring the big international aviation meet in 1910 to some site between Baltimore and Washington. President Joyce has also appointed 48 additional members, all representative citizens of the city, of the local committee which is intrusted with the work of raising this guarantee fund.



When the Mitchell Ranger Visited Chicago Friends

With a cargo of newspaper men at the South Shore Country Club. Frank X. Zirbles at the wheel; Joseph E. G. Ryan ("Inter Ocean") and R. J. Finnegan ("Journal") on the fender; in tonneau, left to right, E. G. Westlake ("Evening Post"), Davis Rotroff ("Daily News") and J. C. Patterson ("Examiner"). Walter A. Birmingham ("Inter Ocean") is leaning against the car

PROMINENT BAY-STATER TO BECOME CALIFORNIAN

BOSTON, Nov. 20—A. E. Morrison was the guest of his motoring friends Thursday evening at a farewell banquet tendered him at the Bay State Automobile Association on the eve of his departure to make his home and engage in business in California. Mr. Morrison has been engaged in the trade in Boston almost since there was an automobile trade, being manager of the Peerless branch for several years, and afterwards agent for different cars. More recently he has been manager of the Taxi Service Company, of Boston. He goes to California to take up the management of the Studebaker Bros. branch in San Francisco. Until he was injured in a road race at Lowell several years ago Mr. Morrison was prominent as a race driver.

At the banquet James Fortescue, secretary of the club, presided, and J. W. Bowman of the local Stevens-Duryea agency presented to Mr. Morrison, in behalf of the Bay State Association members, a gold watch fob bearing the insignia of the club. C. J. Bailey presented to him a handsome diamond scarf pin. Other speakers included E. A. Gilmore of the Whitten-Gilmore Co.; J. W. Maguire, the Pierce agent; E. P. Webber of the Diamond tire branch; Kenneth Skinner and J. S. Hathaway of the White Co.

MILWAUKEE'S SHOW PLANS SPELL SUCCESS

MILWAUKEE, WIS., Nov. 22—The second annual Milwaukee motor show, to be held under auspices of the Milwaukee Automobile Club from Feb. 22 to 27, inclusive, will not be a "local" affair, but of national importance, if the flood of applications for space is to be taken as an indication of its extent.

President Clarke S. Drake, of the club, who is general manager of the show, says that plans are being considered to make the show a genuine "Motor show" in every sense. Motor boats and the like will be given full representation.

This plan is feasible this year through the use of the new $500,000 Milwaukee Auditorium, covering an entire city block. There are four halls, in addition to the main hall covering a half block, each as large as the average theater. The main hall seats 8000 comfortably and the smaller halls 1500 each.

The accessory department will be one of the features of the show. Motors, engines and parts will be given adequate representation also.

CHRISTMAS DECORATIONS FOR COLUMBUS SHOW

COLUMBUS, O., Nov. 20—The committee of arrangements for the automobile show to be given December 25 to January 1 under the auspices of the Columbus Automobile Club, has arranged for the decorations to be white and green and to be in accordance with the Yuletide. All the decorations, including flags and bunting, will be fireproofed before placed in position, and in addition a squad of firemen will be detailed to watch the hall constantly.

The admission price has been reduced from 50 to 25 cents, and it is expected to have at least 60,000 visitors. Special rates will be given on all railroads for the occasion.

In all there is 14,451 square feet of space for the automobile exhibits and a large space for the accessories. It is stated that several of the automobile exhibits will be taken intact to the Grand Central Palace show in New York the following week.

LOUISVILLE HUNTING BUILDING FOR SHOW

LOUISVILLE, KY., Nov. 22—It is likely that Louisville will have an automobile show next Spring. Eugene Straus, President of the Louisville Automobile Club, is behind the movement and some definite action will probably be taken at the next meeting of the club. The armory, the largest building in Kentucky, is regarded as an ideal place for an automobile show, the structure covering an entire block. The basement could be used for accessory exhibits. Additional space here will allow twice the size of show held last year at the Coliseum building which was recently destroyed by fire.

A new home for the club is now practically assured, as the membership campaign was a success, seventy-five new members being added.

A. C. OF CINCINNATI'S SHOW, FEB. 21-26

CINCINNATI, O., Nov. 22—Under the auspices of the Automobile Club of Cincinnati, an automobile show will be held in Music Hall, the largest building suitable for the purpose in the city, February 21-26. No effort will be spared to make the show a pronounced success, and the club announces that any profit resulting from it will be expended in the interest of autoing and autoists in this section. Jesse Lippencott, whose headquarters are at the Gibson House, is at the head of the committee in charge of the exhibits, and any requests for information will receive his prompt attention. Although the date has just been announced, many firms have signified their intention of exhibiting.

ROADS BUILDING NEWS FROM ALL OVER THE COUNTRY

INDIANA ROAD BONDS FOUND UNCONSTITUTIONAL

INDIANAPOLIS, Nov. 22—A severe blow has been given road building in Indiana through a decision of the Indiana Supreme Court holding that all road laws providing for the payment of the construction of highways by bonds to be paid in turn by township taxation are unconstitutional. This decision was rendered last week, and practically all road building in the state has stopped, and there is considerable doubt as to the validity of millions of dollars worth of bonds that have been issued by townships.

For many years the method of road building followed in Indiana has been for the county to issue road improvement bonds, the county being reimbursed by a township tax levy. Thus all persons living in the township were taxed for the construction of a road in any part of the township.

This law has applied only to townships having incorporated towns of less than 30,000 inhabitants, and the Supreme Court holds that this makes the law class legislation, and, therefore, unconstitutional. The decision was reached on a case appealed from Hamilton County, where the Circuit Court refused to enjoin the county commissioners from ordering a road to be paid for by township taxation.

The only method of road building now left is to build it by direct assessment against all property within one mile of the road thus constructed.

KENTUCKY'S GOOD ROADS AMENDMENT

LOUISVILLE, KY., Nov. 22—The South has without question a decided advantage over the North in the use of automobiles, owing to the fact that cars can be used the entire twelve months of the year, 'while in the North climatic conditions make this almost impossible. It is true that the roads in some seasons are in rather bad condition, but the whole South has waked up to the vital importance of good highways and atuomobiles as one of the most modern methods of increasing wealth.

The vote on the good roads amendment to the constitution of Kentucky was a disappointment to those interested in the betterment of the State's highways, and it is apparent that the apostles of good roads have much to do in the way of evangelization. There seems a slight chance that the amendment has been adopted, but if such proves the case, it will be by a close margin. The result will not be known until the official count has been completed. Should the amendment be carried, it is evident that a number of the counties will be slow to take advantage of its provisions. The small vote on the proposition in many counties and adverse majorities in others are due to popular indifference and to the widespread fear of "tinkering with the constitution." Some of the wealthiest and most progressive counties of the State voted overwhelmingly against the amendment. Other counties of which not so much was expected gave the proposition a surprisingly good support.

OHIO HIGHWAY DEPARTMENT TO ISSUE STATE MAP

COLUMBUS, O., Nov. 20—The Ohio State highway department will shortly issue a booklet containing a complete road map of the State by counties. The department has been busy on the work for months and assurances are given that it will be one of the most complete road maps ever worked up. Every turn in the road, bridge, railroad crossing and rough place in the road will be shown. It may be issued in colors later. This booklet and map will be of unusual interest, and great value to all automobilists obliged to travel by motor car through Ohio.

LANCASTER CLUB ATTACKS NEGLIGENT ROAD OFFICIALS

LANCASTER, PA., Nov. 20—The good roads committee of the Lancaster Automobile Club has filed exceptions to the reports of the road supervisors of Eden, Penn, Manheim and Lancaster townships, of Lancaster county. Several weeks ago Charles G. Baker, solicitor for the club, sent a circular letter to every road supervisor and every township constable in Lancaster county, calling their attention to certain Acts of Assembly relating to sign-boards and the removal of loose stones from roads.

The first of these acts provides that the supervisors shall cause posts to be erected at the intersection of all public roads in their respective townships, with boards affixed bearing an index hand and inscribed in legible characters with the name of the town to which the road leads, and the distance in miles; and also, that if any supervisor shall, after ten days' notice, fail to put up or put in repair such sign-boards, he shall be liable to a fine of $20. The "loose stones act" provides that the supervisors shall have removed from the public roads all loose stones at least once a month during May, June, August and October. For failure to do this a fine of $10 may be imposed.

After the warnings had been sent out the club committee had various members inspect the roads and report on them, witnesses being taken along to secure a perfect case. As a result of these investigations the club took the action stated above, filing exceptions to the returns of four of the forty townships. The matter will be taken up in the November term of the Quarter Sessions Court.

New Road Through Crawford Notch, in the White Mountains

WISCONSIN'S GOOD ROADS ENDEAVORS

MILWAUKEE, WIS., Nov. 22—M. C. Moore, of Milwaukee, president of the Wisconsin State Automobile Association, urged the employment of convict labor in highway improvement and good roads construction, at the session of the special Wisconsin legislative committee investigating the good roads problem, at Milwaukee. Several prominent owners claimed this system to be highly unsatisfactory and that it would add to the difficulties.

Chairman Jones, of the committee, closed a lengthy and excited discussion by saying: "Once you get this work started you will find plenty of men who will make it a business."

Townships in the vicinity of Fond du Lac and West Bend are taking the lead in erecting guide boards, as demanded by a law passed by the last legislature. These boards were to have been placed by November 1, but farmers claimed that harvest work halted them and they have asked for a little more time. In Fond du Lac and Washington counties, a new type of guide board and standard is being used. The post is a hollow steel pipe, set in concrete, with a special bracket at the top, with room for six signboards. The post is being used exclusively in these counties. It is cheap and will last a life-time.

OHIO COMMISSIONER FAVORS ROAD SYSTEM

COLUMBUS, O., Nov. 20—State Highway Commissioner J. C. Wonders will soon issue a booklet containing all the laws relating to highways and road improvement. The booklet will be issued to show every community in the state the method of securing appropriations for road improvement, and the laws that provide for their maintenance. The booklet will contain full explanation of the working of the designing board.

Commissioner Wonders, in a public statement, favors the adoption of a general plan of pike repairs and road maintenance modeled after the system in vogue in France, which, he says, is of the greatest efficiency of any in use in any part of the world. The Ohio General Assembly will be called upon to enact some law in that direction at its next session.

LONG ISLANDERS ANNOUNCE 1910 NOMINEES

BROOKLYN, N. Y., Nov. 24—The Long Island Automobile Club held its regular monthly meeting at the clubhouse, 920 Union street, Wednesday evening. The entertainment took the form of a beefsteak dinner. It was a busy evening, as the program following will indicate: Music and preliminaries at 6 p. m., meeting at 6:30, banquet at 7, presentation of silver cups at 8:15, addresses at 8.30 and advanced vaudeville at 9:15.

At the meeting, besides the regular business of the club, forty applications for membership were favorably acted upon, and the nominating committee reported nominations as follows:

For president, Allen C. Alderman; for vice-president, Louis T. Weiss; for treasurer, Charles C. Cluff (renominated); for secretary, C. Stewart Cavanagh; for governors (two years' term), Frank G. Webb, William Schimpf and Dr. C. B. Parker; for membership committee, J. Pell Disbrow and William M. Alford. No opposition nominations are expected. The election will take place at the annual meeting, to be held December 1. President Webb declined a re-election, stating that business duties made its acceptance impossible. Nominee Alderman has been a most prolific member-maker.

HISTORIC BUILDING BURNS IN DETROIT

DETROIT, Nov. 22—The old Biddle House, in this city, which half a century ago was a notable hostelry, was burnt to the ground last week. The ground floor was occupied by a number of automobile concerns. The Firestone Tire Company lost about $20,000, the Jackson Automobile Company $2,500, the Republic Rubber Company $2,000, the Detroit Tire & Repair Company $1,000 and the Studebaker Automobile Company $1,000. These losses were fully covered by insurance.

WINNERS OF SAVANNAH-ATLANTA RUN

SAVANNAH, GA., Nov. 21—The winners in the Savannah to Atlanta endurance run have been announced by Arthur W. Solomon, chairman of the technical committee.

It was found that in Class A, for cars listing at $2,000 and over, Dr. Craig Barrow, driving a 24-horsepower Stevens-Duryea, had made the trip with a perfect score, which of course meant first prize.

In Class B it was harder to decide, and after going over the cars for the second time it was found that two were tied, these being a Crawford 30-horsepower, driven by W. C. Mahoney, and a Maxwell 30-horsepower, driven by Robert Brockett, Jr. The prize in this class will be divided.

Again in Class C the same trouble came over the technical examination as it did in Class B, and two cars were again declared tied, these being a Maxwell 10-horsepower, driven by E. G. Gager, and a Buick 22-horsepower, driven by E. A. Weil. The Maxwell in this class is the same car that made a perfect run from New York to Atlanta. The prizes in this class will be divided.

Next Run From Savannah to Jacksonville

It seems certain that the next run to be given by the Savannah Automobile Club will be to Jacksonville, Fla. If this run is arranged it will work out the last link to blaze the way in the New York to Jacksonville highway.

The run may be in the latter part of April or the first part of May. The distance is something like 162 miles, and can be easily made in nine hours, which, of course, would take less than a day. The entrants would be much more numerous than in the run to Atlanta, this because of the fact that concurrent with the Atlanta run, there were several other runs from Georgia cities. Entries would be received from all the cities along the road, and also from Jacksonville.

NEW BOOKS FOR AUTOMOBILISTS

"Sicily; the Garden of the Mediterranean"—Those modern gypsies, the automobilists, will find an inspiration in this latest volume from the press of L. C. Page & Company. Will S. Monroe, author of "Turkey and the Turks," and "In Viking Land," signs his name to this additional work of biography, as it were, of a land and its people. Mr. Monroe speaks interestingly of the history of Sicily, and of the origin, social conditions, religion, education, industries and art of its people. To each of the principal cities is devoted a chapter, not forgetting unfortunate Messina. Tourists will read with especial interest the chapter on "Hostelries, Brigandage and the Mafia." Hotel keepers appear to be of even a more predatory nature in Sicily than in other parts of the world, and their wiles are many and surprising—amusing, too, when one's self is not the victim. Brigandage, according to Mr. Monroe, has almost disappeared, and the Mafia is on the decline. The volume, printed on thick, tinted paper, is handsomely bound in cloth, and its 400 pages are enriched by innumerable full-page illustrations.

"Guatemala and Her People of To-Day"—Guatemala is virgin territory for the automobilist. Although comparatively near this country it is little heard of save when an occasional revolution finds a scant paragraph in the daily papers. "Guatemala and Her People of To-day," by Nevin O. Winter, is another of the publications of L. C. Page & Company, in its series of works on the various countries of the globe. Roads in this country of few accomplishments and great possibilities are in a most rudimentary condition; yet with development they must inevitably improve, and that time is not so far away. The awakening has already begun. Gautemala has extensive coffee plantations, and growths of rubber which might be developed to much profit, especially in view of the rising price of that article. Automobiles will no doubt play an important part in the future transportation systems of the country. This volume is a companion to the others of the Page series, and the typographical work is up to standard, illustrated with no less than 49 full-page plates.

THE LAW AND THE AUTOMOBILE

HOLDS NEW JERSEY LAW IS CONSTITUTIONAL

TRENTON, N. J., Nov. 19—The Supreme Court, in an opinion by Justice Reed, has sustained the constitutionality of the Frelinghuysen automobile law. The law was attacked principally on the grounds that it was an improper interference with interstate commerce. The White Company of New York sent R. H. Johnston, its advertising manager, through the State in a machine loaded with parts intended for the Philadelphia branch, so that the car was directly engaged in interstate commerce. The driver of the car was arrested for failure to comply with the provisions of the law.

The law was attacked on the following points:

First—The right of the State to license automobiles not according to true value, but according to the horsepower.

Second—Is this not a double tax, as the first tax is levied by taxing assessors?

Third—That the law puts automobiles in a special class for the purpose of taxation.

Fourth—That this is a tax on interstate commerce in violation of the Federal Constitution.

Fifth—This tax is a violation of the fourteenth amendment of the Federal Constitution, and

Sixth—That the act discriminated against citizens of other States because it compels the designation of an agent upon whom process may be served in this State.

Justice Reed bases his decision on the police powers of the legislature. He says that the automobile is a dangerous machine, and that the first duty of the State is to protect the public from danger to life and limb. He further says that the so-called taxing of automobiles is really licensing, as properly called under the Frelinghuysen law, and therefore not unconstitutional. He denies that anyone has an inherent right to use the highways for automobile travel. The opinion may be summarized on the following points:

These provisions (license fees) are legitimate exercises of the police power of the State, notwithstanding the clause in the statute that requires all fees, fines and penalties arising under the act to be paid to the State Treasurer, and to be apportioned by the State Road Commissioners for the repair of improved roads.

If it was necessary to regard these provisions as an intentional legislative imposition of a tax for revenue, they yet would not be unconstitutional.

The provisions requiring each non-resident owner of an automobile to designate an agent in the State upon whom process may be served in any action against the owner growing out of the operation of his registered machine in this State is not unconstitutional.

In view of the present need of a vigorous enforcement of these laws for the protection of all users of the highways, I am of the opinion that the condition imposed that a man who proposes to use our highways for motoring shall agree to submit himself to the courts of the State into which he comes is legal.

MARYLANDERS DRAFT PROPOSED AUTOMOBILE LAW

BALTIMORE, Nov. 21—Harmony was the keynote of the conference between the Maryland Automobile Commission, appointed by Governor Crothers to draft an automobile law for passage by the State Legislature, which convenes in January, and the Automobile Club of Maryland, at the club house last Wednesday evening. The long-sought compromise on the figures of taxation was made after a lengthy discussion, in which both members of the commission and the club participated. These are the rates decided upon:

For cars of 20 horsepower and under	$6
For cars of over 20 horsepower and not more than 40	12
For cars of more than 40 horsepower	18

It was also decided to fix the salary for the proposed automobile commissioner at $3,000 a year.

MASSACHUSETTS LAW OPERATIVE JANUARY 1

BOSTON, Nov. 20—By the new automobile law passed by the Massachusetts Legislature last Spring, the Highway Commission is permitted to begin its preparations for reregistering cars and reissuing licenses the first of December of this year, though the bulk of the law does not go into effect until the first of January. The commission is taking advantage of this provision, and has so far progressed with its plans, that it expects to be able on the first of next month to send out the new application blanks for both registration certificates and licenses, and to issue number plates as fast as applications are received. The commission has made this early preparation because of the fact that the new law requires almost revolutionary changes in the methods heretofore pursued. Up to this time, from the passage of the first automobile law in 1903 all private operator's licenses have been perpetual. There have been issued 34,702 of these licenses and the new law annuls them all. How many there are in actual use the commission has no means whatever of telling, but it is confident that at least half of them will be renewed and perhaps the proportion will be even larger.

Aside from having to renew all the licenses of private operators, no mean task in itself, the commission has to reregister the cars. There are over 23,000 of them in the State and probably many thousands will be registered immediately, as their owners will want to use them all through the Winter. And they must be reregistered on the new horsepower basis with fees graded from $5 to $25. In addition there is a large number of motor cycles to be reregistered.

The commission has made a change in terminology. "Private operator" is now merely "operator," and "operator for hire" is "chauffeur." No person under 16 years of age can receive an operator's license and no person under 18 years can receive a chauffeur's license. Persons to whom operator's licenses have been issued at any time during the past six years can obtain a new license under the renewal clause, paying 50 cents instead of $2, the fee for a new license. The application blank for a license contains no less than sixteen questions to be answered under oath, including date of birth, color, sex, height, weight, color of hair and of eyes, experience in driving motor cars, criminal record so far as motor laws are concerned if any, habits as to use of intoxicating beverages, physical or mental infirmities and familiarity with the law of the road.

NEW LAW PROPOSED FOR BUCKEYE STATE

COLUMBUS, O., Nov. 20—A bill has been prepared by Representative Ritter, chairman of the finance committee of the Ohio House of Representatives, providing for graduated fees for the registering of automobiles in the Buckeye State. The bill, which will be introduced in the General Assembly early in the session in January next, provides for a tax of $3 for all electric cars, $5 for all gasoline and steam cars up to 20 horsepower, $10 for all cars between 20 and 40 horsepower, and $15 for all above 40 horsepower. Trucks will be charged $5.

It is known that fully 25 bills will be thrown into the hopper early in the next session of the General Assembly, and the Ritter bill will probably be united upon by autoists to keep freak legislation from being placed on the statute books. The Ohio State Automobile department is of the opinion that the present law is sufficient. Mr. Ritter has come to the state department for suggestions, secured from experience.

There is some doubt if a law providing for different fees, based on horsepower will withstand the tests of constitutionality in the courts. In the present law, which was carried through all the tribunals of the state, the fee was declared not a license but only the exercise of police powers. It may be that increased fees will be construed as licenses, which is contrary to the Ohio constitution.

CHICAGO CLUB IN VARIED LEGAL ACTIVITIES

CHICAGO, Nov. 20—Directors of the Chicago Automobile Club have gone on record as favoring the erection of permanent gates at draw-bridges, and have appointed a special committee, consisting of F. W. Blocki, Allen S. Ray and T. J. Hyman, to investigate the matter. Secretary C. A. McDonald, who is also the club's legal adviser, will then draft an ordinance which the club will present to the city council for adoption. One of the features of this bill will be the suggestion that the gates be placed forty or fifty feet from the bridge.

Discussion of the tail-light law, which was scheduled for the meeting Thursday, was prevented by the fact that Secretary McDonald has been unable to find in the official reports of the council's proceedings any reference to the passage of such a measure, although it was reported in the daily papers.

More work was also given the legal-minded secretary in relation to the club's probe to find out what the various towns and villages in the vicinity of Chicago have done with the money collected from scorchers. This money is supposed to be spent on the improvement and repair of the highways. The club has been investigating this for some time, and has reason to believe that all the money has not followed the proper course. The city of Chicago reported that a considerable sum had been turned over to the park commissioners.

THE OHIO AUTOMOBILE LAW AND ITS WORKINGS

By FRED. H. CALEY, STATE REGISTRAR OF AUTOMOBILES.

WITH the advent of high-powered automobiles capable of being driven at a high rate of speed along the roads and highways of this State there arose the necessity of some method of regulating and identifying these motor vehicles. To that end the Ohio Legislature in 1908 enacted what is known as the Ohio Automobile Law, which becomes effective on June 10 of same year. It provides, in brief, that all motor vehicles shall be registered annually in the office of the Secretary of State by the filing of an application containing the correct name and address of the owner, and a detailed description of the car, together wtih a fee of $5 for each steam and gasoline and $3 for each electric automobile owned or hereafter acquired. The Secretary of State issues a certificate of registration or "license" card and two number plates bearing the distinctive number assigned to such motor vehicle which are to be conspicuously displayed, one in front and one in rear of the car.

The rates of speed at which motor vehicles may be legally operated are provided by the statute and each motor vehicle is required to be properly equipped with lights at night.

Under the provisions of this law as originally enacted all "licenses" continued in force for one year from date of issue. This involved considerable confusion and the last Legislature so amended the law that all certificates of registration now expire at the end of the calendar year for which they are issued. Certificates of registration issued in 1908 expire one year from date of issue and must them be renewed for the period from such date of expiration to January 1, 1910. The fee for registration cannot be pro rated for a part of a year, and certificates of registration and number plates are not transferable in any event, either from one automobile owner to another, or from one motor vehicle to another. An automobile owner is required to register each motor vehicle owned or acquired. An amendment to this statute will be offered when the Legislature convenes providing that in case of sale or transfer of ownership of a car the original owner may, if he immediately acquires another car, file a description of his new car in the office of the Secretary of State accompanied by a nominal fee of $1 and be re-issued the same number and number plates for his new machine.

The net revenue acquired from these registrations is converted into the State Treasury monthly and maintained as a separate fund for the improvement, maintenance and repair of the public roads and highways in this State and is apportioned as the State Highway Fund is proportioned by law.

The paramount object of this statute, however, is to provide for the absolute identification of the owner and operator of every automobile driven upon the roads and highways of this State. A full and accurate list of all the ledger records of this department is furnished to the clerk of courts in each county of the State, and additional registrations are furnished monthly. This list contains the name of the owner and his address, his registration number and a detailed description of his car and is provided with a numeral and a name index alphabetically arranged. In case of an accident occurring in a remote part of the State it is not necessary to write to the Secretary of State to ascertain the name of the owner of any automobile, as this information can be procured at the office of any county clerk.

One of the most beneficial results of the State law to the automobilists has been the elimination of what was known as the "city licenses." Heretofore each city in the State had a local license ordinance providing for the imposing of a fee of from $1 to $7.50 for a license on each automobile. The Supreme Court has recently decided that these city licenses are unconstitutional inasmuch as they conflict with the provisions of the State law.

Reciprocal relations have been entered into with the secretaries of States and automobile departments of other States, and Ohio "licenses" or number plates are now recognized in practically every State having automobile registration, with the exception of New Jersey and Maryland.

As a result of this statute there was converted into the State Treasury for the fiscal year ending November 15, 1908, the sum of $46,000 in round numbers, being the net receipts for the first four months' operation of the law. The net receipts for the year ending November 15, 1909, will approximate nearly $100,000.

By reason of letting all contracts for the furnishing of number plates and chauffeurs' badges by competitive bidding the expense of the department will be greatly reduced for the year 1910.

The department is conducted upon a strictly business basis, and we are endeavoring to insure a maximum amount of efficiency with a minimum amount of expense.

There are now registered in this department in round numbers twenty-three thousand owners, four thousand chauffeurs and about five hundred manufacturers and dealers.

The growth of the automobile industry during the past ten years is astounding. The city of Cleveland alone has nearly 5,000 machines, or nearly as many as in Toledo, Columbus, Dayton and Cincinnati combined. There are more automobiles in Columbus to-day than were operated in the entire United States eleven years ago. It is estimated that the total number of machines in the United States in 1898 was less than 1,200. Now there are over 180,000, and the manufacturers' associations estimate that during the year 1910 there will be made and put upon the market over 200,000 new cars, or 20,000 more than the entire output of all the factories in the country during the past ten years.

There is probably no class of citizens who are more intensely interested in good roads and who suffer more inconvenience from bad ones than the automobilists of this State.

A number of eminent silk hatted, faultlessly attired gentlemen have met from year to year in a so-called good roads convention. They have "resolved" and "resoluted" by endorsing various methods of road building and have made two-hour speeches in which everybody was urged to "co-operate" with everybody else, but the automobilists of the State have waited in vain, until now, to see the man with the shovel.

This convention, I take it, gentlemen, is a convention of actual road builders. You are not here for the purpose of passing compliments, or listening to platitudes, but to devise ways and means for improving the highways of this and every other State in the United States in the best and most ecenomical manner, and to that purpose the automobilists of Ohio, who are 25,000 in number this year and will be 40,000 next year, are ready to assist you. The automobile owners of Ohio do not object to paying a registration fee, but they insist that the revenue derived shall be devoted to this purpose. What we need, however, is not so much of an appropriation of revenue as an appropriation of brains. If we can convince the members of the Legislatures of the various States that the money appropriated for road purposes will be properly and judiciously expended there will be no trouble about ready money forthcoming to carry on the work.

Paper read before the National Congress of Road Builders, and the American Road Makers' Association Convention, Columbus, O., Oct. 27, 1909.

THEORY AND WORKING OF THE THERMOSYPHON*

By D. Siebenmann, M.E.

WITH reference to no other part of the modern automobile does there appear to be such an erroneous impression prevalent as with regard to the working of the thermosyphon system of circulation. Before taking up the subject, I must first refer to a scientific discussion regarding the need for the characteristic broad return pipe in order to create a great amount of space for the return flow, that has been dwelt upon by a well-known expert.

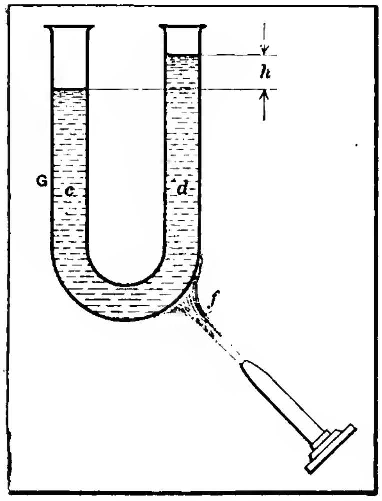


Fig. 1—Test tube, filled with water, showing flame from Bunsen burner playing against same

There are so many different parts of wholly variant nature to be designed and allowed for in the construction of an automobile, that it is quite conceivable errors may be made in the above form, and that without in any way reflecting upon the designer. Then woe to the builder—as in the automobile industry, unfortunately, it is at his door that failures are commonly laid—if he adopts something the operation of which is not entirely clear to him. The responsibility for numerous failures is due to the fact that the particular construction has been adopted without a sufficiently detailed investigation, its merits have been passed upon purely from surface indications of value, and this is especially the case where the thermosyphon is concerned. It just so happens that articles on this subject have fallen far short of covering it completely.

Data Throws Light on Former Unsatisfactory Results—The following, which consists of data compiled by the well-known firm of Renault Frères, serves to throw light on a number of things, and above all on the errors in the relation of the parts peculiar to this type of cooling system. At the outset, the results obtained were most unsatisfactory, and the conclusion was accordingly reached that sufficient cooling was not obtainable in this manner and this system was not available for use on the automobile. But this was entirely erroneous. By properly calculating the size of the various parts, taking into consideration all the necessary factors, which are now well known, any cooling effect desired is obtained.

In a definition of the term "thermosyphon" we have an expression that is about as far from being indicative of its real nature, as are many others to be found in automobile terminology. A much better term would be "heat-circulating." The word indicates that under the influence of heat, a circulation is set up, and it is quite apparent that heat is the moving force acting on the water. Experiments have shown the causes of this movement to be as follows: See Fig. 1. *G*, is a U-shaped test tube, the legs of which, *c d*, are filled with water; *f* is a Bunsen burner, the flame of which is directed against the leg *d*. The flame is allowed to play against this part of the glass until a definite relation of the surface of the water in this leg of the tube is established with regard to its loss in weight.

This will continue at the expense of the density of the water until a so-called thermal column of the height of *h* will be raised. The two legs *d* and *c* may then be joined at the height of *h* by a tube, so that the level will be restored, both columns then having the same weight, which will set up a circulation of the water. Here, then, is an explanation of the principle involved, showing the reason for the circulation. The driving power of the latter is indicated by the thermal expansion of the column, and the greater this driving power, the more lightly is the density relation between the cold and warm columns of water defined. This power must overcome the friction of the water against the tube, cooling effect of the walls, changes in direction, contraction, and like factors of resistance opposed to the circulation. The value of these factors may be ascertained accurately and in such a manner that they may be brought into definite relation with one another and a positive circulation established, so that the details of a thermosyphon system may easily be planned ahead. These being known, a typical example may be constructed. Fig. 2 is a graphic representation of such a cooling system.

Some Theoretical Considerations—*M* indicates the motor, *L* the return tube, *K* the radiator and *m m* the center or dividing lines of the hot and cold zones of the motor and radiator, *b* representing the vertical distance between the two. It follows then that:

W volume warm water delivered.
d inside diameter of *L*.
t_1 temperature of outgoing water.
t_2 temperature of returning water.
γ_1 density of outgoing water
γ_2 density of returning water.
g acceleration of the drop $= 9.81$ m/sec.
l length of the tube *L*, in meters.
ρ coefficient of friction.
ξ coefficient of resistance.
v speed of the circulation.

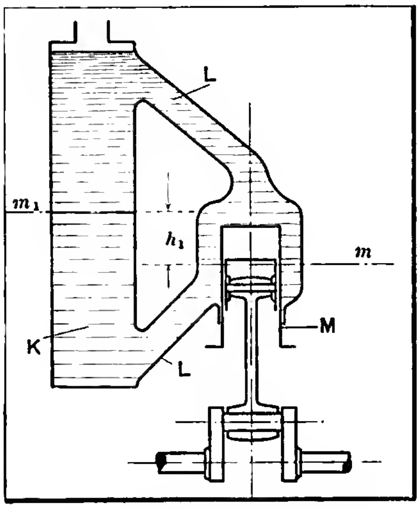


Fig. 2—Typical example of thermosyphon cooling system

The equation for *W* is then as follows: (Rietschel, *Sanitary Heating*, 1891; Birlo, do., 1891).

$$(1) \qquad W = \frac{d^2\pi}{4} \times v \frac{\gamma_1 - \gamma_2}{2} (t_1 - t_2) \times 1000 \times 3600.$$

While the number of heat units per hour and the speed of circulation necessary are derived from the following formula:

$$(2) \qquad v = \frac{W}{10000} \times \frac{1}{275.65\, d^2 (t_1 - t_2)} \text{ m/sec.}$$

*Translation from the German of "Der Allgemeine Automobil Zeitung," by Charles B. Hayward.

W is known in each case, but d and v must be taken for the master formula (3) which will give the attainable speed of flow.

$$(3) \quad h_1(\gamma_2 - \gamma_1) \geqq \frac{v^2}{2g} \times \frac{\gamma_1 + \gamma_2}{2} \times \left(l \times \frac{\rho}{d} \Sigma (\xi) \right).$$

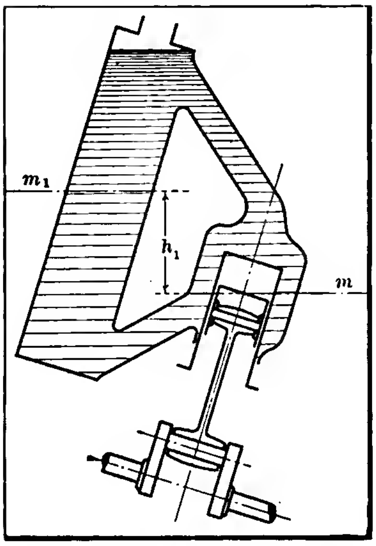


Fig. 3—Showing inclination of thermosyphon system mounting a 20 per cent. grade

This formula will be found to produce substantially different results, so that the operation should be repeated, taking a different value for d. In no case should the product of the right member exceed that of the left.

Coefficients of Resistance the Same as Air.—The coefficients of resistance are approximately those established for the movement of air, the principal ones with which we are concerned in the present case being as follows (Rietschel's *Manual,* 1894):

1. Increase of section $\quad 1 - \left(\frac{f}{c^2 f_1}\right)^2$

2. Decrease of section (obstruction) $\quad \left(\frac{f}{c^2 f_1}\right) - 1$

3. Contraction, inlet of same diameter $\quad$ 1.0 (c = 0.85)

4. Contraction, with enlarged inlet $\quad$ 0.5 — ~ 0.2 (c = 0.90)

5. Right-angle bend, sharp corners $\quad$ 1.5

6. 135-degree angle $\quad$ 0.6

7. Right-angle bend, rounded $\quad$ 1.0

c = linear contraction coefficient.

f = cross-section of tube.

The friction coefficient is, according to Weisbach:

$$(4) \qquad \rho = 0.01439 - \frac{0.0094711}{\sqrt{v}}$$

and the volume and degree of density of the water in a temperature range from 0 to 100 deg. C. is as follows:

Temperature C	Volume	Weight Kilos	Temperature C	Volume	Weight Kilos
0	1.000117	0.99988	50	1.01196	0.98818
4	1.000000	1.00000	55	1.01434	0.98587
5	1.000008	0.99999	60	1.01692	0.98336
10	1.000264	0.99974	65	1.01961	0.98077
15	1.000852	0.99915	70	1.02263	0.97787
20	1.001741	0.99826	75	1.02572	0.97492
25	1.002897	0.99711	80	1.02891	0.97190
30	1.004300	0.99572	85	1.03222	0.96879
35	1.00582	0.99421	90	1.03571	0.96552
40	1.00771	0.99235	95	1.03933	0.96216
45	1.00981	0.99029	100	1.04312	0.95867

It may seem that this method of calculation is somewhat rambling and lengthy, but it is, however, the shortest way of solving the problem. It would be more complicated if the amount of cooling surface necessary for various pipes were taken. Then it would be necessary to outline a formula for the maximum speed of flow in each different conductor. Thus:

$$(5) \qquad \frac{\gamma^2 - \gamma^1}{\frac{\gamma^1 + \gamma^2}{2}} = a,$$

and the formula for any particular stretch of conductor n, would be as follows:

$$(6) \quad a \times h_1 = \frac{v_n^2}{2g}\left(l_n \frac{\rho}{d} + (\Sigma \xi) \right) + \frac{v_{n1}^2}{2g}\left(l_{n1} \frac{\rho}{d} + (\Sigma \xi) \right) \text{ etc.}$$

For a predetermined temperature drop and cross-section of conductor, we may obtain constants from formula No. 2, which will serve to greatly simplify the calculations.

What Influence the Height *H* Has—The importance of the factor h_1, representing the vertical distance between the center lines of cold and warm zones, is very evident in the different formulæ. Were this equal to zero, or even negative, a circulation would naturally be out of the question, and the higher the cool body of water is placed over the hot, the greater will be the driving force, and, in consequence, the speed of the circulation. But the vertical distance h_1, separating the two levels, as it appears in Fig. 2, can hardly be accepted as a fixed relation, particularly where the conditions were not favorable. It must not be forgotten that we are not dealing with a stationary installation, and that even in traveling over good roads, the rising and falling would be such that the relation of the two would be continually changing, now above and again below.

Assume, for instance, that the automobile of which the cooling system illustrated by Fig. 2 forms a part, is mounting a 20 per cent. grade, which gives us Fig. 3, and in which it will be evident that the relation has been altered in such a manner as to make it much more favorable for rapid circulation of the cooling water. The distance h_1 has been increased substantially and with it the driving power of the circulation. This is a prominent and peculiar characteristic of the thermosyphon system that makes it particularly advantageous for automobile work, for the motor runs much hotter in hill-climbing and the intensity of the water circulation is increased to correspond. Naturally, the relation taken in the foregoing formulæ is that which obtains in ordinary running and is based on the minimum amount of cooling necessary under such circumstances.

Form of Cooling Used by Leading French Firms—Another example of this type of cooling system is shown in Fig. 4, which illustrates its arrangement as applied to the Renault cars, on which the radiator is placed behind the motor in order to obtain a relation between the hot and cold levels that will insure a strong circulation. It will be evident that here also the unfavorable conditions brought about in hill-climbing have been taken into consideration. In view of the insignificant amount of driving power available, it is marvelous that even a minimum speed of flow should be produced. To put this on a basis where its regulation will be absolutely certain and always bear a constant relation to the working of the motor, the complete temperature range should be worked out. For a system with a total height of 0.3 meter for h_1, and a temperature drop of from 90 to 40 deg. C., the driving power is obtainable from the following:

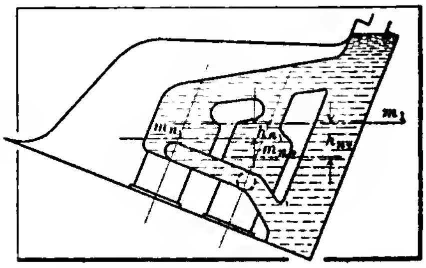


Fig. 4—Form of cooling system used in leading French cars, notably the Renault

$$(7) \quad \text{Total: } a \times h_1 = \frac{0.99235 - 0.96552}{\left(\frac{0.96552 + 0.99235}{2}\right)} \times 0.30 = 0.00725 \text{ m.}$$

So that under unfavorable conditions, such as mountain climbing, as shown by Fig. 3, there would be a head corresponding to the pressure of a water column of 7.25 mm.

Careful attention should be devoted to the laying out of the conductors—the greater the diameter, the less the resistance and, consequently, the greater the speed of flow. It is seldom possible to make the latter exceed .03 meter per second, even with conductors of large diameter, for if the change naturally took place more rapidly and the difference in density were eliminated, the temperature drop would be insignificant.

Another Point of Vital Importance.—There still remains an item of importance to be taken into consideration; an excessive amount of space must not be allowed between the sections or tubes of the radiator. While the friction will be insignificant where tubes of literal cross-section are adopted, as recommended, on the other hand, it must also be considered that the heat-conductivity of water is slight (0.51 according to H. F. Weber) and that if the interior arrangement is not such as to insure a quick and steady movement, light counter-currents will be set up with detrimental results to the cooling.

Consideration should therefore be given to the question as to which of the two most essential cooling appliances is the most suitable, in order that it may be definitely determined. In general, however, it may be maintained that from the standpoint of efficiency and simplicity, it is difficult to render definite and decisive judgment as to the superiority of either the thermosyphon, or the pump circulation system of cooling, except insofar as the omission of the pump makes a logical conclusion inevitable. Then there is the greater certainty of operation, the far simpler arrangement, and the decreased danger of freezing to be mentioned. It will be apparent from the foregoing that for the thermosyphon system, as opposed to pump circulation, all radiators are not well adapted, so that the latter has an advantage and that is the slight temperature drop.

Provided that the pump exerts a strong and constant suction, the average temperature of the water will be considerably higher, owing to the increased speed. It follows, therefore, that there is a greater delivery of heat per unit of surface, and this is an advantage in which the thermosyphon is lacking. For the same thermal efficiency, the radiator employed with the thermosyphon system must also be larger. How much larger still remains to be definitely determined. Only the investigations of Péclet give any data on this point. However, there exist authentic data on the coefficients of heat dissipation for arbitrary speeds of flow of the cooling fluid under such conditions, although the automobile industry does not appear to have taken advantage of this information as yet. We have simply established the rule according to which the speed of heat-dissipation through a wall is governed, and that the resistance of a body of water to undergo a drop in temperature is inversely proportional to the strength of its movement. Investigations are now being carried on with a view to the further development of the thermosyphon system of cooling, and particularly as a means of trying to overcome the disadvantages mentioned above, but the present status of the experimental work does not permit of publication of the results, as yet. The thermosyphon system is largely in the minority, so far as its present use is concerned, but it is certain that its application will ultimately be general and then the causes referred to will have been overcome.

A STORY OF THRIFT AND AN AUTOMOBILE

By H. L. W.

LESS than fifteen years ago two very young people in a mid-Western State were married. Their possessions were a sewing machine, a few yards of new rag carpet, a few dishes, a little bedding and a few pieces of old furniture. They had little or no money.

The first few months were spent on a farm as tenants where they had a house, rent free, and a garden plot and could keep a few chickens. Both were frugal and had no bad habits, and added a little to their goods. Then the man took a position at $40 per month as clerk for a grocery firm in X——, a town of 8,000 or more population.

The wife did all her own house-work and sewing. Having a good eye for a bargain, and quick to see the possibilities of remnants, she dressed on almost nothing. She was also a good cook. In the fruit season her husband on Saturday nights obtained, for very little, fruit that the firm would not risk keeping over Sunday. This she put up for winter, thus securing enough for their use at a merely nominal cost. A baby came before the end of their first year, adding to their expenses.

After a year or two with this grocery firm the man found a similar position in a larger town. This store did a big business and he soon became in fact, if not in name, manager, though his salary attained only $60. The close confinement affected his health and after a year or two he returned to X——, where he obtained a position as traveling salesman for a wholesale grocery house. He speedily rose to be one of its few best salesmen. His wife still did most of her work and sewing, although the children now numbered two.

While working for this firm he invested his savings in a lot and built a house, borrowing from a building and loan association. This debt was discharged rapidly and they were the proud possessors of a comfortable modern house with a fine lot.

Manufacturers, to push their goods, offer premiums (of cash sometimes, but more frequently of silverware, articles of furniture, etc.) to the salesman traveling for houses buying from them. The man did so well that their house was largely furnished by his premiums, among them being one or two musical instruments and a phonograph. In this way in time he secured two or three phonographs with nickel-in-the-slot attachments. These he put up in railroad stations on his route, paying, of course, a percentage for the privilege. These machines, each, brought in several dollars monthly.

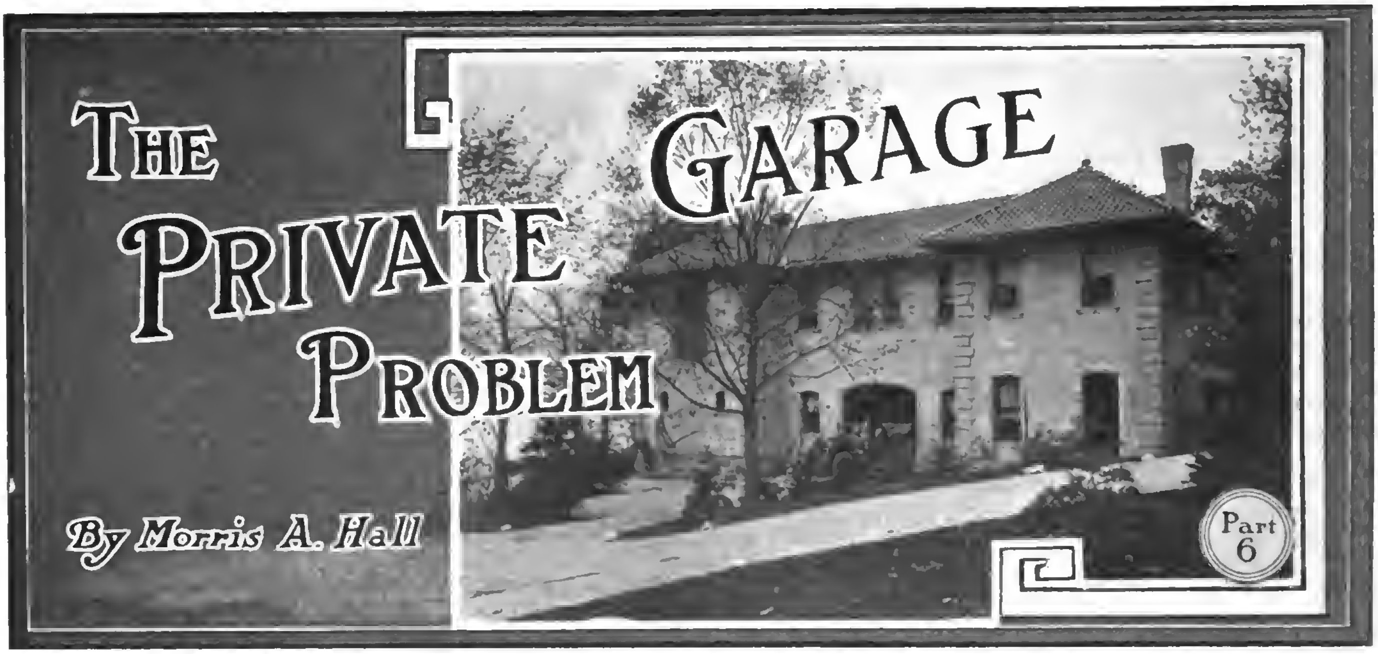
In time his house proposed to give him a certain sum in cash yearly in place of settling his expense account. He took the offer, bought an automobile, using it as far as possible to make his trips, and nearly paid for it with what it saved for him the first year. There were, of course, some places that he still had to make by train all the time, and others that had to be reached thus when roads or weather made the automobile impossible.

He had an inherited bent for mechanics and was soon selling automobiles as a side line, his wife attending to this business for him in his absence. This trade grew rapidly till the machines came in by the car load. They were sold on commission, which was clear profit, as they were delivered on arrival, and so no expense for store-room was incurred.

Convinced there was more money in the automobile business than in groceries, he resigned his position and removed to a town farther west. Here he started a garage and repair shop, and bought and sold machines. He now owns considerable real estate and is sole owner of his business. On an invested capital of $10,000 he recently cleared in one year $9,000 above all expenses, including living.

His wife has been of great assistance, keeping books for him and running the business in his frequent absences. To do this, she has employed a competent housekeeper, wisely considering her time worth more in the office than in doing housework. This does not mean that the home or the children have been neglected Two better behaved children it would be hard to find. Nor does it mean a total sacrifice of self. She has found time to study and take lessons in subjects which her limited advantages in girlhood prevented her acquiring before marriage.

These young people—neither is yet forty—have not denied their children or themselves reasonable pleasures. In later years they have traveled considerably. But from the first, they have kept well within their income and have watched for opportuni- which no one can justly say is not rightfully theirs.



Large Ornamental Cement Private Garage and Stable at Yonkers, Overlooking the Beautiful Hudson River

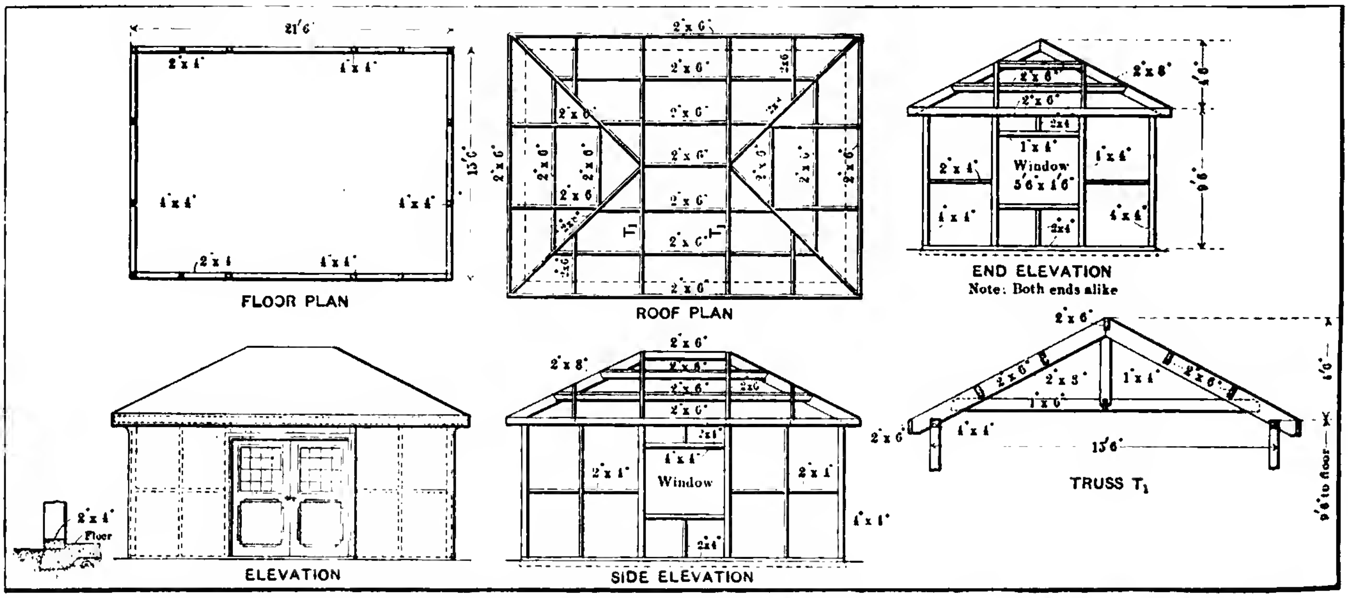
CONTINUING our concrete and cement story from last week, a number of garages of larger size will be given. In these, while no attempt has been made to produce great architectural beauty, the designs and actual work of construction show considerably more scope and, therefore, require somewhat different treatment from those previously given.

While the small house built by the man of modest means and for that reason, very simple, is by far the most interesting, the larger buildings represent more thought and may not be as lightly dismissed. For one thing, the larger sizes mean longer walls, and larger unsupported walls and roofs. This necessitates considerably heavier iron for the reinforcing and more of it, when the reinforced form of concrete is used. And when it is not used, this means much heavier walls; that is, walls of a much greater thickness. The reinforced form, too, will have greater thicknesses of concrete.

In the larger sizes, the roof design is easily the biggest problem, for it is desirable to have an unobstructed floor—that is, without posts. Now the bending moment at the middle, the point of greatest strain, varies as the linear width, but as the cube of the thickness of the supporting member. So if the width is doubled, the thickness is multiplied by 9. This would lead to some unusual thicknesses, so that the strength is increased by more internal reinforcement, rather than simply increasing the thickness of the material.

Another problem enters as soon as the number of cars to be housed passes one, and that is the matter of maneuvering space. With a single car, the shifting around may be done outside and the movement within restricted to a simple in and out motion. With two cars, this same thing does not hold, for there will be the pit, cutting into the available floor space. This, too, must be considered in such a situation as: one car properly placed, and another coming in, with a necessity for the use of the pit. In that way, the two-car garage must allow for about three cars: that is, space for each of the cars and additional space large enough to allow either one to go to the pit without disturbing the other or moving it.

Larger Number of Cars Introduces More Difficulties—With additional cars this trouble becomes even more pronounced, thus with three cars there must be room for each one, plus sufficient space to allow any one of the three to go to the pit and return to its place without disturbing either of the others. This would



Complete Plans of Commodious, Medium-Sized, One-Car Garage to Be Built in Concrete on Metal Lath figure out to about floor space for five cars. This argument does not apply, however, to the public garage, since there every inch of space must be utilized at times, while at other times there is room for many more cars than are in the place. The writer has seen a dozen moved to bring one to the pit, this sounding like waste labor. It is, but labor is sometimes cheaper than space.

At the head of this article is to be noticed an excellent example of the private garage. This is not only a model garage, but, considered from an esthetic standpoint, has what many garages, even very large ones located on big estates, lack, namely, some architectural adornment. This garage shows, too, very plainly the tendency of the wealthy man not to tie himself up to any one method of transportation, provision being made under the one roof both for several large touring cars and runabouts, as well as several fine horses. This division of space really makes the building a combination barn-garage, but the features of building construction most suitable to the automobile are also very necessary to the up-to-date stable.

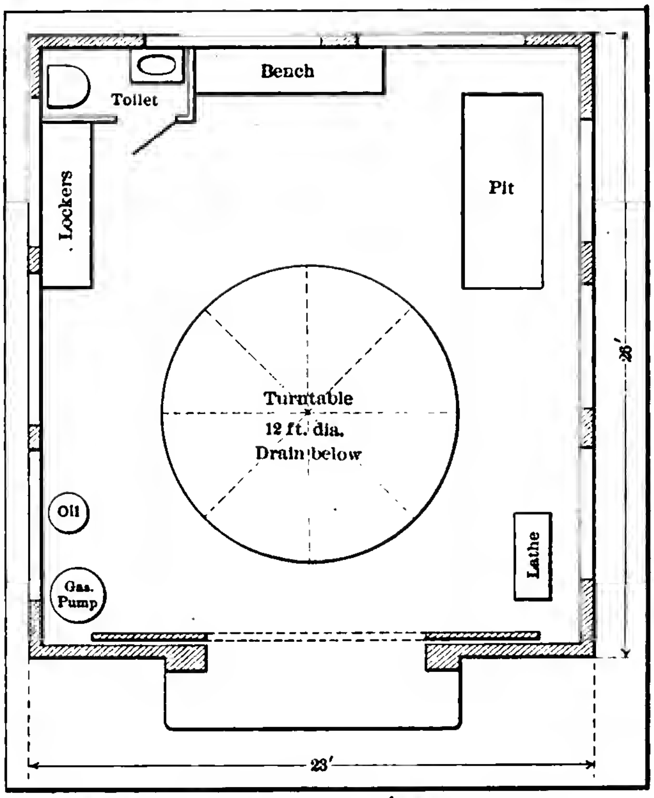
It might be mentioned in passing that this garage is located at Yonkers, but a few miles north of the New York City line on the direct road into the city. The owner, Rudolph Oesler, has several cars, a big Benz seven-passenger touring car and a runabout. The building is really in two parts, the lower for the cars and horses; the upper, living rooms for the coachman-chauffeur and his family. The convenience of the latter has been considered in more ways than one. Thus, the back side of the building, the one opposite to that shown, carries on the second floor level, a very large roomy porch, roofed over against inclement weather. On this, the employees may spend many a pleasant hour sitting in the shade (this being on the north side) and overlooking the Hudson River at their left and the main road north and south between New York and Albany at the right-hand side.

Like the building itself, the floors are of concrete, with a wash rack occupying the center of the large floor space. The projection on the right houses the harness-room and the door shown leads into the oil and gasoline storage-room. The whole left wing nearest the Hudson, which may be dimly seen in the distance, is given over to the horses. The automobiles, on the other hand, have the whole central portion and the back part of the right wing, behind the oil and harness-rooms. This gives an ell-shaped space about 25 feet by 30 feet long dimensions.

Another One-Car Cement Garage Plan—Before finishing up the story of cement in its relations to the small concrete garage, it will be advantageous to give another set of plans from which the amateur owner may, if he wishes, construct his own motor house. These are given on the previous page and show a more ornamental job than the one previously given for a single car. The shape is more nearly square, greater space being left along what would be the back side for closets, shelves and cupboards.

Being intended, like the other, for the use of concrete or cement plaster over a metal-lath, Hy-Rib or some other similar product, the walls are of wooden beams; mostly 2 by 4 and 4 by 4's. The roof, on the other hand—it runs up to a point, different from the others—is framed up in 2 by 6 and 2 by 8 timber, with a few cross-beams of 1 by 6 and verticals of 1 by 4.

Provision is made for three large windows, one in each end and one in the middle of the back opposite to the large, double sliding or hinged doors. As the floor plan shows, the space allowed for the car is very liberal, being 15 feet by 21 feet inside. This garage, like the previous small one, is intended, was designed, in fact, for the use of cement, and in order to use wood, corrugated iron, sheet steel, or other sheeting on the outside in place



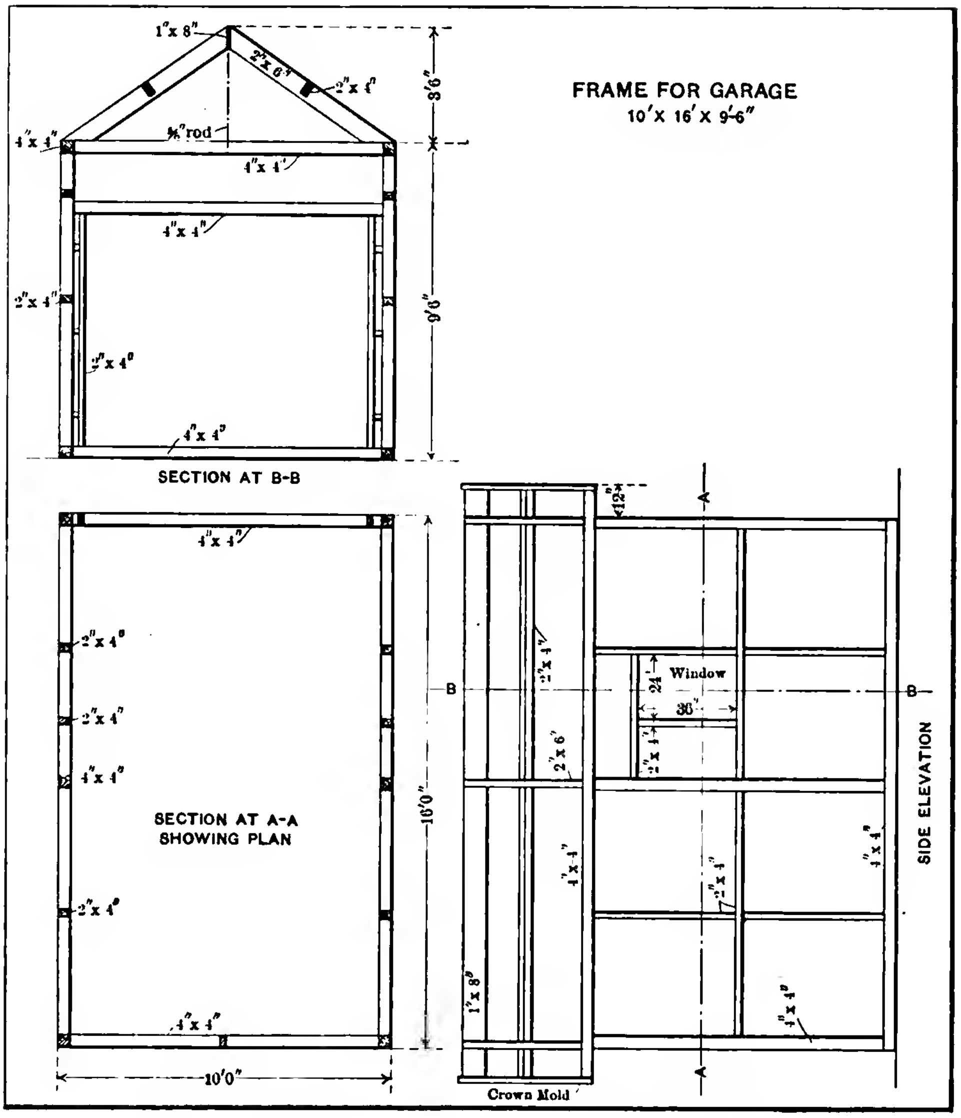
Suggestion for Large and Well-Equipped Garage

of cement, would require some small alternations. The bill of material and estimate of cost on this house, using the wooden framework shown and cement, as described, is as follows:

Bill of Material and Estimate—One-Car Garage

Frame—Sides,	4 x 4, 229 lin. ft.	
	2 x 4, 169 lin. ft.	
Roof,	2 x 6, 228 lin. ft.	
	2 x 8, 40 lin. ft.	
	1 x 6, 46 lin. ft.	
	1 x 4, 8 lin. ft.	
	Total, 726 sq. ft., at $20.00 per M..............	$14.52
	Cut and waste (15 per cent.)...................	2.18
	Labor, at $40.00 per M.........................	29.04
	Hardware, etc.	2.50
	Windows, double hinged, in place (estimated at $6.00 each).............................	18.00
	Doors (double, 8 x 8) in place.................	20.00
Walls,	612 sq.ft. No. 28 galv. Hy-Rib painted.	
	570 sq. ft. plastering, 1¾ in. thick.	
Roof,	475 sq. ft. No. 26 galv. Hy-Rib painted.	
	475 sq. ft. concreting, 1¼ in., and plastering underneath.	
	Water proofing at 3 cents per sq. ft............	14.25
	Making the total cost without Hy-Rib or cement	$100.49

Cement Garage and Stable of the Noted Horseman, C. K. G. Billings



Another Cement-Plastered One-Car Design, But Slightly Smaller

the owner of Lou Dillon, 1:58 1-2, the holder of many world's records, and of numerous other fast horses, to have a very large garage. But, as a matter of fact, his large combined stable-garage, located at Fort Tyron, One Hundred and Ninety-sixth street and Fort Washington road, New York City, as shown at the bottom of the preceding page, not only has not given over all of its spacious interior to the horses, but nearly one-half of the building is devoted to automobiles, the list of six or seven machines owned including all of the world's most famous makes.

This building forms an excellent example of what may be done in a very large building with concrete, being at the same time a most excellent design from the utility point of view and a very nice appearing place architecturally, although it probably would not be designated as beautiful.

Elsewhere is shown another plan for a small garage in cement of the same type and general description as the one for which the bill of material has just been given. Lack of space prevents giving the same for this structure, but it may be summarized. The total estimated cost, with lumber at $25 per thousand, and labor at $3.50 per day, exclusive of the same two items as before, is $79.30, which, adding twice as much for the omitted items, would make the whole cost about $240. The economy of reducing the floor space by 54 per cent is thus summed up in actual dollars, although this design is somewhat less elaborate, which doubtless had some little influence upon the total estimated cost.

Even if the omitted quantities be taken at twice the others, this makes the whole garage come to but $302, which is certainly very cheap for an all-cement garage of this size.

Turntable Really Enlarges Floor Space—As previously discussed, the maneuvering space needed when more than two cars are housed, is very considerable. In this connection the turntable forms a very useful adjunct of the modern large garage, for it economizes on the floor space. That is to say, having a turntable in the center of the floor does not cut out any of the floor space as a pit does. On the other hand, it allows swinging cars around within its own narrow confines and with absolutely no maneuvering other than a straight ahead run onto the turntable and another similar run off of it.

Aside from the big house, where it saves space, and thus first cost, it is of great and daily use in the small well-equipped house, where it saves much work, either of pushing the car by brute strength, or by carrying in fuel, starting a cold engine, and then backing and filling until the required location is obtained. On the previous page is shown a design for a small garage in which this feature is included. The outside width of 23 feet is like the length of 26 feet, ample. Although large, considered in the abstract, it is not any too large when the projected pit, lathe space, oil and gas pump space, lockers, bench, and toilet are all taken into account. Sliding doors are figured upon as economical of space and more handy to open and close than the hinged variety.

Noted Horseman's Big Concrete Garage and Stable—No one would expect as enthusiastic a horseman as C. K. G. Billings,

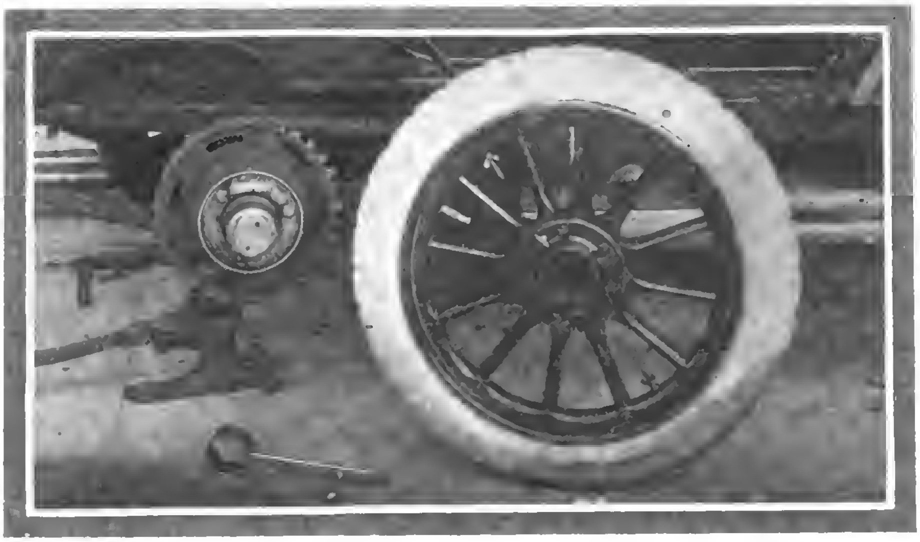
Playing so large a part in modern society, the automobile should be considered in the construction of a house. Then, too, in the general scheme, the advantage of knowing this, locating it, and figuring on it prevents marring an elaborate arrangement as might be done otherwise. On this page are a garage and the corner of a very elaborate residence. This is one of the show places of Long Island, Italian villa style. An ugly garage would spoil it.

(To be continued.)

Garage Built to Complement Fine Concrete Residence

DETACHABLE WHEELS POPULAR IN GREAT BRITAIN

COVENTRY, ENG., Oct. 12—A new detachable wheel possessing special features of merit has just been brought out by the Dunlop Tire Company and will be shown at the Olympia exhibition next month. The special advantage of this design is that any looseness or side play can be taken up immediately by screwing the actuating sleeve further out, whereas with most other types of detachable wheels such looseness cannot be cured once it has been set up. Briefly described, the device works on the simple principle of placing a doubly screwed sleeve between the internal hub, which has a left-hand thread, and the outer hub shell, which has a much coarser left-hand thread. Consequently, when the sleeve is turned in a right-hand direction by means of the spanner, it unscrews somewhat off the inner hub, and this action causes the wheel proper to be screwed up tight against the flange of the inner hub. The wheel is prevented from revolving during this operation by the studs which fit into holes in the inner hub flange.

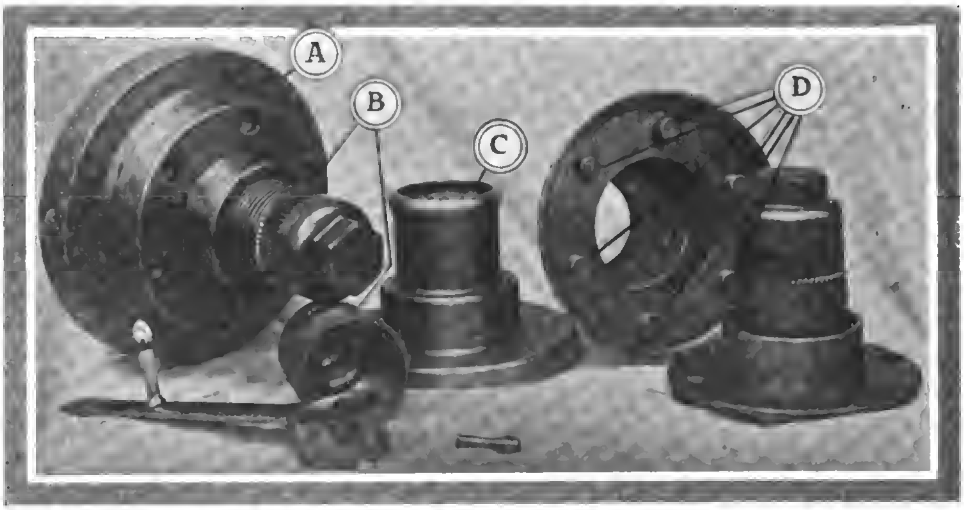


Showing New Dunlop Detachable Wheel Ready to Place On Hub

The action will be easily understood by reference to the accompanying illustration, the main points being that both the inner and outer threads are left-handed, and that the outer thread is of a very coarse pitch, so that the sleeve need only be unscrewed slightly off the inner hub in order to make the wheel screw fully on the outside of it.

Any locking device is really unnecessary, but to prevent any possibility of the wheels being removed by some unauthorized person with an ordinary spanner, a ratchet and pawl device is fitted in the hub so that the sleeve cannot be turned to unscrew the wheel unless the special spanner is used. This wheel is supplied both in the wire and in the wooden artillery forms.

Wheels of this type have become extremely popular in England, and even the little two-seater is rarely seen on the highways without some device of the sort on its running board or rear body. They are also much used in racing, as it is said that they can be changed even more quickly than the demountable rim, which has its chief popularity on the Continent. The detachable wheel, in fact, is a strictly British development. It was over its use, it will be remembered, that S. F. Edge had his famous quarrel with the French racing commission at the time of the last Grand Prix, which resulted in the withdrawal of the Napier team from the event. The subsequent slaughter of various demountable rims, which put half the cars out of the running, seems to have justified his action. At any rate, the average Englishman firmly believes in his detachable wheel.



Dunlop Detachable Wheel Hub Dissembled, Showing the Parts

(A) Inner hub. (B) Actuating sleeve, screwed on left hand on inner hub (fine thread). (C) Outer hub, screwed with coarse left-hand thread, to engage with sleeve. (D) Driving keys.

MICHIGAN'S AUTO-MAKING STATISTICS

LANSING, MICH., Nov. 22—That there has been a great growth during the present year in the automobile industry in Michigan is shown by the report of the Secretary of State, which shows that from January 1 to November 15, the present year, 34 companies for the manufacture of automobiles were organized in Michigan, representing a capitalization of $15,423,000. The amount of capital stock of the various concerns ranges from $5,000 to $10,000,000, the latter figure being the capital stock of the Packard Company of Detroit. In addition to this 54 companies were organized for the manufacture of automobile parts.

NEW SPEED HONORS FOR THE KISSEL KAR

In the recent Phoenix (Arizona) 50-mile derby, which was run November 12, and in which a new Pacific Coast record was made for the distance, the performance of the Kissel-Kar, a car of medium price, was an unusually meritorious one. This six-cylinder machine was the only competitor of an imported car of three times its price, but upheld the American end in valiant style. The winning Isotta-Fraschini finished in 52:45, which averaged practically 57 miles per hour. Back of this but 28 seconds, the showing of the Wisconsin-built car was gratifying to its friends.

LETTERS INTERESTING

HOW TO BUILD A RACER

Editor THE AUTOMOBILE:

[2,093]—Through the columns of your magazine will you kindly answer the following questions: Is there any concern that makes all of the car ready to run with the exception of engine and transmission; that is, frame, running gear, shaft drive, front and rear axles, steering gear, etc.? I want a car to have a 20 to 25 horsepower engine, with all of the parts strong enough for this purpose, and once read of a concern in this business, but have forgotten the name. I do not refer to the 15 horsepower Metz plan car, as I want a miniature racer.

Middletown, N. Y. SUBSCRIBER.

There are several concerns known to be doing just this kind of a business, although all of them will also sell you the engine and the transmission if you wish. A number of other firms make and sell about all of the parts which would be necessary but do not advertise to sell them assembled as you seem to wish. As to the former, you may try the following firms:

Borbein Auto Company, Ninth street, St. Louis.

Dart Manufacturing Company, Chase street, Anderson, Ind.

Elwell-Parker Electric Company, Cleveland.

Franklin Machine Company, Franklin avenue, Brooklyn.

Neustadt Auto & Supply Company, Olive street, St. Louis.

The third of these, as you will note from the name of the firm, builds chassis ready for an electric power plant, but it is included in the list because the firm would doubtless be able to supply you with a frame which would fill your wants.

In the second class of parts makers manufacturing all of the necessary parts but not assembling them to sell as a whole, a list is also given. It is urged in favor of this method, that, as long as you expect to put in the engine and transmission yourself, you might as well assemble the whole machine and save the cost of that work. In addition, this method will render you more familiar with the component parts and their peculiarities. The list follows:

Auto Parts Mfg. Co., Muncie, Ind.

Continental Engine Company, S. Canal street, Chicago.

Elyria Machine Parts Company, Elyria, Ohio.

Garford Company, Elyria, O.

General Mfg. Co., Richmond street, Elkhart, Ind.

High Wheel Auto Parts Company, Muncie, Ind.

Indiana Auto Parts Company, Marion, Ind.

Long Arm System Company, Cleveland.

McCue Company, Hartford, Conn.

A. O. Smith Company, Clinton street, Milwaukee, Wis.

From this list you should be able to get a firm which will be able to fit you up with all of the required parts. In buying these parts, if, as you say, you want a sort of racer or very fast car, you must bear in mind that racing or fast driving sets up many unusual strains, and you should select your parts accordingly. That is, either the running gear should be of a superior material or else you should buy for a higher power than you expect to install, in order to have an increased factor of safety. Thus to buy for 35 horsepower would be right.

CAR WON'T RUN SLOW

Editor THE AUTOMOBILE:

[2,094]—Please advise me what to do to make my car run at a low rate of speed on high gear. A knock or miss develops unless the car is speeded up to ten or twelve miles an hour. At a higher rate of speed, or on a pull, it seems to work perfectly. Changing the gasoline feed does not remedy the matter, since in either case the car has to run at a rather high rate of speed before the engine works smoothly.

I have difficulty in starting the motor by cranking, either with rich or thin mixtures without first priming carbureter.

Weatherford, Tex. A. N. GRANT.

Most carbureters have two adjustments, one on the needle valve or regular air inlet, and the other on the auxiliary air. The two work more or less in combination, and the proper combination is often difficult to find. You say you have adjusted the gasoline; have you tried the auxiliary air? Another possible cause is that the magnets of your magneto have lost their strength. This may have been caused by taking the magneto apart and failing to put proper "keepers" across the magnets while the armature was absent from its place between the poles, or their weakness may be due to natural depreciation. This would in a measure account for difficulty in starting the motor; we do not believe the priming or absence of it enters into the question, as on many cars this is necessary even under the best circumstances.

Remagnetization is a delicate process, and should not be attempted rashly; so the only way of telling whether this surmise is correct would be to try a new magneto. If there are other cars of the same make in your vicinity, you might try a temporary exchange of magnetos, which would at once show whether or not the trouble lay there.

LIKES OUR STYLE

Editor THE AUTOMOBILE:

[2,095]—I have taken great pleasure from time to time in looking over "Letters Interesting, Answered and Discussed." More than that, I think them of great value, especially to the person who drives his own car. So I can say that I was greatly surprised that any one would have the nerve to kick as in letter 2,073 of the Nov. 4 issue. This party must have been out on a tour with a friend, who wanted to know the name of every passing car. Being unable to make good, he kicks; either that or else he is trying to revert this section to advertising. What automobile owners want to know is what causes certain troubles and how to remove or prevent them. I wish to enter a protest against such kicks. H. P. F.

Chicago, Ill.

A HOME-MADE MACHINE

Editor THE AUTOMOBILE:

[2,096]—Will you please give me some information about a car which I made myself from parts of different machines. It has a 12-horsepower opposed motor, planetary transmission, and chain drive with nine teeth on front sprocket and 31 on the rear. The engine runs well without load and fairly well on level ground, but doesn't seem to run fast enough in high gear to develop any power, or enough to pull up a five per cent. grade without changing to low. I have a new Schebler carbureter, and the engine has fairly good compression. The machine weighs about 1,000 pounds. What can I do to make my car pull better? I am not anxious to go fast, but just to get it to pull up a small grade without changing to low gear.

Fernandina, Fla. W. F. M.

The obvious thing for you to do is to gear the machine lower. Nine teeth is rather few for a sprocket, so we suggest that you make the rear sprocket larger, instead of the front one smaller. Some cars of the same type use rear sprockets up to 40 teeth. If you put on a 39-tooth sprocket the speed of the machine would be reduced about one-fourth, and the pulling power on hills greatly increased.

The larger sprocket may, however, interfere with the design of your rear axle, if this is of the single-chain, central-drive type. For such possibilities the makers of these axles, in the stock sizes, provide curved bolts instead of the straight ones which straddle the sprocket and hold the two halves of the casing together. In case your axle is of this type, and the larger sprocket would interfere, you can obtain these curved bolts from the maker, or have them forged by a local blacksmith, and save the expense of a new one.

By the way, did you ever have your machine weighed on trustworthy scales? Most machines of this type weigh nearer 2,000 than 1,000 pounds. If you have not had the machine weighed, try it, and we think that you will find your 12-horsepower engine is doing pretty well after all.

This is really the vital consideration, for even with high power, if the weight be increased in proportion, there is no gain, and the extra weight must be driven at the expense of additional fuel. Less weight per horsepower means not only less fuel used, but in the matter of speed, the power is then more effective. On page 314 of the Aug. 19 issue, you will find this subject discussed very thoroughly, with a series of figures given for the different classes of machines, taking the divisions by price from the lowest up to the $5,000 cars. Your car would apparently come in a class which had an average power of 19.5, an average weight of 1,280 pounds, and an average ratio of power to weight of 65.6 pounds per horsepower. If your power and weight are right, the ratio of 83 is not bad.

HOT WATER HELPS SOME

Editor THE AUTOMOBILE:

[2,097]—Will you please give me the name and address of a firm or of firms making a two-cylinder engine suitable for an Oldsmobile curved dash runabout, one that would go into the old machine without much trouble. I notice that some of the latest engines have a device for letting the hot water from the engine jackets into the carbureter, this giving more power and speed on heavy pulls. Do you know of any automobile companies that have this device on their cars? ELDON C. FRIE.
Duncan, Okla.

As to the two-cylinder engine, nearly any opposed engine of this type would be suitable, and by consulting the advertising pages of THE AUTOMOBILE you will find that a number of firms making engines are advertised there. We do not know of any firm making an engine especially for this use.

In the matter of water jacketing the carbureter so that the hot water from the engine jackets may be used with beneficial effect of the action of the carbureter in cool weather, this is done by nearly every reputable carbureter manufacturer. This is usually fitted as an option, that is, the carbureter maker makes the same sized carbureter with the jacket and without. The purchaser has his choice, the charge for the jacketed form being but little more than the other.

After buying a carbureter so equipped, any handy mechanic can fit it to your car. All that is needed is several lengths of small diameter copper or brass tubing. A hole is bored into the water outlet over the cylinder head and another elsewhere in the water circulation system at any convenient place. Into these holes are fitted and soldered the tubes. It is then an easy matter to apply the tubes. When applied, the hot water rising from the cylinders when heated flows into the carbureter jackets, around and through them, out, and back into the water system again.

"EATS UP SPARK-PLUGS"

Editor THE AUTOMOBILE:

[2,098]—Could you please tell me why the first cylinder of a new Model T Ford "eats up" spark plugs? A new plug will run about one day of continuous running and is then seemingly "all in," even after cleaning it. The car is new and the cylinder seems perfectly clean. RUSSELL R. HOLMES.
Whiting, Ia.

The answer to letter No. 2,100 above seems to fit your case pretty well, too, although your letter opens up several different possibilities. Your statement that the cylinder seems perfectly clean and that the plugs refuse to work after an experience in this cylinder, even after being cleaned, suggests that the trouble may come from another source, namely, overheating. This overheating, of course, could be purely local and not otherwise affect the running of the engine. In fact, the construction of your engine suggests a way in which this might occur.

The cylinders are cast in one block, with the heads separate in another block. The cooling water passes from the cylinder block to the head block through a number of holes in the upper face of one and the lower face of the other, which register when the two are brought together. If the hole nearest the spark-plug of the first cylinder should become stopped up, the circulation might be impeded to the extent of allowing that part of the cylinder to become extremely hot. This heat would crack the porcelain of the spark-plug.

This is a deduction rather after the manner of Sherlock Holmes, and we are by no means sure that it is correct. An examination of your engine, by removing the cylinder head block, would quickly show, and in any case can do no harm.

GARAGE WINTER HEATING

Editor THE AUTOMOBILE:

[2,099]—Will you please advise me as to whether a heating plant should be installed in a small garage housing one car, in order to maintain the car in good condition after being put up for the winter. It has been suggested to me that unless an even temperature was kept the varnish and paint would crack and at the same time considerable rust would accumulate. An article in "The Automobile" concerning preparing the car for storage through the winter would be timely. XX.
Gambier, O.

We do not believe that such precautions as you describe would be necessary; certainly we can recall no acquaintance who ever went to similar trouble and expense, nor can we recall anyone whose car seemed to suffer from neglect to provide heating. If the varnish and paint are of suitable quality they should not be affected by any degree of cold to be found in these latitudes. As for rust, that can be cared for at the time of putting the car away. The motor, gears and driving mechanism should be thoroughly cleaned out and provided wtih fresh oil, and all parts which might be attacked by rust should be coated with pure grease or vaseline. We agree with you that an article on putting a car up for the winter would be timely, and it is by no means improbable that you will find one in an early issue.

In fact, it is not unlikely that one of the concluding chapters of the garage story now running, "The Private Garage Problem," will contain much matter on the subject of heating of automobile houses.

IGNITION "SPARK GAP"

Editor THE AUTOMOBILE:

[2,100]—Will you kindly, through "Letters Interesting" or otherwise, help me out of the following dilemma? I have a four-cylinder water-cooled automobile, and have been having trouble with the ignition in No. 1 (front) cylinder. This cylinder has spells of refusing to fire, and no amount of coaxing will induce it to do so as long as the high-tension wire is attached to the spark-plug. If the high-tension terminal is detached from the spark-plug and held about 1-8 inch away, letting the spark jump from the terminal to the plug, the cylinder will immediately begin to fire, and continue as long as the terminal is held in that position. I have used new plugs and new batteries, but with the same result. W. A. ERVIN.
Petersburg, W. Va.

Several years ago a number of spark-plugs were made with terminals designed to afford a second gap for the spark to jump, in just the way you describe. The object of this was to give a better spark inside the cylinder. For electrical reasons which are none too clear, this exterior spark causes a spark to appear at the regular sparking points when the latter are so sooted up that they refuse to show a spark otherwise. This may be explained by saying that the electric current, coming first to the outer gap, is banked up there until it is strong enough to jump across; and then it comes down on the second gap with a rush and goes across by its own momentum, as it were. The spark-plugs embodying this feature gradually dropped out of sight, as improvements in spark-plug construction and in motor lubrication made them, for the most part, unnecessary.

The first cylinder of your motor probably has some peculiarity which is very hard on spark-plugs, so that even new ones last but a short time. Although you do not say so, we believe that you have found that a new plug will work all right in the "hoodoo" cylinder for a short time. If this is true our conclusion is undoubtedly correct. The trouble may be due to the lubrication, some fault of motor construction causing the first cylinder to receive more than its share of oil. If your lubrication is by a force-feed oiler, feeding each cylinder separately, the remedy is to try cutting down the supply to the first cylinder. If the lubrication, on the other hand, is by splash to the cylinders, the trouble may be with the partitions in the crankcase, maintaining a higher level of oil in the first pit than in the others, or to an extra nut or other protruding part on the connecting rod big-end, which would cause it to throw up more oil. If the motor has one of the modern circulating systems of lubrication, the overflow hole from the pit into the pump well may be stopped up.

If you don't care to tamper with the lubrication system, why not make yourself a plug with a permanent exterior "spark gap?" You might fasten the terminal to the plug with a strip of fiber or other non-conducting material in such a way as to maintain the proper gap. Or, if you do not care to do this, there are spark plugs made which have a testing arrangement, which includes a gap of this kind. One of these should answer all of your requirements.

Fig. 1—Development of Schebler carbureter, beginning in 1900, and ending with semi-automatic type of 1909

ACCESSORIES of necessity, as they relate to automobiles, differ from accessories in general in that the cars will not render good, if any service, without them. A radiator, for illustration, seems to be necessary to a water-cooled motor; a carbureter, likewise, is a necessity to every motor. A gradeometer, on the other hand, is not absolutely necessary; the car may be utilized in the absence of this device, although, as a convenience, such an instrument may have a fitting value.

In drawing the distinction, it is done for the purpose of pointing out the trend, not from guesswork, but as it seems to be reflected. Accessories of convenience will probably always be made in separate shops, simply because makers of automobiles will most likely have all they can do to turn out cars.

The more progressive of the specialists, feeling that they are in a position to compete with the world both in point of quality and price, keep adding to their buildings and improving their processes and, in all truth, the strides now being made are past describing. Obviously, the cost of an improvement, while it may foot up to many thousands of dollars in the abstract, amounts to very little per unit when the output is on an enormous scale, and the accessory makers are in a position to take advantage of this phase of the situation to the maximum extent, and this is one of the reasons for believing that they are with us to stay, and that they offer one of the solutions to the great problem involved.

A Concrete Example Will Best Show—Any further discussion of this phase of the automobile situation, along the lines taken, would be a mere reiteration; the history of the accessory makers' growth, however, may be reflected by writing the history of some one capable manufacturer, and while the story will be told from one angle only, even so, it will be in its most simple form and leave more for the telling from some other point of view at a later time. Disregarding the fact, then, that there are many other plants which would serve perfectly to illustrate the permanence of the accessory-making industry, the one nearest at hand will be taken, and since the writer is at Indianapolis, it is but a short ride to the plant of Wheeler and Schebler, makers of the Schebler carbureter.

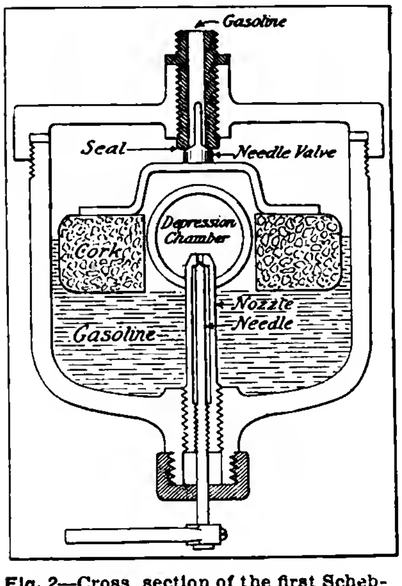


Fig. 2—Cross section of the first Schebler carbureter, made in 1900

Referring to Fig. 1 (A) depicts the first carbureter made by George M. Schebler, in 1900, before he engaged in business with Frank H. Wheeler. The firm of Wheeler & Schebler was formed as the result of the good performance of the first carbureter, and the business acumen of Wheeler has been proven by the growth of the concern. The second carbureter, (B) Fig. 1, was brought out in 1901, differing from the 1900 type in some minor particulars. The point to be here made, however, lies in a certain similarity of all the Schebler carbureters from A to J, inclusive.

Fig. 2 is a section of the 1900 type of carbureter, and the concentric float, somewhat modified to be sure, is still used. The first carbureter, in the light of present practice, was a crude device, but Schebler, than a violin maker of note, aimed to build a satisfactory carbureter for a motor he then built, having failed to find one on the market such as would perform in a satisfactory manner. The carbureter offered as B, Fig. 1, was made in 1901 and it differs from the earlier type in that the float was improved and a bale attached to diametrically opposite sides engaged a lever, which, in turn, imparted motion to the needle-valve, thus controlling the flow of gasoline, after a fashion, more certain. Fig. 3 is a section of the 1901 type of carbureter.

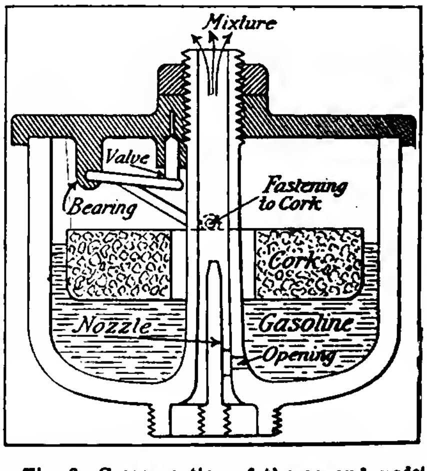


Fig. 3—Cross section of the second model Schebler carbureter made in 1901, which has been little changed

In 1902 the carbureter shown as (C) Fig. 1 was brought out and letters patent were granted on the type. In 1904 some detail changes were made, as shown by (D) Fig. 1, and the business end of the industry took on a more promising turn. In 1905 the carbureter looked as at (E), Fig. 1, a section of which is given in (A), Fig. 4, and in 1906 more refinements brought the carbureter up to (F), Fig. 1, and in section as depicted in (B), Fig. 4. Model E came out in 1907, looking like (G), Fig. 1, and the section was as given in (C), Fig. 4.

Water-jacketing Was Introduced—By this time, owing to changes in the quality of gasoline, it was found that, under some conditions of service, water-jacketing offered advantages and

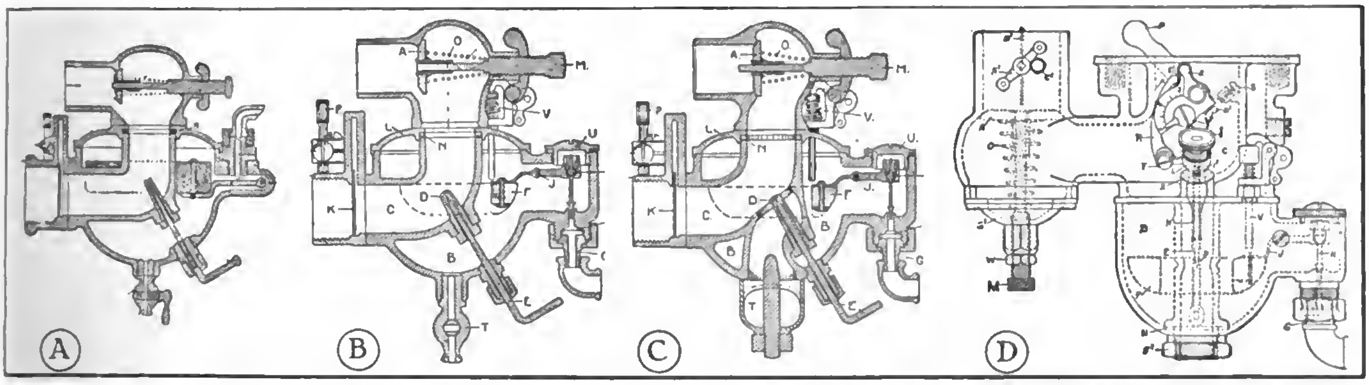


Fig. 4—Sections of Schebler carbureters as made from year to year, showing a certain similarity in design, style and finish

the Model F Schebler carbureter was offered to buyers. The exterior of this carbureter looked as in (H), Fig. 1, shown in section in (C), Fig. 4. The following year the company brought out an improved form of motorcycle carbureter, which has been continued, subject to all possible improvement down to the present. This carbureter is depicted in (I), Fig. 1, and (J), Fig. 1, is of the 1909 Model L carbureter, a section of which is offered in Fig. 5, with names of parts given.

Constant Refinement Price of Success—But one year (the second) was passed without bringing out a new model or making refinements of a character designed to improve the good working qualities of the carbureter. Had there been any disposition to avoid the cost of new models, it is avowed that changes would have been less frequent, but, as may be quickly determined by a little calculating, the cost per carbureter, of changing, is scarcely worth taking into account, excepting that it would be fatal to make a mistake.

By sticking to the main idea, confining the advances to a mere evolution, and refining as proof of better results would be the reward, the maker was enabled to advance the situation from year to year without risking a serious mistake, and as a reward for stability of design and manufacture as well as enterprise, the business grew in a fashion which may best be illustrated by a table showing the number of carbureters made and shipped:

CARBURETERS DELIVERED SINCE 1906.

Year.	Carbureters Shipped.	Carbureters Made.
1907	37,263	48,625
1908	49,876	57,513
1909	100,000	100,000
1910 (estimate)	200,000	200,000

The above tabulation tells a story of the marvelous growth of the motor accessory business, and also of the faith of one man in it; in 1907, when business in other lines looked bad, this concern went right on building carbureters, and actually did build 11,362 carbureters more than were sold, and there were times during the year when the stock in hand was even as high as 25,000 carbureters.

Present Situation Looms Up Big—A single maker of cars is now taking a car load per month (about 5,000 carbureters) from this one plant alone, and the foundry is using raw material on a basis as follows:

Copper................................2 car loads per month.
Tin......................................6 tons per month.
Lead.....................................2 tons per month.
Spelter..................................1 ton per month.
Home scrap...............................all made.

In this plant every part of the work is done, starting in the

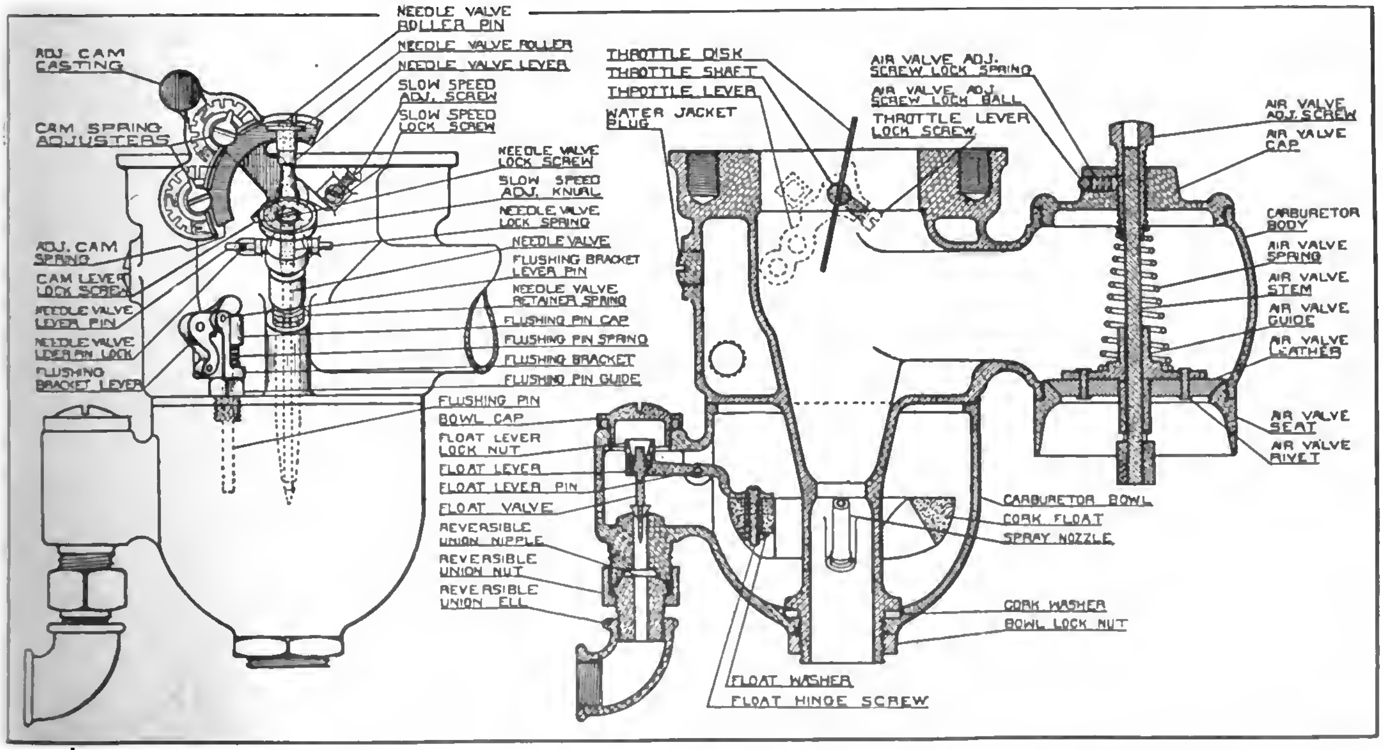


Fig. 5—Section of the present model of Schebler carbureter, showing strangle type, auxiliary air valve, and adjustments

foundry, and ending with the final test before shipping. In order to appreciate the enormity of the undertaking, it will be necessary to follow through the plant and beginning with the raw material for the charge, in the foundry, as shown in Fig. 6, of copper ingots, it is but a step to the crucible and other furnaces. The illustration shows but a part of the battery of crucibles, and allowing from 60 to 80 pounds per charge for each crucible and five heats per day, counting the tilting furnace in the foreground, the capacity of the foundry is not far from the amount as shown above for the raw material purchased for the foundry during a recent period of one month. Gas is used for firing, for the most part, and the change to gas entirely, is rapidly being made.

In another part of the foundry cores are moulded, and Fig. 8 represents a core-oven, for baking them, of which there are two, side by side, and in addition to this provision the cores are heat dried in a room for the purpose. Some of the castings make their own cores and when this part of the work is ahead, the moulding is done partly by machine, one of which is shown in Fig. 9, while moulding in general is done on the floor as depicted in Fig. 10. The character of the work is under the control of the maker of the carbureter in this case, and experience has shown that it pays to use "new brass," thereby reducing "wasters" and the number of parts that are found wanting during inspection.

Much to Be Said for the Machining Process—A certain similarity exists between the big carbureter used to furnish producer gas to the gas engines and the output of the plant. The gas producer illustrated in Fig. 11, made by the Smith Gas Power Co., of Lexington, Ohio, is charged with pea coal twice each day and about one-half of a ton of this coal per day serves for the purpose. The fuel is burned in the generator G in the presence of atmospheric air and steam in definite proportions. The combustion of some of the coal which takes place due to the action of the blast, liberates heat, and under the influence of this heat, in the presence of excess carbon, the steam carried over is decomposed, contributing its oxygen for the carrying on of the combustion and liberating hydrogen as a desirable constituent of the resultant fuel gas. The combustion of the carbon in the presence of oxygen liberates heat and the decomposition of steam, under a suitably high temperature, in the presence of carbon, absorbs heat. To

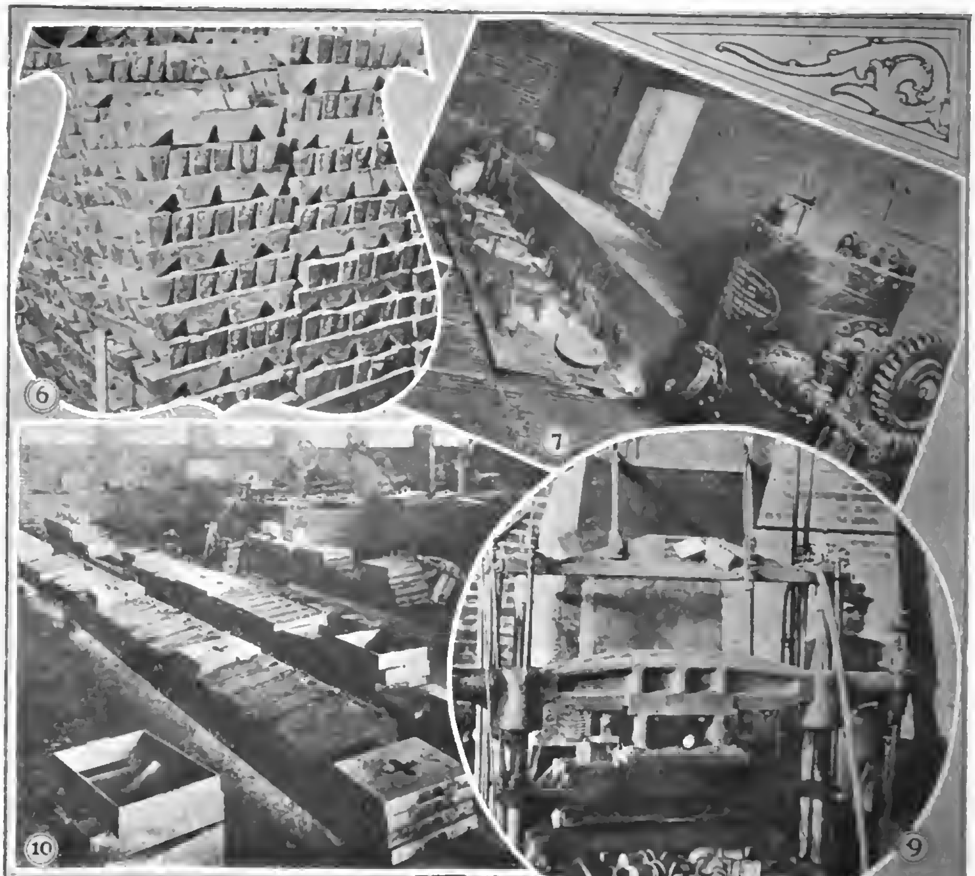


Fig. 6 Ingots of copper kept in store, ready for the foundry, which is the best possible assurance of prompt delivery of carbureters

Fig. 7 Part of the foundry showing a battery of crucibles and a tilting furnace in the foreground.

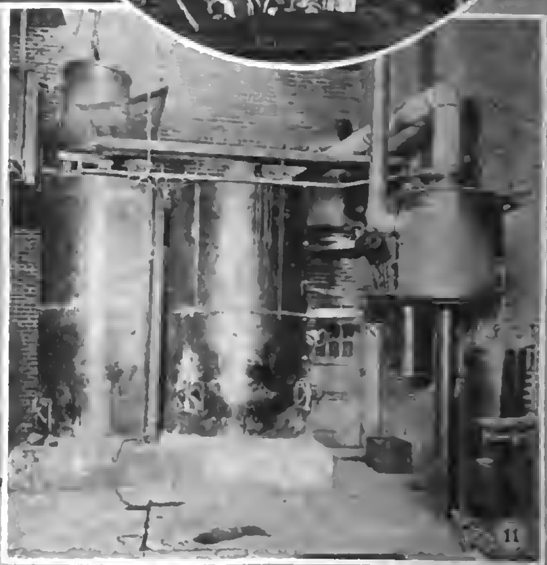
Fig. 8 Baking oven for cores, with cores in place, on shelves, ready to seal up and apply heat

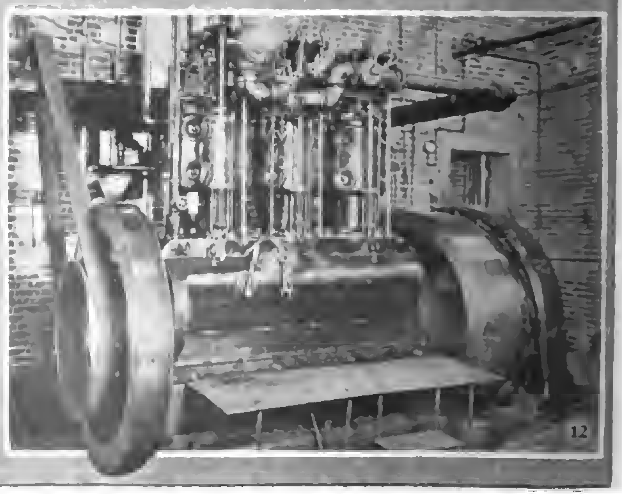
Fig. 9 Moulding machine, by means of which more and better work may be done than by hand moulding

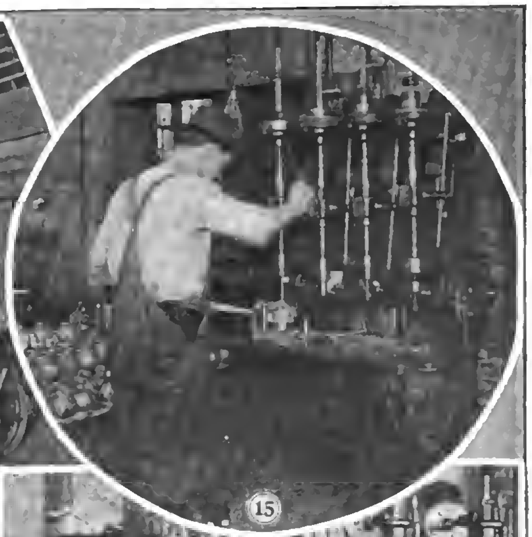
Fig. 10 On the floor in the foundry, showing moulds ready for moulding which is done four times per day in this plant

Fig. 11 Gas producer, using pea coal in the production of gas which is used for power purposes

Fig. 12—Three-cylinder, vertical, 100 horse power gas engine run from producer gas to furnish power for the plant







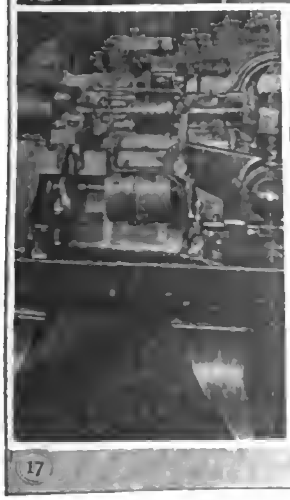
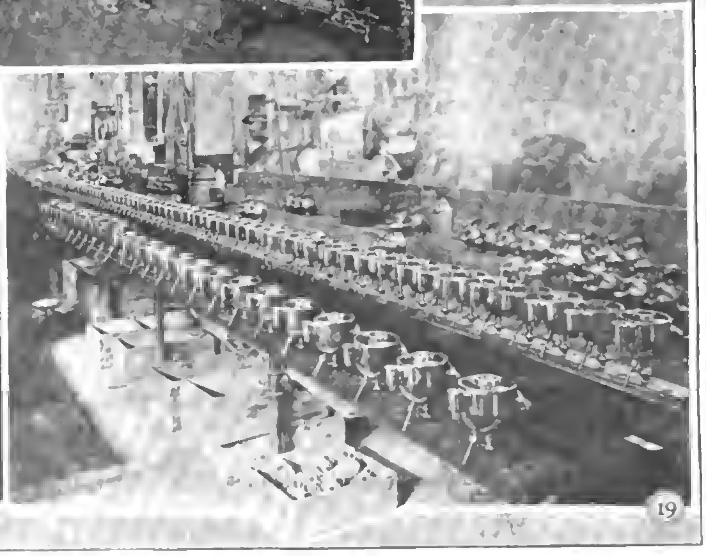



Fig. 13—Sand blast in operation, cleaning bodies of carbureters just as they come in on a truck en route to the machine shop

Fig. 14 Gig drilling, using a multiple spindle drill with fixed tools arranged for several operations

Fig. 15—Multiple spindle drill and gig used to complete several operations

Fig. 16—Turret-lathe of the Fox type, with a special chucking device used in machining carbureter parts at high speed

Fig. 17—Acme automatic screw machines used to make small parts as bolts, nuts, screws, nozzles, etc.

Fig. 18—Battery of Acme screw machines showing how they are nested to economize in floor space and save labor as well

Fig. 19 Testing bench showing a double row of carbureters being tested for tightness and buoyancy of the float

obtain the desired quality of fuel gas, then, it is necessary to regulate the temperature, and this is done by properly proportioning the amount of air and steam by means of the regulator.

Fig. 12 depicts a 100-horsepower, three-cylinder Rathburn gas engine. Provision is now being made to greatly increase the size of the power plant, it being the idea to displace some of the smaller (horizontal) gas engines with new type of 250-horsepower vertical engines.

What Happens Beyond the Power Plant—The carbureters, after they come from the foundry, are chipped, slicked off on grinders, and then they are subjected to the action of a sand blast as depicted in Fig. 13. This process leaves the carbureters free from core sand, and of an even surface all over. The product thus prepared is ready for machining operations and Fig. 14 is illustrative of the use to which special jigs are put in holding the work under a drill and assuring interchangeability of work. The jig G, despite the irregular shape of the carbureter, holds the work firmly, and it is but the task of a moment to set the same and begin drilling.

Fig. 15 is still another illustration of the way jigs are contrived to displace the irregular task which would follow were the workmen required to lay out the work and center the same for drilling. Fig. 16 differs from the preceding figures in that a special jig, or, in this case, chucking device, takes the part and fixes it in the correct relation for turning operations. The turret tool, of which a suitable number are at hand, does quick and accurate machining and is largely responsible for the even quality of the product.

In view of the presence, in carbureters, of a considerable number of small parts, it is found necessary to employ automatic screw machines to a considerable extent or put up with the ills of a famine market, and be short of material, more often than not. Fig. 17 depicts a corner in the automatic screw machine department with an Acme automatic screw machine (side view) in the foreground. These machines are devoted to the production of such parts in the carbureters as screws, nozzles, bolts, nuts, etc., made from bars of steel, hard brass, or other material, such as will best serve the ends. The automatic chucks of the screw machines, while they demand the use of materials, as bars coming close to size, are capable of accommodating themselves to quite some extent, although it is commercially possible to limit variations in diameter to 0.0005 inch above and below nominal diameter. Fig. 18 is a general view of the battery of automatic screw machines, and it is of more than a little interest, first, as showing the extent to which carbureters require the use of costly automatic tools if they (the carbureters) are to be produced in quantity, on a basis of interchangeability, and again, the compact plan of installing the tools will be of interest to those who may have to cope with just such problems.

Testing Is Done During the Process—When all the parts required are in sufficient quantity ahead, considering any given model, the work of assembling a lot is undertaken, and inspection is necessary, at every stage, in order to assure that the carbureters will pass the final test, one phase of which is shown in Fig. 19. In this case a considerable number of carbureters are set up in rows and each one is filled with gasoline to note if the metal is porous or if the joints leak. If the material is satisfactory and if the joints are all ground tight, the float is then adjusted in such a way that the gasoline will stand in the nozzle within 3-16 inch of the top.

Some Special Features for This Year—Referring to Fig. 5, it will be observed that the leather seat of tbe air valve is reinforced by a metal flange behind it. Time has proven that certain grades of leather will serve well for this purpose, but it has also been shown that the leather will curl up unless it is thus supported. True, the amount of the deformation is but slight, but it is just enough to unbalance the mixture and motorists are not always in fettle to cope with the ills which are natural to an unbalanced mixture.

The float, which is made of Spanish cork, is of the finest possible grade, so close, in fact, that it would absorb but little gasoline, even if submerged for months. In order, however, to safeguard the cork, it is subjected to a coating process which precludes the chance of float trouble. In the first operation, in the process of coating, a fine grade of shellac is cut up in grain alcohol, and when it is in a perfectly liquid state, and thin, the cork is submerged. When the time has been sufficient to allow the thin shellac to penetrate all the pores and form a skin all over, the cork floats are then removed and subjected to a drying process for sufficient time to assure that the shellac in the pores, as well as on the surfaces, is dry and hard. A second dipping is then given the cork; the shellac being more viscous but in even condition, and when this layer is dry and hard, if the cork, after being submerged in gasoline, shows the required degree of buoyancy, it is accepted.

The float lever pin (see Fig. 5) is not midway between the center of the float and the axis of the float valve; the lever advantage is in favor of the float, and the result is that the valve seats firmly. The conical seat of the valve is easily ground to tightness, and the valve stem is of a fine grade of material, and light. Inertia, therefore, will not have a mal influence, and the float, being submerged in gasoline, considering the lightness of cork, will not set up motion when a car is negotiating bad roads, so that the flow of gasoline, to the bowl, is always carefully regulated and flooding is entirely avoided.

The sectional drawing, as reproduced in Fig. 5, presents ample evidence of an adequate thickness of walls, but what is more to the point is the perfectly even casting work, with all cores so nicely set that an uneven thickness of walls at any point is avoided. New brass, that is, brass made from ingot copper, tin, lead and spelter, with just enough home scrap to fetch up the teeming mass, accounts for the even quality of the castings, but the foundryman, since he has a plant fitted out for this especial work and confines all efforts to products of this character, is enabled to train a corps of moulders up to a high state of efficiency. It is equally an advantage to do all the work of every character, considering the question of the delivery of carbureters, for in these days, with a material famine well in sight, makers of automobiles will naturally feel confident when it is made plain to them that every situation is under control in the one plant and the raw material is corded up in the storehouse, there to be taken out and melted up as required.

What the Near Future Holds Forth—The power plant is being increased by 250 horsepower, which includes a new and larger gas producer as well as a 250-horsepower gas engine. The foundry will be increased to double its present capacity, and the floor space present and near future is estimated as follows:

Present plant, including foundry............	150,000	square feet.
New addition, not including foundry........	51,750	" "
New addition to foundry..................	8,000	" "
Total floor space after addition is made....	209,750	" "

All buildings are of a substantial character, brick and reinforced concrete, and the new addition, which will take up about a half a block just back of the present plant, will presently be under way; a church for negroes, and one or two private dwellings, now on the ground, having delayed matters somewhat.

Everywhere in the plant provision is made to cope with fire, and sanitary arrangements, as well as other conveniences for the workmen, makes the plant one that is far from labor trouble of any character, so that, deliveries are made with great certainty and the company is frequently in a position to fill an order for five or ten thousand carbureters the day the order is received.

RAMBLER REGULARITY AT KENOSHA

Kenosha, Wis., Nov. 22—Work on the new Rambler models is advancing with such exactness as to put deliveries in the same class as the Twentieh Century Limited, and The Automobile's representative in going over the plant finds many evidences of methods that make for precision of fit of parts, so that, in assembling, delays will scarcely have to be coped with. The situation all along the line is for interchange ability of parts, and this very desirable condition is a prime issue in the production of Rambler cars under the direction of Thomas B. Jeffery & Company.

The company, in order that its large stock of repair parts will be a real accommodation to its patrons, keeps an exact record of everything shipped, and the system of duplication of parts in vogue at the plant, makes it worth while to do so. The new laboratory, which is now sufficiently complete to be of the greatest service, is on such a large scale that it almost outstrips the name. A new 500-horsepower generator set, directly connected with a Corliss engine, will soon be in operation, and present additions to the Jeffery concrete construction, saw-tooth buildings will bring the aggregate up to 20 acres of floor space.

Additions to the building number five, amounting to over 1,600 square feet, which makes room for the new laboratory.

TARRYTOWN BECOMING MAXWELLVILLE

Tarrytown, N. Y., Nov. 22—Tarrytown is gradually becoming Maxwellized. To keep abreast with the enormous demand for 1909 models the company is compelled to acquire all available factory space in the immediate locality regardless of cost. The newest acquisition, that of the Tarrytown Tile Works factory, provides 62,520 square feet, and though only recently acquired is in full operation. Again, the new brass foundry on the company's property with 21,500 square feet is just completed, soon to be followed by the new aluminum castings plant with twice the area. The company now controls six plants, and with the completion of those now in process of erection will employ nearly 6,700 employees.

SUCCESS OF THE FISK FREE AIR IDEA

Some time ago the Fisk Rubber Company conceived the idea of furnishing its branch houses with compressed-air tanks, which are placed on the sidewalk close to the curb, for the convenience of passing automobilists. On opening the tank box, a rubber tube is disclosed, to be attached to the tire valve, and a lever and gauge regulate the amount of air. Keys to these boxes are furnished to automobilists on request.

WHAT THE ACCESSORY PHASE OF THE INDUSTRY REPRESENTS

WE frequently hear the fixed phrase "parts makers" and it is sometimes said that they are not imbued with the idea of doing accurate work beyond the barest necessity. Then, there are the class of persons who confuse parts makers with accessory manufacturers. They fail to discriminate as between the makers of complete units and members of units; as if, indeed, there is no difference as between a piston for a cylinder of a motor and a carbureter or a radiator. Certainly, there is a vast difference, and it is self-evident that there is far less chance of trouble due to the purchase and use of a carbureter than can follow when a crankshaft, for illustration, is made in one shop, the cylinders in another, and the remaining parts somewhere else; all to be assembled by the final maker of the car.

F. H. Wheeler

Besides, there is a further distinction to be made; accessories of convenience, catering to luxury, can never occupy the position which is natural to an accessory of necessity. Having made this distinction, rather with the expectation that it will convey the impression that necessities must be taken in all seriousness, it is a natural sequence that accuracy is the child of the work done in the production of a necessity.

Obviously, a thing made by a specialist, if it is a serious undertaking, will be far more likely to thrive than when it is given the slight care which is all that can be expected from even a corps of designers who have to cope with the intricacies of 900 different genera of parts which will be found in a full-fledged automobile.

But there is still another phase of the problem to be given at least scant attention; makers of automobiles, even if they build a large number of cars, cannot expect to rival the manufacturers of necessary accessories who cater to numerous car producers. While it is true that cars are made in thousands in some instances, it is equally a fact that manufacturers of necessary accessories foot up on their order books in hundreds of thousands.

When units are made in hundreds of thousands, the cost of special tools, fixtures, jigs, and equipment falls to a level so low that the overhead charges per unit may be even in fractions of a mill. The cost, therefore, of a set of tools such as will guarantee absolute accuracy is no bar, and the result is that the accessories made on this tremendous scale, under fitting conditions, are so accurate that there is no further chance for improvement.

Having arrived on the plateau of accuracy in the manufacture of accessories, brought about as a natural evolution in the process involving quality, it remains for accessory manufacturers to hold their own, which is a matter of providing for the future by anticipating the wants of customers, which is not an easy task to cope with, owing to the rapid growth of the industry.

In estimating on the future, basing prognostications on the past year, it has thus far been impossible to be conservative and to be anywhere near right. The wildest imaginable figures seem to be still more wild when they are exceeded, as they invariably are, and yet it is a serious matter to fail to come up to the requirements in the production of accessories, so that success, in its broadest aspect, will come to the class of accessory manufacturers who build right, think big, and prepare to receive business on a basis of a half million automobiles per annum, and that, too, in the near future.

F. H. Wheeler

RELATION OF ACCESSORY MAKERS TO CAR BUILDERS

IN the manufacture of accessories for automobiles there are several terms to be coped with, brought about, to a vast extent, by relations which producers of accessories bear to makers of cars. The accessories, as carbureters, radiators, etc., are made in sizes, and it is not always possible to select the size of carbureters, for illustration, such as will be a perfect fit. The difficulty is brought about by a lack of co-operation of makers of motors and of carbureters. As the state of the art will permit, considering the designs made, it is better to carefully consider the sizes of motors and select the proper carbureter in every case, for then the carbureter, instead of having to cope with the bad relations due to the poor selection, will respond more perfectly under severe conditions and will afford a more pronounced degree of flexibility under conditions of changing speed.

Geo. M. Schebler

The torque of a motor may be relatively high at some one speed, due to the perfection in design of the motor itself, but it will not be on a basis of constant torque at all speeds, unless the carbureter is free from dead points and capable of delivering a mixture of a constant richness at all speeds. It is evident, as before stated, as present in carbureters of advanced designs, but to realize it to the maximum involves the deliberate consideration of the size of the motor when selecting the carbureter. If the carbureter is of the exact right form from every point of view its universal properties will then be there to influence the torque of the motor instead of being absorbed in the process of bringing up the average working conditions in the presence of defects of selection. Under these more perfect conditions the high torque due to motor harmony will be maintained at all speeds and the service rendered will involve flexibility to the maximum possible extent.

In practice, when the carbureter reaches the ultimate user there are one or two points which can well be reduced to formula. If a motor fails to perform in a satisfactory manner it is a fallacy to at once assume that the carbureter is out of order. It is more chance that the ignition system is in need of a little attention or that the compression in some one or more of the cylinders is down. The first recourse, then, is to be sure that the ignition is in good working order and properly timed, and then observe if the compression is in proper presence in the respective cylinders. Even so, it is necessary to see if there is any more gasoline in the tank, and since gasoline is loaded with foreign matter, it is not difficult to understand how such matter may impede the action of the more delicate parts of the carbureter. The natural inference is that the carbureter should be examined with a view of cleaning it out, if necessary, before making adjustments. The final operation, under the circumstances, is to adjust the carbureter if necessary, and then only.

In view of the conditions in point of design and the respective makes of carbureters nothing can be said in a general way which will serve as a guide in the process. Even so, it is extremely important to approach satisfaction with the utmost care and to avoid upsetting the good adjustment which may obtain, only to find that the trouble is somewhere else.

Geo. M. Schebler

THE AUTOMOBILE

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EUROPE'S DISILLUSIONMENT

Europe's automobile industry has had a sad awakening. Just at present it is undergoing a more or less painful adaptation to new conditions, which but few of the constructors had the wisdom to foresee.

The trouble really began two or three years ago. A body of large and world-famous manufacturers had been pursuing their majestic course, building four and six-cylinder cars of forty horsepower and more. Their cars, from the engineering point of view, were very creditable productions. Suddenly these manufacturers discovered that there was no longer a demand for their cars. Intent only on a visionary ideal, they lost touch with their public.

The market for large cars is necessarily limited, and even more limited in Europe than in America. The market suddenly filled up, and the annual production was about ten times the amount necessary to keep it full. About the same time several European governments got the idea that automobiles were a good subject for increased taxation. Result: no Grand Prix, no Paris show, no Berlin show; also a hasty renewal of interest in the popular-priced car.

Then the big and famous makers discovered further that it was not sufficient merely to announce a popular model in order to bring to their feet this profitable class of trade. A number of firms whom the famous makers had been accustomed to look down on superciliously had formed a solid and thriving patronage, and were by no means disposed to relinquish it. Moreover, the buyers of medium-priced cars, far from being dazzled by a name, required good and sufficient proof of superiority before signing their checks.

After the first shock of disillusionment, most of the big makers took their lessons manfully. They realized that they must give their best, both in designing and in workmanship. The supreme efforts of their talented designers, of their well-equipped machine shops and corps of skilled workmen were required to win a place in this new aristocracy of the industry.

It was to be expected that the small cars turned out by such factories would have a neatness and refinement in detail often lacking in the output of a cruder plant; yet the latter had the advantage of long experience in that class of work, and excelled through sheer strength and solidity. Between these two camps the struggle has been keen. In the striving for advantage much more attention than usual has been paid to new ideas in construction, such as slide and rotary valves. The value of such competition to the industry cannot possibly be overestimated.

For this reason the Olympia Show—held solely because the association promoting it is composed of popular-priced makers—includes within its walls the finest exhibit ever before seen of "the cars of the future." The forty-horsepower model (foreign rating) has been somewhat relegated to the background; the salesmen speak of it reluctantly, unwilling to admit that it has been continued. The day of the "forty" is well-nigh past; the day of the "fifteen" is just dawning.

AS TO INTERNATIONAL RACING

It is among the possibilities that international automobile racing may have a fairly active renewal innings next year, especially if the congress adopts the recommendations of the Manufacturers' Contest Association as proposed through the American club which has a sitting in the international organization.

But the indications are that international racing of the old and popular sort has come to its conclusion; firstly, because the foreign makers figure so slightly in the American market, and, secondly, because they have found it unprofitable to continue big competitive events in Europe to keep alive the home market.

The foreigners, as a whole, are turning their attention to aviation and its spectacular contests, simply through a widespread belief that the value of automobile road contests, to them, has depreciated far below par. Hence little may be expected from the American recommendations in the forthcoming meeting in December, though the effort to obtain well-defined international conditions for stock-car racing is praiseworthy, and indicates plainly that the Americans now have no hesitancy whatever in engaging with their foreign competitors in any kind of a contest.

Time was when any American race of importance had a field overwhelmingly foreign in complexion, but it is now a certainty that the excellently managed and contested Savannah Grand Prize race was the finale in real international competition, either here or abroad. Of course, there will be races where both American and foreign cars will participate, and these shall serve, in some degree at least, to diversify competition.

AUTODOM'S HUB SUPPLIES A LIVE NEWS BUDGET

DETROIT, Nov. 23—By far the largest project of its nature with which Detroit has had to do in recent years, and which promises to eclipse anything else of its kind locally in magnitude, is about to be consummated, according to reports from official sources.

The deal involves the establishment in Detroit of headquarters by the General Motors Company, and the installation here of a group of plants of hitherto unequaled size and capacity. Options on sixty acres of land have been secured, and more property is being acquired as rapidly as possible, although to date the operations have been carefully kept under cover. It is understood that the investment in real estate alone will exceed $300,000, and that the contemplated plant when completed will furnish employment to 5,000 men. The details of the project have not been worked out to a point where much can be said authoritatively, but it is understood that the Detroit plant will be devoted largely to the manufacture of parts, as well as turning out complete cars. Unless something unforeseen occurs to block the undertaking, ground will shortly be broken, and it is the intention to have a major portion of the plant in operation for 1910.

Concentration of General Motors in Detroit

Ever since the General Motors Company was organized and began buying up plants throughout Michigan dissatisfaction was expressed by President W. C. Durant and his associates over the vast amount of territory over which their holdings were scattered, and the even more serious drawback of being to a considerable extent dependent upon outside interests for much of their material. This, coupled with the announcement that orders booked for next year will tax every plant of the General Motors Company to its utmost, and that Mr. Durant predicts 1911 will be an even greater year, is believed to be the controlling factor in the decision which will give Detroit another enormous plant, and materially strengthen the proud position it now holds as the hub of the automobile industry of the world. When the Buick Auto Company something like a year ago rented one of the most expensive business blocks on Woodward avenue, in the choicest part of the retail district, and converted it into a salesroom, leaving the other three floors idle, wise ones figured that the company planed moving its head offices from Flint to this city. Whether the building will now be occupied by the head offices of the General Motors Company, of which the Buick is now a part, cannot be determined at this time, although there are rumors to that effect.

Owen Motor Company Developments

Meanwhile, other interests are active, and the incorporation of automobile companies goes merrily on, with many others in prospect.

The new company foreshadowed in THE AUTOMOBILE two months ago, when Angus Smith resigned as secretary-treasurer of the Olds Motor Works, and Ralph R. Owen gave up his position as factory manager of the same concern, came into existence with the incorporation of the Owen Motor Car Company, with a capital stock of $500,000. The principal stockholders of the Owen Motor Car Company are R. R. Owen, Angus Smith and Frank E. Robson. The company has already secured options on a desirable site in Detroit, and it is the intention to begin the erection of a plant at once.

A Rumor Also Involves Lozier

A report going the rounds, and generally accepted as accurate by those identified with the automobile industry, is to the effect that the Lozier Motor Company, of Plattsburg, N. Y., will shortly establish a branch factory in Detroit, to cost $800,000. Several local capitalists of prominence are reported as backing the undertaking. It is said to be the intention to produce a car selling around $3,000.

Newcomers That Are Partially Heralded

Detroit and Pittsburg capitalists have taken options on thirty-two acres of land in Wyandotte, just at the edge of the city, and are said to be contemplating building two large plants, one for the manufacture of machine parts only and the other to turn out complete cars.

President DuCharme, of a Hornellsville, N. Y., auto company, is also negotiating with Wyandotte land holders with a view to establishing a factory there, which he declares would furnish employment to several hundred men.

The Watt Motor Company, capitalized at $100,000, has just been incorporated, and promises several surprises once it gets under way. Automobiles and marine engines will be manufactured on a large scale, the feature of the motor being that it can be reversed without the use of air compressors, according to the designer. Starting, stopping and reversing is all controlled by a single lever, and although the motor is of a six-cylinder type any number of these can be cut out at any time without moving from the driver's seat, leaving any desired number in operation. It is expected the new car will be on the streets early in January.

All of which is not so bad a showing for one week even in Detroit, where big things in the automobile world are of such frequent occurrence that they no longer arouse surprise.

Factories That Are Working Day and Night

In addition to the new companies entering the local field. those already established continue to branch out at a surprising rate, builders working day and night in an effort to keep up with the demands for more space. With no less than a half dozen additions now under way, the Studebaker E.-M.-F. Company has taken out permits for a two-story brick factory 80 x 265 feet, to cost $40,000. In accordance with its long standing policy of not waiting to complete one addition to its enormous plant before beginning another, the Packard Motor Car Company also figures in the week's proceedings with permits for a five-story reinforced concrete structure, 60 x 262 feet, and 72 feet in height, to cost $65,000.

A. L. A. M. HOLDS SPECIAL SESSION

At the A. L. A. M. headquarters, 7 East Forty-second street, its executive committee held a two-day session last week, Thursday and Friday. An announcement had been anticipated, but no information was forthcoming after the meeting. It is understood, however, that something important will be made known in the next fortnight. The impression prevails that W. E. Metzger, formerly of the E-M-F Company, will be successful in making license arrangements for his recently formed company. It is known, however, that he has not consummated arrangements with the Hewitt Motor Company. A definite statement may soon be forthcoming from the Metzger Company.

SYRACUSE CLUB ACTIVE IN SIGN-POSTING

SYRACUSE, N. Y., Nov. 20—Secretary Forman Wilkinson, of the Automobile Club of Syracuse, is still receiving requests from neighboring towns and villages for road signs giving warning to tourists of crossings, bad hills, etc. During the season the club has sent out several hundred signs into various parts of the country hereabout, posting nearly every road leading out of the city for thirty or forty miles, and in some instances much further. As a result of the club's activities, its membership is steadily growing, with indications of a very substantial increase before the Spring driving season opens. The roads in the vicinity have been much improved.

DETAILS OF DETROIT'S NEW WARREN

Detroit, Nov. 22—The Warren Motor Car Company, of which the organization was recently reported, is now insatlled in its plant at the corner of Isabella and Michigan avenues, in this city. The company, which is capitalized at $100,000, is headed by Homer Warren. John G. Bayerline, formerly with the Pope Mfg. Co., and the Olds Motor Works, and more recently with the Hudson Motor Car Company, is vice-president and general manager. R. W. Allen, secretary, is another graduate of the Olds Motor Works and the Hudson Motor Car Company. W. H. Radford is chief engineer. The company will deliver 500 cars before July 1, 1910.

The Warren-Detroit, as the car will be known, will be turned out as a roadster. Its motor has four cylinders, 4 by 4 1-2 inches, cast *en bloc,* with valves on one side. Ignition is by Volta magneto and dry cells. The clutch is a leather-faced cone, and the change-gear selective, giving three speeds forward. Springs are semi-elliptic front and three-quarters rear. The wheelbase is 110 inches and the tires 32 by 3 1-2 front and rear. The car complete will sell for $1,100, and deliveries are expected to begin February 1.

BRIARCLIFF COMMITTEE GETS MONEY

The Briarcliff race committee won back the $4,000 it deposited to guarantee against injury to roads in the Briarcliff race, April, 1908. The money was deposited on the demand of Frederick Skene, then New York State engineer, who threatened otherwise to withhold permission to use the new roads in Westchester County, which were included in the circuit. He agreed to return the money if the roads were not damaged, or to return the balance after making such repairs as were necessary. The committee did not get any money, however, and was forced to bring suit. According to the decision of Supreme Court Justice Platzek, the $4,000 must be returned in full, with interest.

FORD DISQUALIFIED IN TRANSCONTINENTAL

The Contest Committee of the Automobile Club of America has decided that the Ford car No. 2, which had been declared the winner of the New York-Seattle race last summer, was not entitled to the award. The car has been disqualified on account of the substitution of its motor en route. The Shawmut car No. 5 has now been declared the winner.

GENERAL MOTORS ABSORBS ELMORE

Toledo, O., Nov. 22—The General Motors Company now claims as its property the Elmore Automobile Company, located at Clyde, O., the transfer having just been made at a price said to be around the half-million mark. As to the intentions of the new owners, nothing has yet been officially announced, but it is hinted that the factory will be entirely rebuilt, overhauled, and enlarged to such an extent as to make it one of the largest and most important plants owned and operated by the General Motors Company. The location for such an enterprise is said to be ideal, both on account of shipping accommodations, three direct trunk lines running through the city and one electric line, and on account of low taxes and sanitary conditions.

The Elmore Automobile Compay was owned and operated by H. V. Becker and his sons, James and Burton. Twenty years ago the father operated a small stave mill at Elmore, a village near Clyde. About this time bicycles came into the market, and securing an abandoned factory at Clyde, Mr. Becker moved there and started making bicycles. When wheels became a thing of the past, so far as the craze was concerned, the Beckers started manufacturing automobiles, the firm being one of the pioneers in the automobile industry. The factory has been several times remodeled and enlarged.

CANADIAN AUTO SHOW IN TORONTO

Toronto, Can., Nov. 22—The Canadian Automobile Show will be held in the St. Lawrence Arena, Toronto, under the auspices of the Ontario Motor League, from February 24 to March 3, 1910. E. M. Wilcox, secretary of the League, will be the manager. There are some 30,000 square feet of space available in the building. An elaborate plan of decoration will be carried out. The League proposes to have the annual convention of members and others interested in good roads during the week of the show. The session will last three days.

APPERSON WINS LOS ANGELES RACE

Los Angeles, Cal., Nov. 22—The Apperson "Jack Rabbit," driven by Harris Henshaue, won the 150-mile race at Ascot Park to-day in 3 hours 45 minutes. Guy Irvin, who drove a Franklin car, was probably fatally injured when his car went through the fence. R. McIntyre, his mechanic, was hurled from the machine, but not seriously hurt.

THE AUTOMOBILE CALENDAR

Shows, Meetings, Etc.

Dec. 25-Jan. 1....Columbus, O., Automobile Show, Columbus Automobile Club.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Jan. 17-22........Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows Building.

Jan. 24-29........Detroit, Wayne Hotel Gardens, Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19........Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dai H. Lewis, Manager, 760 Main Street.

Feb. 19-26........Newark, N. J., Essex Troop Armory, Automobile Show, New Jersey Exhibition Company.

Feb. 19-26........Salt Lake City Auditorium, Automobile Show, Utah Automobile Dealers' Association. W. D. Rishel Manager, 1-5 East First South Street.

Feb. 21-26........Cincinnati, Music Hall, Automobile Show, Automobile Club of Cincinnati, Jesse Lippencott, Chairman Exhibits Committee, Gibson House.

Feb. 22-26........Kansas City, Mo., Convention Hall, Fourth Annual Automobile Show.

Feb. 22-27........Milwaukee, Wis., Auditorium, Second Annual Automobile Show, Milwaukee Automobile Club.

Feb. 24-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 24-Mar. 3....Toronto, Canadian Automobile Show, Ontario Motor League. E. M. Wilcox, Secretary.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

March 12-19......Syracuse, N. Y., State Armory, Automobile Show. Syracuse Automobile Dealers' Association.

March 21-30......Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show, Buffalo Launch Club. D. H. Lewis, Manager, 760 Main Street.

Races, Hill Climbs, Etc.

Dec. 22-29........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

Feb. 4-6..........New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.

WRIGHTS FORM $1,000,000 AEROPLANE SYNDICATE

SOME of the most prominent capitalists of America, in conjunction with the Wright brothers, have organized a company capitalized at $1,000,000 to manufacture aeroplanes. The incorporation was effected at Albany, N. Y., November 22. The incorporators are Cornelius Vanderbilt, Theodore P. Shonts, Allan A. Ryan, Morton F. Plant, Howard Gould, Andrew Freedman, Robert J. Collier, Edward J. Berwind, August Belmont and Russell A. Alger. The announcement was made by De Lancey Nicoll, of the law firm of Nicoll, Anable, Lindsay and Fuller. The company will be a close corporation.

Either Orville or Wilbur Wright will be president of the company, and the other brother and Clinton R. Peterkin will be vice-presidents. The treasurer and secretary have not yet been chosen. A meeting will be held within the next few days to elect officers. The executive committee will consist of Messrs. Shonts, Freedman, Belmont, Alger and the Wright brothers. The main offices will be opened November 29 in the Day and Night Bank Building, at Forty-fourth street and Fifth avenue, New York.

Statements surprising even to the most sanguine believers in aeroplane have been made by the promoters of the company. According to Mr. Nicoll, the Wrights have for several years purposely refrained from revealing by word or performance the possibilities of their machine, and the public has many surprises ahead when the full powers of the invention are disclosed. Mr. Nicoll is further quoted as saying that the Wrights believe an aeroplane for carrying twenty passengers is perfectly feasible, and that such machines will be constructed by the company in the near future. However, the brothers do not believe that the ocean will be crossed by a heavier-than-air machine until a motor has been invented with a fuel consumption far lower than any made at present. A field will be developed for the aeroplane in the West, for passenger service and carrying the mails.

An aviation field is to be opened during the coming winter in Florida for the instruction of prospective customers, and a staff of instructors will be maintained. It is said that the manufacturing plant will be located at Dayton, O., and that a number of the machines will be delivered by May 1. Those who order machines in advance will be given instruction in Florida during the winter.

The new-formed company will take every possible legal measure to protect the Wright patents, which those of the promoters who have made statements believe are fundamental. One fight which the company has already assumed is the injunction proceeding against Glenn Curtiss, which will come up December 14 before Judge Hazel in Buffalo.

When asked whether, in substance, the syndicate did not amount to a flying machine trust, which would monopolize the manufacture of aeroplanes, Mr. Nicoll replied that the Wrights unquestionably were the owners of all important patents on heavier-than-air machines, and that their claims would be defended by the company against all comers.

BISHOP FAVORS DENVER BALLOON RACE

BOSTON, Nov. 22—The New England Aero Club held a banquet to-night in commemoration of the one hundred and twenty-fifth anniversary of the first balloon ascension. Cortland F. Bishop, president of the Aero Club of America, spoke in favor of his plan for a series of aeronautic contests in different cities of the country, which he believes is the only means of inducing the prominent French aviators to cross the Atlantic. Mr. Bishop urged the New England club to join in promoting one of the series.

Denver is favored by the Aero Club president as the location for the international balloon and aviation meets. The location is especially good for balloons, and new world's records for distance might be made there. Mr. Bishop said that he thought dirigibles were impracticable, and that no provision would be made for them in the meets. Concluding his speech, he offered the New England club a cup as a trophy for long-distance balloon flights, to be competed for during the coming year.

FOR BALTIMORE-WASHINGTON AERO MEET

A committee of citizens of Washington and Baltimore, headed by Thomas F. Walsh, arrived in New York Tuesday morning to present to the Aero Club of America their reasons for wishing the international aeroplane meet next year to be held near their cities.

The movement to have this aviation event held in Washington was started soon after Glenn Curtiss won the international trophy at Rheims. Later the citizens of Baltimore organized an aero club and formed a partnership with the Washington men, whereby the two cities were to pull together for the meet. Both cities have raised funds which together will guarantee $100,000 for the expenses of the meet.

The Wright brothers and Glenn Curtiss have been invited to be present when the matter is discussed, at a dinner to be given at the Metropolitan Club in New York Tuesday night, by Mr. Walsh. A committee of the Aero Club of America will be present, as well as several members of the Wright syndicate.

OBSERVED BY AN ELECTRICIAN ABROAD

EMIL GRUENFELD, chief engineer and designer of the Baker Motor Vehicle Company, has just returned from a visit to European centers, and has expressed some interesting opinions on foreign progress. The most remarkable tendency, Mr. Gruenfeld says, is that toward shaft drive. Panhard, Benz, De Dietrich, Mors, Fiat, Berliet and others who formerly used chain drive exclusively, are all changing to shaft drive.

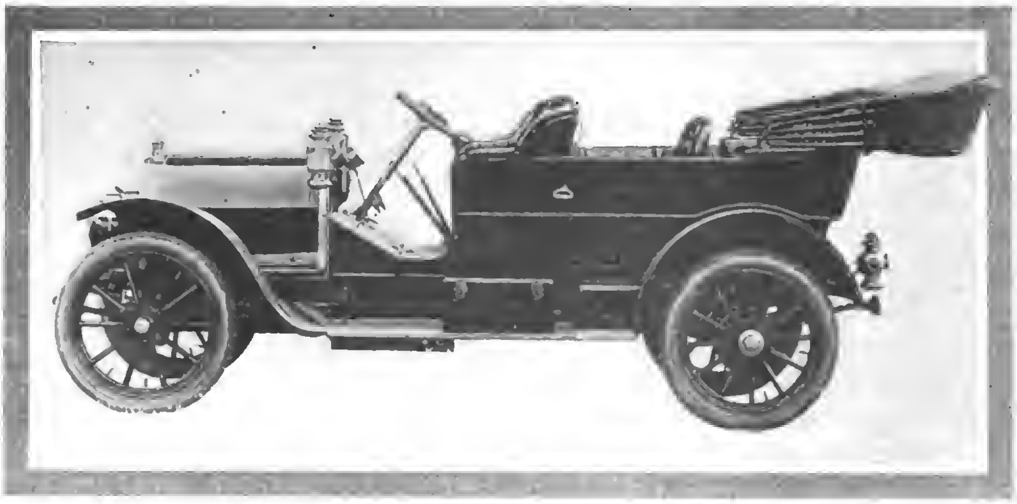
The greatest objection to European electrics, Mr. Gruenfeld says, is the use of very thin plates in the batteries, which, although they give a greater initial mileage, are too short-lived to be practical. The series-wound motor is becoming standard, and all the later models are of the single motor type with double speed reduction and shaft drive. The drum type controller is standard, also, and the electric brake and "recharging point" formerly used have been discarded.

European electro-chemists experimented with alkali batteries for many years, but could not overcome the disadvantages of the great potential drop under overloads and the limited recuperative power, a fault which the late American batteries of this type still show. For these reasons the pasted lead battery is almost universally used.

Solid and cushion tires have both been tried abroad, especially for taxicabs, but on account of the vibration and consequent loosening and breaking of mechanical parts have practically been discarded. Even the electric trucks and buses are being equipped with pneumatic tires of the twin and triple variety; that is, with two or three individual tires side by side on the same wheel. European cities are much more congested than those in this country, which gives the electric an added advantage. Mr. Gruenfeld sees great possibilities in the export trade.

GAETH STANDS PAT ON ITS 1909 MODELS

CLEVELAND, Nov. 22—For the season of 1910, the product of the Gaeth Automobile Company will show so few changes as to warrant the statement that the company is "standing pat" on its last year's model. This is praiseworthy, for it shows that the business has reached a stable foundation when no changes are brought out or suggested by another twelve month's use.



The 1910 Gaeth Is the Twin Brother of the 1909 Gaeth

Thus the changes for the 1910 car include such microscopic alterations as a two-inch addition to the length of the rear springs, as well as changing the material to vanadium steel. Then the valve sizes have been slightly increased to correspond with the modern tendency toward very large valves. Also the wheelbase has been increased by 6 inches making it now 120 inches. This is taken advantage of in the body, particularly in the length and foot room of the tonneau. A most noticeable tendency is the offering of dual ignition as an option, the second system taking the form of a high-tension jump spark outfit, with a Bosch magneto supplying the current.

Since this firm has always been a steadfast advocate of the low-tension system, this addition is noticeable. The make and break type is still put on as the regular ignition, in which a Bosch low-tension magneto supplies the current, the other being added only upon special request.

Distinctive describes the Gaeth clutch, which is unchanged. This is of the contracting band type, acting upon a special drum within the flywheel. The means of operation differs from the conventional, in that the pedal which operates it works backward to release, rather than the ordinary clutch pedal which works forward that is, taking the foot off of the clutch pedal releases the clutch. Some of the other features of the single chassis to be produced are: Double brakes, both placed upon the rear wheels and drop-forged crankshaft. It will be recalled that the motor is of the four-cylinder type. of 4 7-8-inch bore and 5 1-4-inch stroke. This is a long-stroke motor, and should deliver more than 40-horsepower.

FIRST GREAT WESTERN THIRTY OUT OF THE FACTORY

PERU, IND., Nov. 22—Interest now is concentrated wholly upon the newer models, designated by the manufacturers as 1910 models. The first of these are beginning to come out of the various shops all over the country. The illustration on this page shows the first product of the factory in Peru, Ind., of the Great Western Automobile Companies to bear the date of 1910. This is but a toy tonneau job and intended to seat only four. That the space allowed is unusually liberal is proved by the picture, which shows a seating capacity of five people. This comfort is a point which is often overlooked in the selection of machines, despite its great value and real necessity. The five men shown in the car, as illustrated, are Wm. Crossley, engineer, driving, and at his side, E. Mack Morris, general manager. The passengers in the rear seat, reading from left to right are: Paul Creighton, superintendent; R. H. Bouslog, secretary, and R. A. Edwards, director. Special attention is called to the enclosing sheet metal protection for the passengers, visible along the side of the car, just below the frame, and extending from the latter to the running board. This is a recent addition to the construction of the car, and is intended to protect the passengers from mud or dust, which would be thrown up.

Great Western Toy Tonneau with Five Notable Passengers

EARLY DELIVERIES OF NEW MOON MODEL

St. Louis, Nov. 22—Year by year the deliveries of new model cars has worked back from the fall of the year of the model to the late fall of the previous year. The best result of this has been to put the new cars into the purchaser's hands at the actual beginning of the year. As an instance of early deliveries now being made, may be cited that of one of the firms located in this city. The Moon Motor Car Company will commence to make regular deliveries in December of its new model, the Moon Thirty, which sells for $1,500. The car is new in a sense that it is being shown to the public for the first time, and it has been running for nearly a year, undergoing rigorous tests, and began to be built two years ago.

This Thirty is unusual in several respects, particularly noteworthy in a car to sell for so modest a price. Unlike most low-priced motor cars, the motor is suspended in the most approved method, without the use of a sub-frame. The gears operating the half-time shaft and pump are of the helical type and noiseless. Lubrication of the bearings of the motor is by force feed, a dash gauge indicating the pressure. Two and one-half gallons of oil carried in the self-contained reservoir is sufficient to lubricate the motor for 500 miles without attention.

A four-cylinder water-cooled motor with a bore of 4 1-2 and stroke of 5 inches, gives an ample 30-horsepower. It is cooled by extra large water jackets, a positive pump and special fin tubular radiator of ample size. The crankshaft of heat-treated steel, ground to size, is 1 3-4 inches in diameter. The valves are on opposite sides and mechanically operated; they are constructed of steel with nickel-steel heads, bevel-seated.

One finds the frame is such as is used on the most expensive motor cars. It is of cold-rolled pressed steel, 4 inches deep with 3 1-2-inch drop in the rear to allow for full elliptic springs. In front it is narrowed 3 inches to insure turning in a small space. The front axle is I-beam, one piece, drop-forged, with spring seats 4 inches wide forged integral. The rear axle is semi-floating, the live shaft being 1 3-8 inches in diameter and the material 3 1-2-per cent nickel steel. The axle tubing is 2 1-2 inches in diameter of seamless steel. The transmission is integral with the rear axle.

Being provided with a magneto, there is no commutator, and a consequent absence of surplus wiring. The car is sold with two oil side lights, tail light, horn and complete set of tools, for $1,500. The purchaser has the choice of three styles of body—touring car of the five passenger type, baby tonneau, and roadster. The car has a clearance of 11 1-2 inches, 110-inch wheel base, and tires 34 x 3 1-2 all around.

INTER-STATE "THIRTY" PRICE NOT REDUCED

In the description of the excellent car made by the Inter-State Automobile Company, Muncie, Ind., which was given in The Automobile for November 11, the statement was made that "this one belongs in the $1,500 class." This statement in itself would not have been misleading had it been explained and the real price of the car mentioned. As it was, however, the price was accidentally omitted, and the statement as quoted above was not explained.

What was actually meant was this: beginning about a year and a half ago, when the first of the cars listing at $1,500 and close to that were brought out, the phrase "$1,500 class" was coined to express the idea that a car belonged with these cars. Many of these cars actually listed as low as $1,200 and still others ran up in price as high as $1,800, but they were gathered together in one class, because of being natural competitors.

This class has grown and grown each year in both numbers and quality, so that it represents the logical middle or medium price car of today. The intention of the aforementioned remark was to class the Inter-State Model 30 with these cars, and not to indicate any lowering of the price. On the contrary, the demand has been such that an increase would be more reasonable.

TABLE OF WHEEL SIZES AND RIMS

Very few people, aside from those directly concerned with the wheel, rim or tire business, realize the large existing differences in wheel sizes demanded by the various makes of tire. The ordinary person thinks that he may choose his tire at random. So he may, but after that the wheels have got to be changed so as to allow of the use of that particular tire. The attached table, compiled and distributed gratis by the Firestone Tire & Rubber Company, Akron, O., shows this plainly, and in exact figures. The sizes there given demonstrate this fact more plainly than hundreds of words would. Thus it shows that having 36 by 4 1-2-inch tires on a car, say Fisk demountable, should it be desired to change to Continental demountables of an equivalent metric size (920 by 120), it will be necessary to have wheels

TABLE OF USEFUL INFORMATION
APPROXIMATE WOOD WHEEL DIAMETERS FOR VARIOUS SIZES AND TYPES OF RIMS

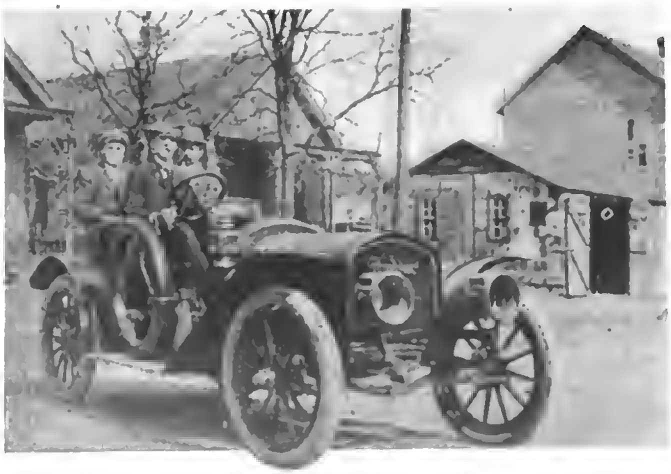
SIZE TIRE	CLINCHER AND UNIVERSAL	FIRESTONE DEMOUNTABLE	FISK BOLTED ON	FISK DEMOUNTABLE	CONTINENTAL DEMOUNTABLE	CONTINENTAL DEMOUNTABLE METRIC SIZES
30X3½	22 11/16	21 11/16	21 11/16	19 7/16	22	
32X3½	24 11/16	23 11/16	23 11/16	21 7/16	24	810X90–23 7/16
34X3½	26 11/16	25 11/16	25 11/16	23 7/16	26	870X90–25 [illegible]
36X3½	28 11/16	27 11/16	27 11/16		28	910X90–27 7/16
30X4	21 11/16	20 11/16	20 [illegible]		21	
32X4	23 11/16	22 11/16	22 [illegible]	20	23	
34X4	25 11/16	24 11/16	24 [illegible]	22	25	875X105–25 [illegible]
36X4	27 11/16	26 11/16	26 [illegible]	24	27	915X105–27 3/16
32X4½	22 21/32	21 [illegible]	21 ½			820X120–21 [illegible]
34X4½	24 21/32	23 [illegible]	23 ½	20 13/16	23 [illegible]	880X120–23 [illegible]
36X4½	26 21/32	25 [illegible]	25 ½	22 13/16	25 3/16	920X120–25 3/16
34X5	23 21/32	22 [illegible]		19 [illegible]	22 [illegible]	
36X5	25 [illegible]	24 [illegible]		21 [illegible]	24 [illegible]	
36X6½	24 [illegible]	23 [illegible]				935X135–24 [illegible]
37X5½	25 [illegible]	24 [illegible]			24 [illegible]	

METRIC AND APPROXIMATE AMERICAN SIZES OF CLINCHER TIRES

750 X 85	30 X 3¼		815 X 105	32 X 4
800 X 85	32 X 3¼		875 X 105	34 X 4
860 X 85	34 X 3½		915 X 105	36 X 4
760 X 90	29 X 3½		820 X 120	32 X 4½
810 X 90	31 X 3½		850 X 120	33 X 4½
840 X 90	32 X 3½		880 X 120	34 X 4½
870 X 90	34 X 3½		920 X 120	36 X 4½ or 5
910 X 90	36 X 3½		1020 X 120	40 X 4½ or 5
960 X 90	38 X 3½		1080 X 120	44 X 4½ or 5
1010 X 90	40 X 3½		935 X 135	36 X 5½

increased in diameter from 22 13-16 inches to 25 3-16 inches. Even then, if it was later on desired to change to Fisk bolted on tires of the same size, a 25 1-2-inch wheel would be required. Also, clincher and universal tires would call for wheels 26 21-32 inches in diameter. Since no putting-on tool for wood wheels has ever been invented, this means new wheels every time.

Wilmington, Del.—Work has been about completed upon the new garage of the Wilmington Automobile Company, on West Tenth street, and the concern expects to occupy the building some time in September. It will then have one of the most completely equipped and spacious garage buildings in the country, and the largest in Wilmington. The structure will be 85 by 114 feet in size and three stories high. The first and second will be used for storage and the third for a repair shop. The agency for the Peerless, Stevens-Duryea and Franklin cars is held.



Texan Travelling Salesman Who Drives a Rambler

M. M. Hinton, who makes his headquarters in Dallas, Tex., has a territory where people order their groceries by long-distance telephone and ride twenty miles to visit a neighbor. He has driven his Rambler fourteen thousand miles while making his rounds

INTER-MOUNTAIN AUTO SHOW AT SALT LAKE

Salt Lake City, Nov. 20—The great Inter-Mountain West is to have an automobile show. It will be held in this city, the fast growing metropolis which furnishes cars to Utah, Idaho, Wyoming, Nevada, Montana and western Colorado. The dates are Feb. 19 to 26. Such is the announcement of the Utah Automobile Dealers' Association. This organization, composed of the leading dealers of the State have already secured the Auditorium with a floor space of 150 by 200 feet. A local firm of architects is now engaged in laying out plans for the booths and an extensive scheme of decoration.

W. D. Rishel, the well-known Salt Lake newspaper man, has been engaged as manager and has already opened offices at 1-3-5 East First South street and began active work.

Salt Lake is a mecca for cattlemen, sheepmen and mining men during the long winter months. These men are the largest purchasers of machines in the West, and it is possible many sales can be booked during the show.

HARTFORD WANTS NEW ARMORY FOR SHOW

Hartford, Conn., Nov. 22—Now that the new State armory and arsenal is completed the old talk of holding the next Hartford automobile show there is revived. The new structure has a greater floor space than Madison Square Garden, hence it is obvious that it would be an admirable place in which to hold an exhibition of this nature. However, the building is limited strictly to the use of the state militia, and no civic functions of whatsoever nature may be held here. The location is good and cars could be run in off the ground floor without difficulty, and in addition to the main floor there are galleries and side rooms as well as a spacious basement. That a motor car show in such a building would be a drawing card is obvious, for it is a certainty that each and every dealer in the town, and now there are more than last season, would do all possible to make a good exhibition. But the State of Connecticut says, "No," so there the matter ends, and the dealers can but sign and find a smaller hall.

SYRACUSE SHOW, WEEK OF MARCH 12

Syracuse, N. Y., Nov. 20—The Syracuse Automobile Dealers Association has practically decided to hold its show this year the week of March 12. Instead of holding it for four days, as last year, it will next spring be put on for a full week, in the New York State Armory, every inch of space being occupied according to predictions. Already committees are commencing to figure upon the details of the big exhibition.

TWYMAN SAYS SOUTH IS GREAT FIELD

Louisville, Ky., Nov. 22—B. W. Twyman, who is thoroughly familiar with trade conditions of the automobile industry in the South, has returned from Atlanta. In discussing the Atlanta show, he said:

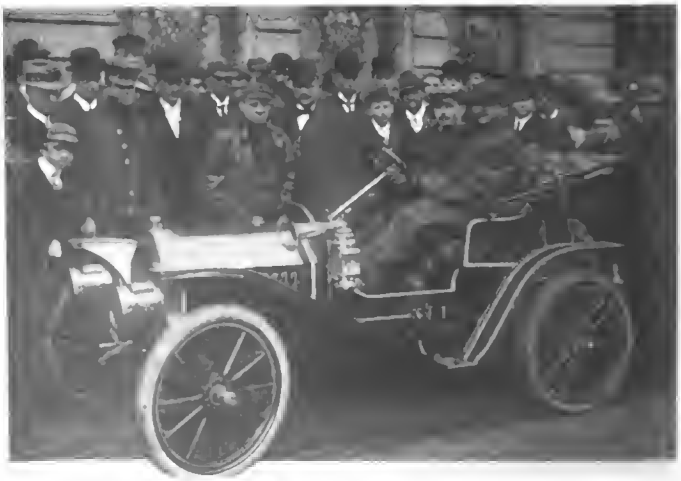
"It is very doubtful whether the automobile manufacturers in the United States realized the important part the South is destined to take in the automobile industry until after the Atlanta show. While all of the principal manufacturers were more or less soliciting business and taking just what was handed to them almost voluntarily, they did not fully realize the immensity of the possibilities of the States south of the Mason Dixon Line. The show, while not so large as those given in New York and Chicago because the building would not permit it, was in every way an ideal, modern, up-to-date automobile show both in decoration, arrangement, management and all. It is usually estimated that about one in every twenty persons who visits an automobile show in New York or Chicago are really interested in the purchase of a machine, while in Atlanta, I am satisfied that this could easily be reduced to one in five. What surprised me most was the amount of knowledge of automobiles and their construction found in the average prospective customer. This shows very conclusively that the automobile is receiving serious consideration by the entire South."

TEST PROVES WORTH OF LITTLEST CAR

Detroit, Nov. 22—With the idea of thoroughly testing out the ability of the "Littlest Car," the manufacturers of the Demotcar have sent two of the sturdy little fellows on State wide tours. One of these will be across Michigan and the other will traverse Ohio. How far the cars will go beyond has not yet been determined, but the marvelous manner in which they have taken to the unusually severe work may bring forth many thousand miles of additional tour.

The object of the test is to give the runabout a test that will prove its dependability beyond question. Leaving the Hotel Pontchartrain, Detroit, last Monday, the Michigan car traveled through Ypsilanti, Ann Arbor, and Howell, en route to Lansing. On Friday evening, O. B. Harper, of Harper & Aldrich, the Lansing and State agents, wired the factory that up to that time every one of the fifty-seven varieties of bad road had been encountered and successfully overcome. Considering the season of the year, with its deterrent effect on all touring, the showing of this $550 car has been such as to convince the most skeptical of its real merit.

In the illustration is shown the Michigan car as it appeared just before leaving Detroit for its dash across the State. This cut shows that the car is a regular stock model, and not a car especially prepared for this trip. It may be noted, too, that the driver and passenger were not particularly light weights.



Demotcar Leaving Detroit for Trip Through Michigan

Getting Ready for the Night On a Camping Trip

The illustration above shows two important members of the Maxwell-Briscoe Motor Co.'s official family pitching camp for the night. This was upon the recent occasion of Ernest Coler and J. D. Maxwell's going deer hunting in a Maxwell "Sportsman"

Moon Shines All Night—The Moon Motor Car Company's St. Louis plant has been running overtime for several weeks and a large force of men is now working at night in the machine shop. Deliveries of 1910 cars are now being made, and beginning in December the factory will turn out five or six cars daily. In pursuance of the company's policy to install the most modern machinery, several new tools have been put in the machine shop during the past week. One of these is a specially made boring machine, which drills six large ports at one time; this is used on the cylinder heads of the new "30." Fifty-four chassis were counted in the assembly room at one time last week, 38 being of the new model 30.

Robbed of $20,000 by Employee—Coincident with the disappearance of the former paymaster, Chauncey W. Hammond, the E-M-F Automobile Company, of Detroit, now controlled by Studebaker interests, found itself minus a week's pay roll, amounting to more than $17,000. A short time after the loss was discovered and reported to the police young Hammond walked into one of the police stations and gave himself up, declaring that he knew nothing of the theft. The abstraction of the money was a very clever job, paving bricks being substituted for the actual "mazuma," without the change being detected, until the satchel supposed to contain the money was opened at the factory to start paying off the company's employees.

Boston Auto Row Moving?—The Peerless Motor Car Company has leased for 20 years a building covering an area of over 10,000 square feet on Beacon street, near the intersection of Commonwealth avenue, which is being built by Eugene N. Foss. Another section of the same property is reported to have been taken by a second well-known automobile concern, and the chances are that the remainder will meet the same fate. The property is within two blocks of the terminus of the proposed Riverbank subway, and is in the hands of Lawrence Whitcomb, of Whitcomb, Wead & Company, who is also treasurer of the National Brake & Clutch Company.

Franklin's Stock of Tubing—Over ten miles of steel, brass and copper tubing—56,527 feet at the last inventory, to be exact—are kept in stock at the Syracuse, N. Y., factory of the H. H. Franklin Mfg. Co. This stock, it is said, would be exhausted in six months if no more was purchased. The larger sizes are used for the exhaust piping and for axles. Tubular axles are retained as a feature of Franklin design because the company believes that they are stronger and lighter than the I-beam type. The metal used in this tubing is 3 1-2 per cent nickel steel, with an approximate tensile strength of 240,000 pounds per square inch.

Economy of Motor Farming—Reports from Oberlin, Kan., tell of a farmer in that vicinity who recently finished plowing and seeding a thousand acres of wheat, using a four-cylinder, 90-horsepower gasoline tractor. He used 2,107 gallons of gasoline, costing $266.84, and about $90 worth of lubricating oil. Expenses for men and their board, and incidentals were $250. The total cost was about $600, or 60 cents an acre. Four drills were used, covering 36 feet at a time, and the packers were hitched just back of the drill so that drilling and packing were carried on at the same time, thus economizing still further.

Lexington Goes to Connersville—According to information received from the Lexington Motor Car Company, all previous reports concerning this company's intentions have been totally incorrect. The Lexington Company will not stay in Lexington, despite the best efforts of that city's population; but, on the contrary, will remove to Connersville, Ind., shortly after January, as the local capitalists failed to secure [illegible]95 shares of stock held by E. D. Johnson, president of the company, who is a Connersville man and most interested in the company's removal.

On the Banks of the Wabash—The Muncie Clutch & Gear Company, of Muncie, Ind., has ben consolidated with the Wabash Gear Works, of Terre Haute, Ind. The latter concern has been in business for some years, while the former is comparatively recent. The new management will be largely under the control of A. W. Wagner, who has become president of the Warner Gear Company, and H. L. Hooke, formerly of Muncie, who has become secretary. With greatly increased capacity, the company will continue the manufacture of change-gears, clutches, levers, etc.

Lecture on Battery Maintenance—Bruce Ford, of the Electric Storage Battery Company, delivered an interesting lecture last week on the care and operation of electric automobile batteries in the Chamber of Commerce, Washington, D. C. The lecture was illustrated by lantern slides and was largely attended. Electric automobiles are very popular in the Capital City and their owners derived much useful information from the evening's talk.

To Make Steering Wheels—Detroit's prestige as an automobile manufacturing center will be increased by the establishment of the Detroit Steering Wheel and Wind Shield Company, incorporated last week. The company is capitalized at $100,000, of which half has been paid in. The stockholders are Albert S. Keen, W. H. Honkle, Howard E. Coffin, Hugh J. Denk, Titus Denk, John A. Galvin and Thaddeus Galvin.

Needed 500 More Men—The Maxwell-Briscoe Motor Company's Newcastle, Ind., plant sent in the biggest request for help yet received by the free employment bureau in the office of the State statistician at Indianapolis when it telephoned for 500 men to be sent immediately. A rush of orders was the cause of this sudden increase in the regular working force of the factory.

Error in Hartford Advertisement—In the advertisement of the Truffault-Hart-

One of the Assembling Rooms at the Rider-Lewis Factory, Anderson, Ind.

ford shock absorber last week a typographical error made it appear that these devices were fitted by manufacturers only at extra charge. This was, of course, misleading, as a number of prominent makers include these shock absorbers in their stock equipment on every car which is sent from the factory.

Grabowsky Building Addition—The Grabowsky Power Wagon Company is building an addition to its present factory building in Detroit. This move has been found necessary in order to take care of the demand. The company is also looking about for a suitable building to acquire in addition to the one now occupied.

And Another Detroiter—Another new automobile manufacturing company is to be located in Detroit. The newcomer is the Abbott Motor Company, which has a capital stock of $300,000 and has just filed articles of incorporation at Lansing Plans are said to be in preparation for the erection of a large factory.

Receiver for Rubber Company—Chester O. Henderson, of Indianapolis, made application recently for a receiver to be appointed for the Goshen Tire & Rubber Company, and accordingly Judge Dodge, of the Elkhart circuit, named George P. Rowell to fill the office. It is likely that the business will be wound up.

Chadwick Doubles Capitalization—The Chadwick Engineering Works, of Pottstown, Pa., which makes the six-cylinder Chadwick cars, has increased its capital stock from $500,000 to $1,000,000.

IN AND ABOUT THE AGENCIES

Studebaker, Atlanta, Ga.—The Studebaker Automobile Company has purchased the interest of G. W. Hansen and his associates in the Georgia Motor Car Company, which will be made subsidiary to the Studebaker company and constitute a branch of the South Bend concern. Mr. Hansen will continue as manager. The branch will control the two Carolinas, Georgia and Florida. A new building is under construction at 45 Auburn avenue. It is estimated that one-twentieth of the Studebaker output will pass through this branch.

American Simplex and Velie, Syracuse, N. Y.—Melville W. Kerr and James E. Doane have combined under the name of the Kerr-Doane Motor Company to handle the American Simplex and the Velie. The new firm intends to build a handsome garage and showroom and is now looking for a suitable location.

Moon, Atlanta, Ga.—The McConnell-Kurfees Company, of 30 North Pryor street, has contracted with the Moon Motor Car Company, of St. Louis, for its agency in Georgia, the Carolinas, Florida and Alabama. Sub-agencies will be established in the latter States.

Ohio, New York City—The Harry S. Houpt Company has been made Eastern distributor for the Ohio, manufactured by the Jewel Carriage Company, of Cincinnati. The New York office of the Houpt Company at Broadway and Sixty-eighth street will be headquarters.

Koehler Lines, Newark, N. J.—The H. J. Koehler Company, which holds the New York City and vicinity agencies for the Hupmobile and Rider-Lewis, has purchased the property at 289-293 Halsey street, Newark, N. J., which will be its headquarters for New Jersey.

Rambler, Newark, N. J.—The Newark Automobile Company has taken the Rambler agency for this section. At present the company is located at 151 North Sixth street, but hopes to move into its new building at 316 North Broad street by the end of the month.

Ohio, Forsyth, Ga.—The Ohio Motor Car Company, of Cincinnati, has contracted with the Georgia Automobile Company, of Forsyth, to act as its agent in Georgia. Branches will be opened in Macon and Atlanta.

Columbia, New York City—The Victor Auto Storage Company, metropolitan agent for the Columbia, is fitting up an attractive salesroom on Broadway, near Fifty-second street, in which to exhibit the 1910 models.

Cole, Savannah, Ga.—Leonard Cater and W. A. Logan have taken the agency for the Cole Motor Car Company. They will act under the name of the Cole Motor Sales Company, with headquarters at 140 Bull street.

Croxton-Keeton, Johnstown and Altoona, Pa.—S. W. Fisher, Pittsburg manager for the Croxton-Keeton Motor Company, has arranged for the establishment of agencies in Johnstown and Altoona, Pa.

Rambler, Brooklyn, N. Y.—Kenney Brothers, who have the local agency for the Rambler, announce that they expect to be in their new quarters at Bedford avenue and Sterling place not later than December 1.

Pullman, Atlanta, Ga.—The York Motor Car Company, of York, Pa., maker of the Pullman, is about to open a southern branch at 10 Auburn avenue, Atlanta, under the management of Capt. Heidt.

Great Western, Niagara Falls, N. Y.—The Great Western Automobile Company, of Peru, Ind., has made arrangements with Swick & Pattison to handle its line in Niagara Falls, N. Y.

Michelin Tires, Kansas City, Mo.—The Michelin Tire Company announces the opening of a branch at 1926 Grand avenue, Kansas City, Mo., under the management of Wayne Murray.

Republic Tires, Buffalo, N. Y.—The Republic Rubber Company, of Youngstown, O., has opened an agency at 46 Chippewa street, at which Republic tires will be sold.

Hupmobile, Jamestown, N. Y.—Jacobson Brothers, located at 701 North Main street, Jamestown, N. Y., have taken the agency for the Hupmobile for Chautauqua county.

Hupmobile, Savannah, Ga.—Messrs. Brockett and Hazzard have taken on the agency for the Hupmobile and will supply this section of Georgia.

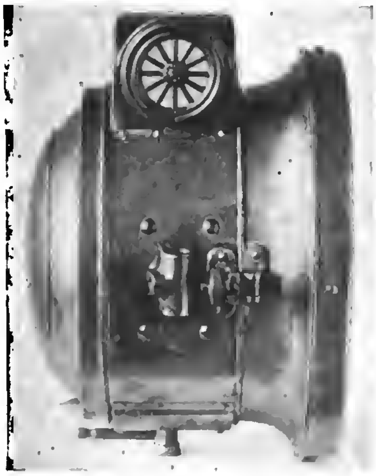
Inter-State, Pasadena, Cal.—Washburn Brothers, of 1032 Mission street, South Pasadena, have taken the agency for the Inter-State car.

Oakland, Syracuse, N. Y.—Willis & Van Brunt, agents for the Oldsmobile in this district, have added the Oakland to their list.

Regal, Tampa, Fla.—Minich & Kang have secured the agency for the Regal car in Tampa and vicinity.

THE RAMBLER'S SPECIAL LAMP

Another distinctive feature has been added to the new Rambler for 1910, by the equipment of all models with a Rambler lamp of special design. The top of the lamp is shaped to include the Rambler spare wheel in relief. This spare wheel, aside from its value to the owner, has become a most valuable asset to the Rambler people from an advertising standpoint. In every advertisement a circle display is used. At the upper points of the circle appear



New Rambler Lamp Design

the front and rear wheels of the car, between the two points the spare wheel attached to the car, and now the spare wheel appears in the lamp.

PERSONAL TRADE MENTION

Charles J. Horan, formerly with Ernest Flentje, of Cambridge, Mass., has taken a position with the Kilgore Mfg. Co., 585 Boylston street, Boston.

KEYSTONE OPENS PHILA. OFFICE

PHILADELPHIA, Nov. 20—The Keystone Lubricating Company, which makes Keystone Motor Oil, has opened an office and warehouse at 1327 Race street. Offices on the upper floors will be sub-let to concerns of good repute in the automobile accessory business. C. E. Huhn, formerly manager of the Puritan Soap Company of this city, has been appointed local Eastern manager of the automobile department.

RECENT TRADE PUBLICATIONS

L. Blériot, 16 rue Duret, Paris, France—Louis Blériot claims the honor of being the first to publish a catalog in which aeroplanes are listed on a commercial basis. His booklet contains fifty pages, artistically bound in rough green paper and well illustrated. The subject matter includes first the rough materials for aeroplane construction. The Blériot factory has unusual facilities for obtaining wood of the quality and grain necessary for this work, and also makes several forms of patented joints for the framework. Further on the Anzani, E.N.V., Gobron and Gnome motors are described and listed, and finally come the three types of aeroplane which Blériot has made famous: type XI, for one passenger, which crossed the English Channel; type XII, for two passengers, and type XIII, for three. The illustrations include photographs of many types of Blériot machines, dating back to 1901.

Sociétés des Moteurs Gnome, 49 rue Laffitte, Paris, France—Many of the successes of the Aviation Meet at Rheims were due in large degree to the efficiency and reliability of the Gnome motor. Although the most radical in its departure from standard practice, this motor has overcome prejudice and built up a most enviable reputation. As will be recalled from previous descriptions, it has seven cylinders mounted radially around a single stationary crank. The cylinders and crankcase revolve, and their weight acts as a flywheel. The 50-horsepower motor weighs 167 pounds, and the 100-horsepower, 14-cylinder type weighs 220 pounds, the cylinders of both being 4.33 by 4.73 inches bore and stroke. The motors are described in a single-sheet folder illustrated by photographs of Farman and Voisin biplanes in flight.

Société Anonyme Antoinette, 28 rue des Bas-Rogers, Puteaux (Seine), France—This well known maker of aeronautic motors and aeroplanes has issued a 12-page pamphlet in which its wares are described. Antoinette motors are made in three sizes, namely, 24 and 50-horsepower, 8-cylinder, and 100-horsepower, 16-cylinder, weighing 110, 198 and 330 pounds respectively. The Antoinette monoplane, made famous by Latham's daring feats, is also described at some length; it is distinguished by a truss construction, in which the members work only in compression and tension. These machines are made to order, many of the details being left to the discretion of the purchaser; the supporting surfaces varies from 300 to 400 square feet, with a weight, empty, of about 1,000 pounds.

New York School of Automobile Engineers, New York City—This organization has sent out to the trade and to others interested a pamphlet entitled simply "Motoring," and sub-titled "Extravagance and Danger vs. Economy and Safety." This case will certainly interest most amateur drivers. The school in question aims not so much to give practice in driving as to explain the underlying principles of the automobile. It is argued that anyone can easily learn to steer and change gears, and make a show of being a competent driver, and yet be completely unnerved by some slight but unusual accident which he has not encountered before. Such untrained drivers are dangerous not only to those who ride with them, but to all who use the same thoroughfare.

Chas. E. Miller, New York City—In preparation for the Atlanta Show this well-known manufacturer and jobber of automobile supplies has brought out a 100-page advance catalog for 1910, of which no less than 75,000 have been ordered from the printer. These will be distributed at Atlanta and at the other automobile shows. Emblematic of the scope of the catalog is the front cover, which shows an automobile in the center, and a motorcycle, a commercial truck, a motorboat and an aeroplane respectively in the four corners. As usual, the articles listed in the catalog include about everything that an automobilist could desire.

West Side Y. M. C. A., New York City—One of the first to start an automobile school, this hustling organization has taken up aeronautics, and under the direction of Wilbur R. Kimball has already a prosperous class in this new science. The aims and methods of the course are set forth in a pamphlet entitled "Aeronautics." The subjects of instruction include the law of gases, resistance and supporting power of the air, shapes of surfaces, kites, lift and drift, soaring and gliding flight, screw propellers, motive power, power-driven models, man-carrying apparatus, superposing surfaces, equilibrium, control, transmission systems and dirigible balloons.

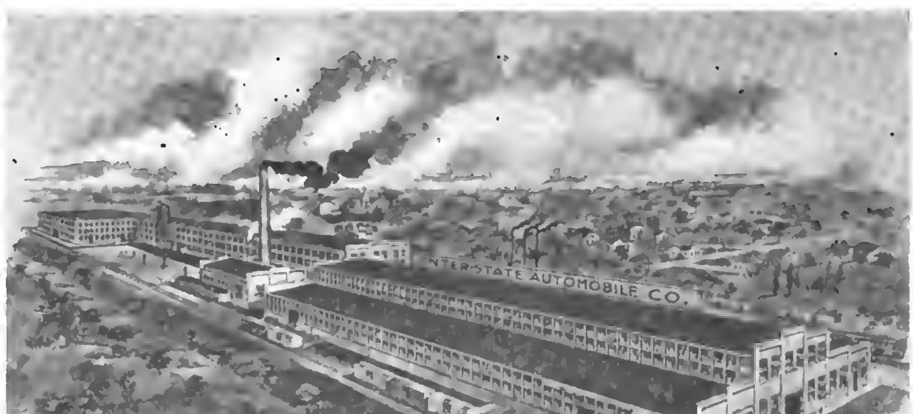
Rockwell Furnace Company, New York City—This catalog should be of great interest to automobile manufacturers and repairmen, listing and describing as it does many kinds of furnaces for forging and welding parts. The Rockwell furnaces are adapted to the use of either oil or gas, and seem neat and workmanlike in construction. The catalog contains 40 pages, 9 by 12 inches, and is profusely illustrated, both with pictures of the various machines themselves, and of factories showing them in actual use. Anyone who contemplates installing a furnace for forging and welding work would do well to consult it.

The American Oil Pump and Tank Company, Dayton, O.—"Dayton Leads the World" is the proud inscription on the cover of this booklet, and it is emphasized by a Wright aeroplane in full flight above the "American" pump which occupies the foreground. These pumps are all double-acting, giving a rapid and continuous flow of liquid, and are made in several styles and sizes, adapted to different forms of storage. The same company makes tanks and is prepared to furnish complete storage outfits, for either private or public garages, and for either gasoline or lubricating oil.

Motor and Manufacturing Works Company, Geneva, N. Y.—"Ejector" Mufflers form the primary subject of this company's catalog, which might well have been brought out by the Society for the Prevention of Noise. "Ejector" Mufflers are claimed not only to discharge the exhaust gases without noise, but also to reduce the pressure in the exhaust pipe below atmospheric, thereby creating a suction on the cylinder at the beginning of the exhaust stroke. Other products listed in the catalog are cutout valves, horn-blowing valves and foot pedals for their operation.

W. H. McIntyre Company, Auburn, Ind.—A striking cover of brilliant orange hue encloses the specifications of the 1910 McIntyre line, which includes pneumatic-tired vehicles of the standard type as well as the high-wheeled machines usually connected with this name. The new models follow the most advanced practice in having very large wheel diameters, the same being 36 inches on both of the two four-cylinder models selling at $1,250 and $1,750. A two-cylinder, $600 runabout also figures in the catalog.

Liggett Spring & Axle Company, Pittsburg—The present scarcity of automobile parts lends additional interest to the catalog of this maker of automobile springs and axles. The catalog in question is devoted to springs, and shows them in all the forms customarily used: full, three-quarters, and half elliptics.



Perspective View of Inter-State Factory at Muncie, Ind.

Information for Auto Users

Foy Electric Tail-Light—The oil tail-light, so often unreliable, has found a formidable rival in the Foy light, made by the Jordan Equipment Company, Beverly, Mass. This consists not only of the tail-light itself, with a tungsten-filament light, but also of a number-holder integral with the frame of the lamp, and arranged so that the number plate is illuminated by a broad band of white light. The number plates are interchangeable, so that different ones may be kept for use in different states, and changed with little difficulty.

The light is operated by an ordinary ignition battery, either storage or dry, and it is said by the makers that four dry

ELECTRIC TAIL LIGHT AND NUMBER PLATE

cells will operate the light with average running at night for ten weeks. The electric filament is German tungsten, cleverly hung up between two spring cushion terminals which prevent it from jarring out and also protect the filament. The lamp is fitted with a large red bull's-eye of the standard railroad type for signalling purposes, and the entire under part of the lamp, above the number plate, is a piece of heavy ground glass, which throws a well-diffused white light on the plate. Perhaps the greatest convenience about the lamp is that it is turned on or off by a switch, which can be placed anywhere within easy reach of the driver. The tail-lamp can thus be lighted without even stopping the car.

The lamp and holder are neat and attractive in appearance, and are claimed to cover the letter of the law in every State in the Union. The machine work is done by the Randall-Faichney Company, of Boston, which statement is a guarantee of excellence in this direction. The outfit sells for a reasonable price.

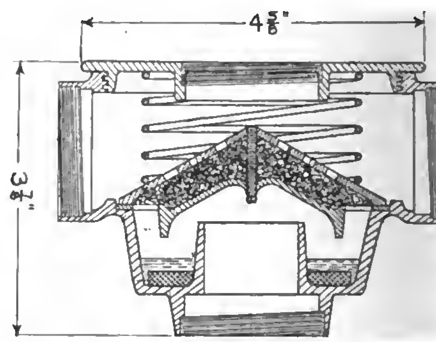
Perfection Magnetos and Battery Chargers—The Economy Mfg. Co., which makes these magnetos, has succeeded the Perfection Magneto Company, of Anderson, Ind., and is now located in Pittsburgh. Many of the former manufacturer's workmen have been engaged, and modern machinery has been installed to secure the production of the magnetos at a minimum factory cost. The jump-spark magneto is designed to be driven by friction or belt in any manner that will give the necessary speed of 2,500 revolutions. It has a drum type armature with laminated core, wound with double silk covered wire and thoroughly insulated. The magnets are of the Economy Mfg. Co.'s own make, of the best tungsten magnet steel. Brush holders are so constructed that the magneto may be run in either direction. Practically the same machine is adapted to service as a battery charger by the addition of an automatic cut-out to prevent discharge of the battery back through the magneto when the latter is idle. All that is necessary to install the battery charger is to adjust the machine so that its pulley makes the contact with the flywheel and to connect its two wires to the binding posts of the battery.

Vulco-Nu-Tread Kit—The old expression, "a stitch in time," is particularly applicable to fixing a cut in a tire casing. No matter how small the cut or hole may be, if it is neglected, sand and water or both will work into the fabric and loosen it from the tread. The Hazen-Brown Company, 100 South street, Boston, which is well known as one of the largest makers of shoe cement in the United States, has placed upon the market the Vulco-Nu-Tread repair kit with the design of meeting the requirements of just such a contingency, and saving the tire for a long period of future use. The driver of the car having one of these kits will be in possession of an outfit whereby repairs can be made immediately, thus saving tires from damage by delay, as the kit contains everything necessary for fixing any cut in a casing. It is packed in a neat wooden case, containing full directions for use.

Nu-Tread, which is a part of the kit, is also put up separately in collapsible tubes, and can be used independently of Vulcanoid—another essential of the outfit. Nu-Tread is virtually a rubber compound in a plastic form, and fills a cut satisfactorily with very little shrinkage, has good adhesive properties and is not easily loosened by wear. Vulcanoid is a fluid for cold vulcanizing, and the makers guarantee results when properly applied, and that it will perfectly cure the rubber.

In addition to the above, the Hazen-Brown Company is the maker of the Pluto vulcanizing kit which has proved so popular for cold vulcanizing; the Tire Doctor kit, which is a combination of both the Pluto and Vulco-Nu-Tread; the Pluto press, a handy tool with which sufficient pressure can be obtained to make repairs; Hazenoid rubber cement; mat and tire revivers, for giving a new finish to those articles; enamel reviver for automobile woodwork; alumino finish, a ready mixed aluminum paint for the engine and its accessories, which is waterproof, and does not tarnish; and an enamel reviver for polishing enameled bodies of automobiles and other highly finished wood or metal work.

Whiting "Airburetors"—O. J. Garlock & Company, of Palmyra, N. Y., have brought out two devices known as the "Airburetor-Filter" and the "Airburetor-Mixer," intended to improve the carburetion of an engine, working in connection with the usual carbureter. Both are intended to strain thoroughly all the vapor which reaches the cylinders, to eliminate every particle of foreign matter; and in addition—which may seem

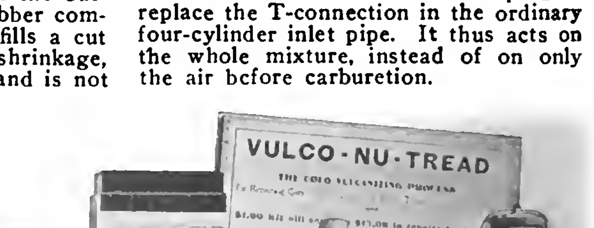


SECTION SHOWING AIRBURETOR CONSTRUCTION

strange to the autoist who has suffered from watery gasoline—both are intended to "humidify" the mixture by the addition of a very small amount of water vapor. The reason for this is the improvement in the running of the motor which is often noticeable at night, and which is supposed to be due to the humidity of the air after dark. A motor with a "humidified" mixture should therefore run as well by day as by night.

Of these two devices the "Filter" is intended to go on the air inlet to the carburetor, and the "Mixer" in the inlet pipe between the carburetor and the inlet valves. The "Filter" consists of a chamber full of asbestos fiber or steel wool through which the air is strained, and containing in the bottom a layer of "Humidifier Compound No. 17," which adds the desired moisture. The straining out of all dust in the air is believed to result in less friction deposit.

The "Airburetor-Mixer" is adapted to replace the T-connection in the ordinary four-cylinder inlet pipe. It thus acts on the whole mixture, instead of on only the air before carburetion.



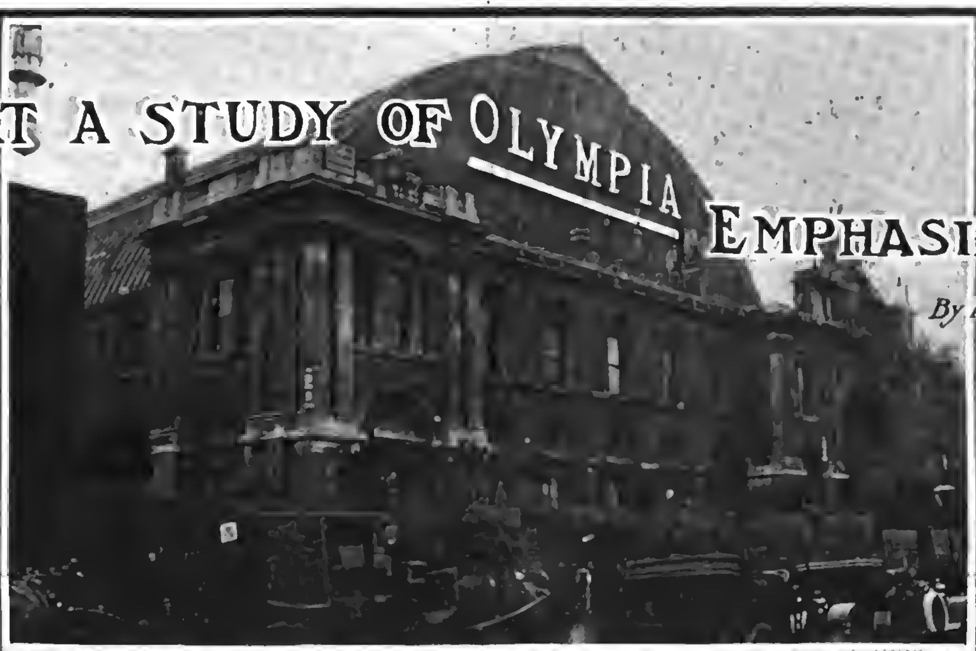
COMPONENT PARTS OF VULCO-NU-TREAD TIRE KIT

VOL. XXI NEW YORK—THURSDAY, DECEMBER 2, 1909—CHICAGO No. 23

THE AUTOMOBILE

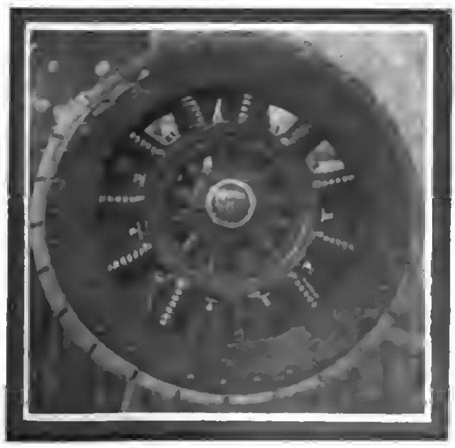
WHAT A STUDY OF OLYMPIA EMPHASIZES

By Basil Weston



The Great Olympia Show Building, London, Where Great Britain's Exhibition of Automobiles Is Held Annually

LONDON, Nov. 13—A detailed examination of the seven hundred or so cars exhibited requires at least two days, and at the end of this period one is driven to the conclusion that design is even further from finality than last year. Instead of settling down to one or more standard types the makers are all tending to develop their own ideas as to necessary improvements; with the result that almost every car presents new features of note—some useful and sound—others apparently the reverse. This is, perhaps, a natural stage in the development of the car. Some one has said, "It took five years to get the car to go and another five to keep it going." Apparently we are now in the third quinquennial period, in which makers are going to get the car to keep going well and without any attention from the user. Perhaps after this stage has been successfully passed we will find the industry settling down to the production of certain stereotyped models just as in the case of the bicycle industry which preceded it.

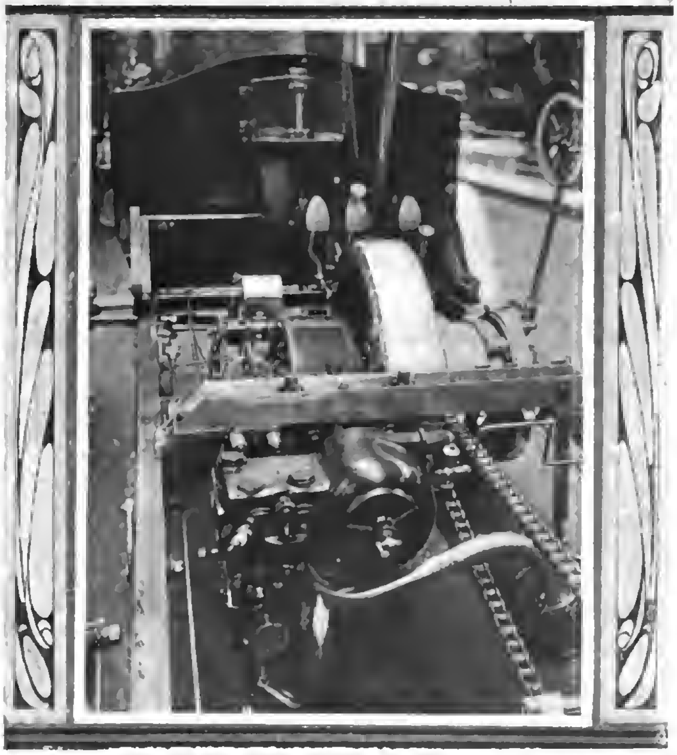


Latest Spring Wheel—The Sirdar

To return to the show. It may be interesting to review the stands in turn, noting down the main features which attract attention. Dealing with the cars in descending order of power and cost, there are a dozen firms which still favor the $5,000 car in spite of the high taxation ($200 per annum) likely to be imposed on this class. Rolls-Royce and Sheffield-Simplex specialize on big six-cylinder cars, while Napier, Daimler, and many others also favor the 60-horsepower, six-cylinder model, with the addition of other cars of more popular style and power.

The Rolls-Royce car is rated at 40-50 horsepower—this being an exception to the usual rule whereby British cars are known according to their R.A.C. rating. The six cylinders are cast in two blocks of three, a feature which has been copied by several other makers this year. All the valves are on one side, while the car-

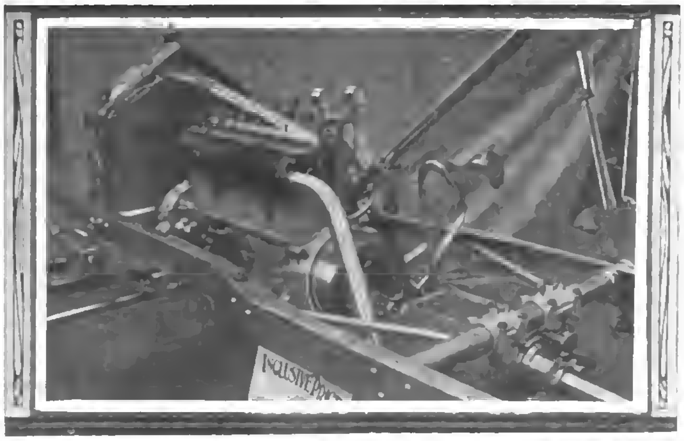
Hydraulic Transmission—Torbina Car



The Adams Car—"Only Pedals to Push"

bureter, pump, magneto and distributor for the battery ignition find accessible places on the other side. The inverted leather cone clutch and three-speed gearbox are of standard type, but the bevel-driven rear axle is provided with a triangular torque stay and radius rods of unusual proportions, for the makers attach special importance to this in connection with smooth driving and braking. The action of the expanding brakes in the rear hubs is equalized by means of a small differential gear placed in connection with the cross shaft which actuates the two brake cables. The springing and other features of the chassis are unaltered from last year with the exception that an air pump driven by the propeller shaft is used to provide the pressure for the fuel tank at the rear. This is in line with a movement of which many examples may be observed.

The most noticeable feature on the Sheffield-Simplex 45-horsepower, six-cylinder car is its "gearlessness," which, however, turns out to be more apparent than real. There is certainly no gearbox, in the ordinary sense of the word, and a straight propellor shaft extends from the clutch to the rear axle, giving a direct drive on which the car climbs hills with remarkable efficiency. In order to give the reverse gear, however, a small arrangement of gearing had to be provided at the rear axle bevel casing, and once this step was taken it was found no further trouble to arrange a low forward gear for emergency use. Hence this car is more correctly termed "gearboxless" than gearless. Another feature of interest is the control arrangement. There are the usual side levers and also two pedals. The left pedal operates first the clutch and afterwards the brake, while the second pedal, which is really a footplate sliding sideways, operates the carburetor throttle. This arrangement is found to be much more convenient to use than an accelerator pedal of the usual type. The front wheels are fitted with band brakes, which are operated by the foot pedal, while the rear wheel expanding brakes are controlled by the side lever. Detachable wire wheels are provided as standard.



Motor and Clutch Layout of the Crossley

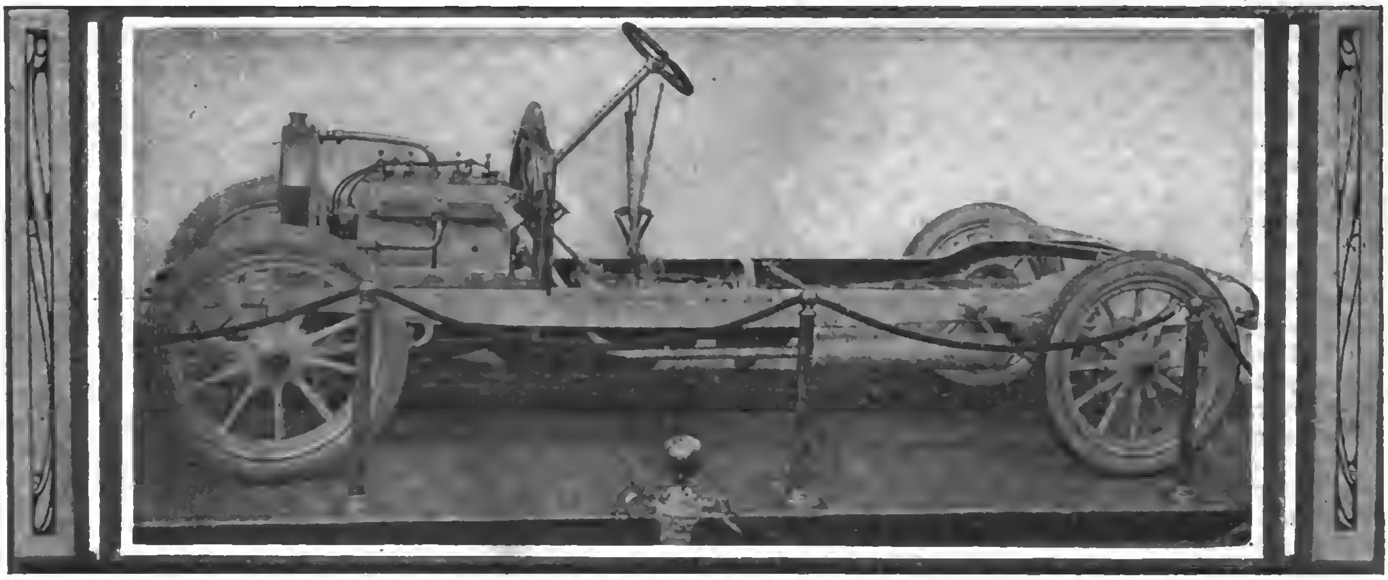
Napier Makes Both Fours and Sixes—The Napier firm has, for several years past, abandoned its former practice of making six-cylinder models only, and now provides cars of all types and powers, from the 10-horsepower, two-cylinder to the 90-horsepower, six-cylinder. On all the cars great attention has been paid to the elimination of all sources of noise, so that the firm has felt justified in adopting the descriptive name of "Noiseless Napiers." The larger models, and also the 15-horsepower type, are almost unaltered from last year, but the 15-horsepower car, listed at $1,750 chassis, has been improved in several ways. The four cylinders, 3 1-4 inches diameter and 5 inches stroke, are cast in pairs, and the valves, which are all on one side, are enclosed by detachable cover plates. The carbureter is of the "vaporizing tube" type, in which the petrol spray is completely vaporized in a narrow heated tube before the main air supply is added. This system has the advantage of enabling the hot jacket to vaporize the petrol in a thorough manner without decreasing the density of the charge. A single aluminum casting is used for the engine crankcase and the gearbox, with the result that the driving shafts are always in line. Roller bearings are used in the gearbox—an innovation for British design. The matter of ground clearance has been given careful attention, and a full 14 inches separates the lowest point of the engine from the ground. One of these 15-horsepower cars is shown with a special body for colonial use. Every tool or cooking utensil likely to be required is stowed away, and the hood is so arranged that it can be detached and used as a tent.

An equally interesting "15" finds place on the Daimler stand, this car and the 33-horsepower, six-cylinder being the new models for 1910. The other three cars—22, 38, and 57-horsepower—which proved so successful during the past season, have been retained almost without alteration, the only new features being the provision of a new semi-automatic lubrication system, whereby a pump supplies oil to troughs below the connecting rods, and the adoption of supplementary spiral springs at the rear of the frame. All the cars have, of course, Knight sliding sleeve engines.

The 15-horsepower model has already shown its popularity before the show commenced, and a very large demand is anticipated. The four cylinders are 80 x 130 mm. bore and stroke, with the usual Daimler detachable heads. These easily removed heads are found to be an advantage in that the combustion chamber can be quickly cleaned if this is found desirable after a season's running. There is no direct water connection between the jackets in the heads and those in the cylinders. Instead, the heads are connected in series, and the water passes through on its way to the radiator.

This last consists of plain flat copper tubes, without any gills or fins, which are arranged vertically, with their edges forward. The efficiency is considerably greater than with a radiator of the usual gilled tube variety, so that a smaller weight of water need be carried. The leather cone clutch and gearbox are of the standard type, and the drive to the rear axle is by a steel worm which actuates a phosphor-bronze worm wheel. The worm is placed below the axle, and hence, in order that the drive shall be in a straight line, and not impose excessive work on the universal joints, the engine is inclined at an angle of about 15 degrees. By reason of the arrangement of the oil troughs, this inclination has no effect on the working of the engine. This car is fitted with detachable wire wheels, and is made in two types, the roadster, with inclined steering, and the tourist. The price of the tourist four seater is $2,225. complete with lamps.

Product of a Battleship Maker—Like the Napier and Daimler firms, the Wolseley Company, which is a branch of Vickers & Maxim, the battleship builders, makes cars of all powers from 10 up to 60 horsepower. All have four cylinders, except the 10-horsepower, with two cylinders, and the 50-60-horsepower, which has six cylinders, all cast together—a practice also followed by the Panhard Company on their new 30-horsepower, live-axle car. The Wolseley engine is cast without the water jacket, this being formed of sheet steel, and fastened in place with screws. The valves are all on one side, and are inclined at an angle to the vertical, so that the combustion chamber is slightly lessened in size. The engine is lubricated by the splash of oil from the troughs situated beneath the connecting rods, these troughs being kept filled by a pump, as in the case of the Daimler. The carbureter has two jets, this being the usual custom with all engines of over 15 horsepower. This car has a four-speed gearbox and bevel drive, but the smaller Wolseleys have three speeds and worm device. All



Chassis of the French La Buire, an Example of the Popular 18-Horsepower Class

models have the road wheels fitted with Timken roller bearings.

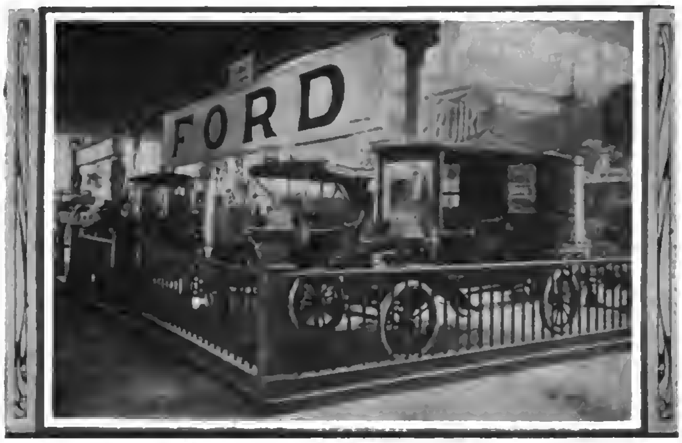
Two other well-known British cars which have in common several novel features are the Lanchester and N. E. C. (New Engine Company). Both of these cars have the engine beneath the front seat, and yet so arranged that all necessary parts are readily accessible. Both have also the engine inclined, so that the drive to the worm wheels at the rear axle is in a straight line. The Lanchester engine has vertical cylinders, four for the 20-horsepower, six for the 28-horsepower model, while the N. E. C. has four horizontal cylinders opposed in pairs. Dealing with the remaining features of the N. E. C. first; the engine can be started by the driver by means of a handle on the dashboard, the latter being hollow and carrying the petrol and oil. The steering wheel is arranged to tilt up out of the way, so that the driver may seat himself more easily. The brakes are water cooled, and the operating gear is arranged so that the throttle is closed when either brake is applied. The four springs are almost flat, and the ends can slide through the brackets, while radius rods prevent any movement of the axles. The gearbox gives four speeds, the gear being brought into mesh by an eccentric movement instead of the usual sliding action. Tbe Lanchester, on the other hand, retains the three-speed epicyclic gear, which has always been one of its special features. Worm drive and wire wheels are, likewise, special Lanchester features, both now becoming standard practice of other makers.

Application of the Worm Drive—The Lanchester worm, however, is special in that the worm is hollow in the center, with the result that the area of contact between the worm and worm wheel is greatly increased. So far, only the Lanchester Company has been able to produce a machine to cut these worms, with the result that their cars are much more quiet and efficient than other makes fitted with worm drive of the standard type.

One make of car—the Deasy—uses worms and wheels purchased from the Lanchester Company. These Deasy cars have the Renault type of radiator, as also have the Arrol Johnston cars. The Renault bonnet and radiator are particularly adapted for use in conjunction with bodies of the torpedo or flush-sided type—a fact which is taken advantage of in the standard models of both makes. The radiator design was one of several Renault patents which were recently revoked in this country on the grounds of non-working, and hence many more cars are likely to abandon the usual type of radiator in its favor—for there is no doubt as to which type is the more popular with the buying public.

The American Contingent—Of American cars, the White, Ford, and Cadillac are the only makes represented, though the Mitchell would have been staged had space been available. As it is, this last car is on view at a nearby garage. The White is shown by Mr. F. Coleman in both the steam and petrol forms, and, judging from the interest which the latter aroused, it would seem likely to prove as popular as the steam car has been. The Ford is only shown in one model—the 20-horsepower—which sells at $950. The Cadillac, also, has a great reputation over here, particularly for its reliability. The 10-horsepower, single-cylinder has not been altered since the memorable standardization test of a year ago. The 20-30, four-cylinder model has dual ignition and a longer wheel-base than before. The Cadillac representative, F. S. Bennett, is well pleased with the business prospects for next season.

Two other makes might be described as semi-American. These are the Adams and the Bedford. The Adams is shown in the 10-horsepower form, with the single-cylinder horizontal engine, epicyclic gear, and single-chain drive, and also in the 16-horsepower and the 30-horsepower types, with four-cylinder engine in each case. Epicyclic gears are fitted as standard to these larger cars, but a sliding-gear type of gearbox will be supplied if required. The Bedford is really a British-built Buick. It is rated at 15-18 horsepower, four cylinders, and has a type of three-speed epicyclic gear known as the Norman, wherein the planetary pinions revolve only at slow speed. The rear springs are complete elliptic—a construction only followed on these and the Austin cars. The Bedford car carries a guarantee for three



Ford Exemplified the American Light Car Ideas

years, the usual practice with other makers being to guarantee only for six months, or one year at most.

Italy Turns to Moderate Prices—In the medium power class there is an interesting group of Italian cars listed at moderate prices, consisting of Fiat, Itala, Lancia and Scat. The Fiat 12-14-horsepower has a bore and stroke of 80 x 120 mm, and the cylinders are cast in one piece, together with the base chamber. The magneto is high tension, and the carbureter a new type, with the jet chamber warmed by a water jacket. All the other parts of the car are standard, but the detail, finish, and general workmanship attract general attention. The Itala has the same bore and stroke, but is rated at 15 horsepower. It is almost exactly the same in appearance as the Fiat, save that it has no radius or torque rods. Its chassis price is $1,475. The Lancia 20-horsepower and the Scat 12-14-horsepower have no special details which call for comment except their general style and attractive appearance.

The British cars of this class which are most popular are the Crossley, Humber and Star. The first named, rated at 12-14 horsepower, has its four cylinders (size 80 x 120 mm) cast in one piece with the crankcase, while the gearbox has an extension which surrounds the flywheel and is bolted to the crankcase casting, thus giving the chassis a very neat appearance. The torque and radius rods are replaced by a steel tube, which surrounds the rear axle and terminates at the forward end in a spherical joint. The rear axle is so arranged that the propellor shaft and differential gearing can be removed without dismantling the axle. The car is fitted with internal expanding brakes on both front and rear wheels, and sells at $1,925 complete with five-seated body.

The 15-horsepower Star has come to the front lately on account of its high speeds—a standard type of two-seater having

White Showed the Gasoline Model beside the Steamer

been officially timed at Brooklands to cover a mile at the rate of 72 m.p.h. The engine has bore and stroke of 85 and 135 mm, and has a high compression and very large valves. The engine, clutch and gearbox form one unit, the latter providing four forward speeds with direct drive on the third.

As it was the Humber firm that first produced a popular four-cylinder car of moderate price, the Humber cars are always looked to as representative of British small car design. The only surprisingly novel feature is the adoption of four speeds instead of three on all models. This is rather contrary to the general tendency, but the designers stoutly maintain that if a small car is to give satisfaction for touring work it must be given such choice of gearing that all hills may be surmounted at a reasonably fast speed. On small cars the first, or emergency, speed is usually so low that it is hardly to be counted as a normal speed, and hence the car has but the second and top gears for ordinary work. When, as usual, only three speeds are fitted, the gap between second and top is too great to enable the car to do well in hilly country; hence the interposition of an extra speed between the two seems a reasonable proceeding. It will be interesting to see if other small car makers follow suit. Other Humber features are the use of thermo-syphon cooling and the provision of the Humber detachable wheels on all models, free of charge.

Several Small Piston-Valve Cars—In this medium power class there are three cars with piston-valve engines—the only apparent results of the experimenting which has been carried out on these lines by almost every maker. The three in question are the Hewitt, Bentall and Cooper. The 15-horsepower Hewitt engine has four cylinders cast in pairs, the bore and stroke being 90 x 108 mm. The eight piston valves are all placed on one side of the engine, and operate in long valve boxes placed alongside and at an angle with the main cylinders. These pistons are operated by connecting rods attached to the secondary shaft, and as they descend they uncover ports communicating with the carburetor and exhaust box respectively. The stroke of the valves is half that of the main pistons. The valves and ports are all water jacketed, and as the piston rings are never directly subjected to the heat of the burning gases, no lubrication troubles are experienced. An important fact is that the exhaust pistons travel downwards at maximum speed during the period of combustion, so that they are self driven and help to give power to the crankshaft. The inlet pistons are smaller in size and are so arranged that they are neutral as regards power. This engine has given excellent results on test, and when the system becomes better known the cars should become very popular.

The Bentall engine has likewise eight piston valves, but these are operated by rocker arms from an overhead shaft. The valve cylinders extend down the full length of the main cylinders, the inlet and exhaust sets being on opposite sides. These piston valves are hollow and are provided with ports about halfway in their length. When these ports register with ports cut in the cylinder walls the incoming or exhaust gases have free passage. As the ports will register on both down and up strokes of the valves it is only necessary to run the overhead shaft at one-fourth the engine speed, and hence the valve movement is correspondingly slower. The inlet and exhaust pipes are cast together with the cylinders, so that a very neat engine results. It might be expected that the hollow exhaust pistons would become excessively hot, but it is claimed that no trouble is apparent even after several hours' full load running.

The third new engine, the Cooper, is of the two-stroke type, having four cylinders, size 92 x 114 mm. Each cylinder has a piston rod and crosshead guide similar to those of a double-acting steam engine, and also a long piston valve, operated by a connecting rod from the half-speed shaft. Each crosshead is stationary, so that, as the working piston ascends, it draws the fresh charge through the piston valve into the space between itself and the crosshead. On the down stroke this charge is compressed and finally transferred through the center of the piston valve to the combustion chamber, where it drives out the exhaust gases through a port on the opposite side. The Cooper car has also an interesting rear axle drive, giving two direct forward speeds. This is effected by having two crown wheels of different size continually in mesh with two bevel gears, one or other of the latter being engaged with the propellor shaft by means of a double-dog clutch. A geared low speed and a reverse are also provided.

Many Single-Cylinder Cars—The small power class mainly consists of four-cylinder and one-cylinder cars, for the two-cylinder engine does not seem to regain its former popularity. There is, as a matter of fact, one six-cylinder car in this low-powered category—the 10-horsepower Delaunay-Belleville. This little two-seater has not been changed in design since last year, and good reports have been made of its running. There are many cars with monobloc engines of 8 to 12 horsepower, such as the French Delage, De Dion and Berliet, the German Adler and Opel, the Belgian Imperial and Metallurgique, and a dozen British cars. A notable newcomer to the four-cylinder section is the Renault, with 8-horsepower engine of 70 mm bore by 110 stroke. All these cars have three-speed gearbox and propellor-shaft drive, with raked steering column and two-seated body. The small car is now by no means the rough and incomplete vehicle of the style customary several years ago. In nearly every case the detail work has received as much attention as would be paid to the higher powered models. The reason for this is obvious, for all makers now look to the small and medium-sized car as the type for which the principal demand exists and recognize that this market is well worth securing.

Handsome Building Occupied by the London Ford Branch

Indicative of this fact is the small 7-horsepower car which the British firm of Austin has brought out. This has a single-cylinder engine of 105 x 127-mm bore and stroke and standard transmission, while all the parts, down to the gate change system and the internal expanding rear brakes, are exactly similar to those of the high-priced Austins. The price of this two-seater is $750 complete.

Other well-known single-cylinders are the Rover, Sizaire-Naudin and Jackson. The latter is curiously rated at 7-27 horsepower; the explanation being that the engine, 104-mm bore, is 7 horsepower by the R. A. C. formula, but on account of its stroke of 215 milimeters and high compression it develops 27 brake horsepower.

Fullest advantage is thus taken of the lessons of the French voiturette races and the Tourist Trophy. It will be interesting to note how the public receives this type of car, as its great power is gained principally at the expense of abnormally high piston speed. The engine has the further disadvantage of being very tall and awkward-looking. No one, however, has cast any doubt on its ability to develop its rated power. The general opinion is that such an extreme design will find little favor.

As Usual, a Hydraulic Transmission—Inventors have not yet abandoned the idea of the hydraulic transmission, which seems as fascinating as the various types of two-cycle and double-acting engines. The latest development in this line is the Torbina car, the vital part of which is illustrated elsewhere. The transmission device consists of a paddle-wheel with twin blades running in water; the blades can be deflected so as to displace a maximum or minimum quantity of liquid. In the maximum position the whole apparatus is automatically locked solid, and at the intermediate angles the slip is utilized to obtain the varying drives. The device is interesting principally as showing that the struggle for novelties has not ceased.


Exterior of the "All-Motor" Fire Engine Station at Charleton Road, East Greenwich, England

Competing Vehicles in French Commercial Trials Leaving the Garage at the End of the Trials

31 COMPLETED FRENCH COMMERCIAL VEHICLE TRIALS

PARIS, Nov. 30—Thirty-one commercial automobiles of various types and powers have been put on the scales, verified, and dismissed with a diploma certifying that they have made twenty-four distinct daily journeys, covering a total distance varying from 1,500 to 2,300 miles on schedule time, have carried a certain load and have used a certain amount of gasoline, alcohol, benzol, and lubricating oil.

This year's French industrial vehicle trials were organized with more assistance from the army than is usual, for the government, after experimenting cautiously for a number of years, has decided to inaugurate a system of subsidies, under which the purchaser of an approved type of vehicle can receive $600 the first year and $200 for each of the three following years, on condition that he presents his automobile annually for inspection and hands it over in case of mobilization. The type to which these favors should be extended was to be decided upon during these trials.

Regularity of running and economy in the use of fuel were the basis on which the trials were held. They were more difficult than on any previous occasion, for, with a view to eliminating the weaklings, the army authorities insisted on the date being October 15 to November 15. It is a time of the year when roads are liable to be heavy, putting engines and transmission to a more severe test than in summer.

Altogether Fifty-one Vehicles Started

At the start the competition united 51 vehicles. At the finish they were twenty-nine in the Automobile Club and army test, with two others that had entered under army conditions only. Two steamers which went through the preliminary formalities were withdrawn on the first day owing to the impossibility of arriving at an understanding on the fuel question. Two gasoline-electrics were withdrawn after the first day's run, owing to their obvious inability to compete on an economical basis with the gasoline products. There were two or three cases of gear failure causing withdrawal, and several of engine breakdown. In four or five cases, the mishaps were so slight that the competing vehicles were repaired and continued, though not given any official credit for doing so. Among these were two Berliet trucks, which on the first day ran into one another on a hill, owing to the brakes of the rearmost vehicle failing to hold. They were both repaired the same day and followed in the wake of the actual competitors, covering all the stages on schedule time. Officiallly, however, they were ignored.

The firms which figured best for team work were Saurer with five starts and five finishers in different classes, several of these being first prize winners. Delahaye with four starters and finishers; Bayard-Clement, also with four to start and finish; Aries with the same number, and Vinot-Deguingand with three out of three. De Dion Bouton lost two out of its four vehicles during the month; Peugeot lost two out of four, one of the two, however, continuing unofficially. Berliet also lost two out of four, the disqualified pair continuing without official recognition. Panhard-Levassor lost three out of four of its 15-horsepower trucks; Malicet & Blin had one failure out of three entrants, and Schneider lost both of its pair.

The reliability test was much more severe than is usual in competitions held by the French club. With the exception of the heaviest vehicles the average speed was fixed at 15 miles an hour, for daily runs varying from 60 to 120 miles. A maximum speed was also imposed, it being the duty of the military observer to see that it was not exceeded on any stage of the journey. If it were exceeded the vehicle had to be held back until the time limit had expired. Failure to make any one control on time meant disqualification.

Three Kinds of Fuel Used in the Contest

Three different types of fuel had to be used. For the first thirteen days, ordinary gasoline was supplied, and for three days over different routes the consumption was officially controlled. For one week the vehicles had to use alcohol, with two of these days during which the consumption was noted. Finally benzol was imposed for five days, with two of them under official control as regards consumption. As a proof of the thorough manner in which the fuel problem has been studied, it is only necessary to state that there was not a single failure successfully to use alcohol and benzol with no other adjustments than were possible during running time. Naturally they were prepared for this, there being a number of interesting carbureter adjustments with a view to economy, but the engines themselves had to remain unchanged. The only difficulty experienced was in starting up.

Fuel economy was not quite so remarkable as during last year's test, the reason being the increased average speed imposed. Another point of interest in the trials was that instead of the economy test being held at the end of the run over a comparatively short distance, it was carried on on seven different days, and for a distance of roughly five hundred miles. Another innovation was that the consumption of lubricating oil was controlled from the commencement to the end of the run, that is to say, for a period of 24 days and over a distance of 2,000 miles.

Horsepower Rating Was Not Excessive

With a view to figuring well on the economy basis the horsepower of the engines was kept as low as possible. In the class carrying loads not exceeding three tons, the rating of the engines varied from 14 to 22. Notable in this class were two Delahaye trucks with two-cylinder engines rated at 15-horsepower and having a bore of 3.9 inches and a stroke of 7.08 inches. Long stroke motors were in the majority, and further showed their superiority over the short strokes by winning in nearly all the classes. In section 5, for vehicles carrying more than a three ton load, two Delahaye trucks with four cylinder engines of 3 1-2 by 6 1-5 inches bore and stroke won respectively first and second prizes. On the official trials the two-cylinder Delahaye, carrying a useful load of almost three tons, would cover twelve miles to a gallon of gasoline. The four cylinder of the same make averaged 10 1-2 miles to the gallon with a load of 3 1-2 tons and a total weight of 6 tons.

The competing vehicles were divided into eight distinct classes, the first one being occupied entirely by a small two-cylinder Bayard-Clement delivery van which naturally won first prize. The second section, for delivery vans carrying a useful load varying from 1,324 to 2,645 pounds, was entered by De Dion Bouton and Vinot-Deguingand. The De Dion Bouton, a one lunger of 9-horsepower, broke down during the trials, leaving the four-cylinder Vinot-Deguingand the victor. In the third section there were only three entries, all of which went through to the end, Saurer getting first prize, Bayard-Clement second and Delaugere-Clayette third.

Saurer Figured Most Prominently

There was keen competition in the fourth class, where loads of 4,400 to 6,600 pounds were imposed. Here Saurer got first and third prizes, the two-cylinder Delahaye second and fifth and Vinot-Deguingand fourth and sixth. The others in order were De Dion Bouton, Aries, Panhard, Malicet & Blin, and Cohendet. The fifth section, imposing loads of more than three tons was, with the fourth, one in which the army was interested, and drew forth a strong set of competitors. Delahaye took first and second prizes, De Dion Bouton third and fourth, Aries fifth and sixth, and Malicet & Blin seventh. Whereas in the fourth class solid rubber tires had been carried almost without an exception, in the fifth section, having loads running as high as five tons, there were several cases of steel shod bandages all round and more in which rubber was used in front only.

The road trains and omnibus classes were not well filled. Saurer was the only one in the tractor class, his tractor having a load of four tons and his trailer one of three tons, pulled by an engine of only 4 by 6 inches stroke. The small bus class, having seats for 6 to 8 persons, was won by Bayard-Clement, with the same firm second and Peugeot third. Saurer was the only entrant in the large bus class, and was declared the winner.

The military section of the jury was more than usually afraid of cheating. When the competition had been brought to a close and final weighing in carried through, this operation comprising four separate weighings, with load, without load, with body and without body, the mechanical organs were tested. Every gasoline tank was sawn open in order to allow an officer to pass an electric lamp inside and examine thoroughly. One car had to have its differential entirely dismounted, another had to take its gearbox entirely to pieces, still another had to do the same with its steering gear, the same was done with a magneto, and even one of the solid tires of a Saurer truck was ordered to be cut off the rim. Evidently the military authorities had no intention of giving their award to a vehicle that had finished the test in a shaky condition or that had made use of any unauthorized methods.

De Dion Experimented with an Aluminum Bound Wheel

Latest Type of French Taxicab

PARIS, Nov. 30—A new type of taxicab is about to be put on the streets of Paris which has a certain general appearance to the electrics formerly employed by the New York Transportation Company. The resemblance, however, is only confined to the position of the driver, who, on the Roval taxicabs is at the back and slightly higher than the top of his cab. Although this is the first time a taxicab of this style has been produced, the idea is not new, this type of chassis having been used for light delivery work for about two years. The feature is that the power plant is above or behind the rear axle. It consists of a single cylinder De Dion Bouton engine rated at 9-horsepower, a very compact three speed transmission, and final drive by side chains.

The frame is special, being of pressed steel with a considerable drop to give a low side entrance, and having the driver's platform stamped out with the side members. The closed body is not only larger than can be fitted to the standard type of taxicab, but it is better suspended by reason of its position midway between the two axles. The front portion, usually occupied by the engine, serves as a platform for the carrying of luggage. The disadvantage of the driver's position appears to be the very complicated and indirect steering linkage made necessary.

The company having taken over this venture has decided to put the cabs into circulation at the same rate of fares as are charged by the horse cab drivers, the initial rate being 15 cents for a distance of practically 1,400 yards. After this distance has been covered the succeeding miles are at a much lower rate.

Roval Taxicab Is an Entirely New Type in Paris

FRENCH SMALL CAR RELIABILITY TRIALS NEXT IN ORDER

PARIS, Nov. 23—Twenty-seven small cars are entered for the first Reliability Trials to be held in France. The small vehicles are to cover fifteen daily stages of 125 miles each at an average speed of 15½ miles an hour without any stoppages other than for tightening nuts, adjusting brakes and driving chains, taking on oil, water and gasoline, cleaning spark plugs or carbureter in case of obstruction, and changing tires. Although these do not count as penalizations, they must be noted by the observers, and will serve to divide the competitors in case of a tie from which a winner cannot otherwise be evolved.

The organizers are convinced that regularity alone will be sufficient to weed out the weaklings, especially as the event has to be run in mid-winter over roads that are never good and are sometimes decidedly bad. The central station will be some garage in Paris, from which the competitors will be sent out each morning to cover one of six courses prepared in advance, but which will not be announced until a few minutes before the start.

By keeping the route to be travelled over in the dark until the hour of starting, it is believed that the possibility of fraud will be altogether eliminated. An observer supplied by a rival firm will be carried on each car, and the technical portion of the test will be under the control of Gustave Caillois, once a Vanderbilt race driver, with Thomas, Paul Meyan, a sporting journalist, and Eugene Renaux, the winner of the Coupe de la Presse.

The cars entered in the Reliability Trials are supplied by the voiturette specialists of France, comprising three each from Sizaire & Naudin, Gregoire, Delage, Barre de Niort, Doriot-Flandrin, Corre La Licorne, Turicum, and Alcyon, and one each from Hurtu, Fouillaron and Zenith. The definition of a small car is one with a single-cylinder engine of not more than 4 9-10 bore by 5 9-10 inches stroke; 3 9-10 by 5 1-10 for two cylinders, and 3 1-10 by 4 7-10 for four cylinders. They must be in every respect according to current catalogue, and completely fitted for touring with mudguards, running boards, hood, windshield and lanterns.

Single-cylinder cars will be slightly in the majority, followed closely by small fours, with a sprinkling of twos. It is not likely that the maximum dimensions allowed under the rules will be taken advantage of, the majority of small cars on the market having engines with slightly less bore and stroke than those allowed. Nothing is to be gained by having the largest possible engine, for no account will be taken of any speeds above 15 1-2 miles an hour average for the entire distance.

LOOKS DOUBTFUL IF FRENCH GRAND PRIX WILL BE HELD

PARIS, Nov. 24—Nine entries have been received towards the 45 necessary before the Automobile Club of France will hold a Grand Prix. As there are less than two weeks in which to obtain the remaining 36, the prospects of the race would appear to be doubtful. The firms already entered are De Dion Bouton, Benz and Rolland-Pilain. The minimum figure is unnecessarily high, for only once has this number of starters been obtained for an international race held in France.

On the Auvergne course in 1905 there were only 29 starters; on the Sarthe in 1906 the number was 34; at Dieppe in 1907 it was 38, and in the following year at the same place it reached the record of 49. Last year, when nobody wanted to race, the number of starters had to be 40; now that there is a certain feeling in favor of a speed event the number has to be 45 before the club will move.

If the Automobile Club of France is rather cold hearted over the prospects of an automobile race, the same does not apply to the Dieppe district. The mayor of the town and the deputy of the district have just paid a visit to the racing board in order to promise a subsidy of $20,000 if the race is held on the triangular course by the seashore. In addition, they will undertake to put the roads in racing trim at an additional cost of about $15,000.

Should an aeroplane race be added to the automobile speed test, the district will come forward with a subsidy of $40.000 in addition to all local assistance for organizing these events.

In a moment of enthusiasm the Club proposed to have two days' automobile racing at Dieppe, two days on which motor boats would show their speed ability in the bay, and two or three days for aeroplane races over a prepared aerodrome, then as a grand final a flight of all the artificial birds across the English Channel to the British shore, a stay there of about half an hour in order to replenish the gasoline and oil supply, and return to the starting point.

The scheme is the most ambitious one ever conceived by the Club. But it was no sooner conceived than they seemed to become afraid of it, as is shown by the fixing of 45 cars as the minimum for the Grand Prix, and the declaration that the aeroplane race will only be held if the automobile event can be carried through. Dieppe, however, is so enthusiastic over the matter that she is capable of carrying all or a portion of the program through without the aid of the club.

Negotiations have already been commenced with Brighton, on the opposite side of the Channel, in order to endeavor to put up a big prize for flights over the sea if the Automobile Club backs out of the affair.

PARIS, Nov. 30—The lists for the proposed revival of the Grand Prix of the Automobile Club of France closed to-day. Insufficient entries were received, and this will mean the abandonment of the race in 1910, unless the club can be persuaded to change its mind.

BUSSING PRINCIPAL WINNER IN AUSTRIAN TRIALS

VIENNA, Nov. 24—Austria's commercial car trials, October 3 to 17, the results of which have just been published, were a great success, as of the fourteen vehicles that started out on the 1,100 kilometers tour, all fourteen returned to Vienna. The judges' awards are somewhat of a triumph for the German industry, as the Büssing cars of Brunswick carried off the chief trophies. The prize of the Ministry of Commerce for the vehicle with the best daily result, went to the Büssing bus, which also received the prize of the Minister of Public Works for the best omnibus. The trophy given by the same department was awarded to the Büssing road-train, which took the gold medal of the Austrian A. C. as well. Two prizes of the Ministry of War went to the Daimler road-train, and the silver medals were awarded to the Büssing bus, Daimler bus, Fiat delivery van, Büssing van, Mulay van, and Büssing trailer, for the best results in the different categories; while all the competitors received diplomas for having ended the journey successfully. The Büssing victory was analogous to that of Saurer in France.

AND NOW A WHITE ONE AND A HALF TON GASOLINE TRUCK

WIDESPREAD interest of late concentrated on the commercial vehicle situation and the existing types of cars, has resulted in several newcomers in that field. Of these, none will excite more surprise than the announcement that the White Company will produce a gasoline-driven truck of 1 1-2 tons nominal capacity. Surprise because this concern has but recently entered the gasoline field, and admiration at the details of the car as turned out, will be intermingled equally.

Rear Construction and Twin Tires on White Gasoline Truck

As the two illustrations on this page show, the conventional lines are followed, the motor being located in front under a hood, driving through a clutch to a transmission in a mid-location, and from there back to the rear wheels by shaft and bevel gears.

In the motor will be noticed a radical departure from the conventional, however, as the block engine of the pleasure car is used. In this the White Company will be one of, if not the first, to use a block motor of four cylinders for commercial purposes.

In detail the engine used in the truck is the standard White gasoline engine with a bore of 3 3-4 inches and a stroke of 5 1-8 inches. The intake and exhaust passages form an integral part of the engine casting. The valve stems and valve springs are completely enclosed. The clutch is of the leather-faced cone type; the transmission has four forward speeds, and the drive from gearcase to rear axle is by means of a shaft. Both the engine and the gearcase are supported in the frame by three-point suspension.

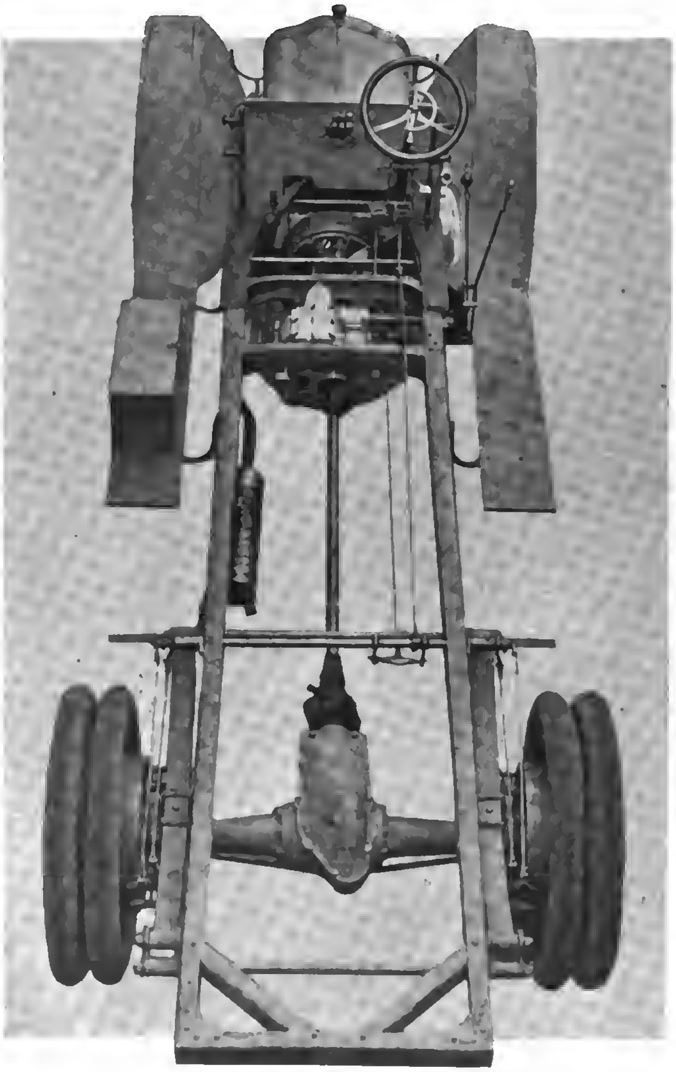
In accordance with recent foreign practice, the truck is fitted with pneumatic tires, each rear wheel being fitted with two 36 by 4 tires. The rear axle is so located that when the truck is loaded practically all of the load is supported by the rear wheels, so that steering is rendered very easy. The wheel base is 144 inches, the ratio between the rate of revolution of the engine and of the rear wheels on the direct drive is 7 to 1. The accompanying illustration of the rear construction shows the liberal dimensions of the brake-drums and the unusually substantial construction of the rear axle, springs, etc.

In particular, the differential housing will be noticed. This is a very neat construction, and withal, a very accessible one. There are but three parts, the two tapering axle sleeves and the gear housing proper. The sleeves are bolted up to the housing by means of integral flanges, while the gears may be reached or seen, for the various purposes of inspection, oiling, repairs, etc., by removing the cover. The latter is held in place by nine bolts, so that its removal is a matter of but a minute's work.

Two sets of brakes are fitted, following touring car practice. These are both located on the rear hubs, and are operated in the usual manner, one by foot pedal and the other by hand lever at the side. The clutch pedal, when pressed clear forward, will pick up the emergency brakes also.

On the order of touring car practice, too, is the frame. This is of pressed steel, of channel section with the open side turned in, so as to present a smooth exterior. The thickness of metal is, however, very considerable, while the bracing at the rear end, where the strains of a truck body would be greatest, is unusually stiff. Not only are the usual gusset plates provided at top and bottom, but a second diagonal bracing is added. This takes the form of a channel of slightly lessened height, bent to a trough shape in the middle of its length. This central part is riveted to the back member of the frame by six stout rivets, while the end portions are flattened to go inside of the side members, where they are riveted in place. In addition to this, the spring support takes the form of a continuous bar, which extends from the outside of one spring eye across the car to the outside of the other spring eye. This at the front and rear of the back springs, which are semi elliptic in shape, strengthens the rear portion of the chassis very materially.

Considering the weight of load in relation to the possible speed, 3,000 pounds moving at not over 16 miles per hour, in comparison with touring car practice, 800 pounds load moving at speeds up to and beyond 40 miles per hour, the use of pneumatic tires is seen to be very reasonably sure of success.



White Chassis From Above, Showing Simplicity of Rear Axle

THINGS RUSSELL HUFF OBSERVED ABROAD

PARIS, Nov. 26—"There is very little that is radically new on the European automobile market," said Russell Huff, chief engineer of the Packard Motor Car Company, to THE AUTOMOBILE representative. Mr. Huff had paid a hurried trip to Europe primarily to visit the London automobile show, and at the same time to look into the European field generally. After a few days in London he made a run of the French factories, slipped over to Belgium, and will sail for New York on the *Lusitania*.

"All the tendency is towards small four-cylinder low-powered cars. The European makers have stopped building large cars altogether. Simplification is being pushed to a very fine degree, the parts being reduced as low as possible in order to make the car cheap to produce in the first case and easy to maintain when in the hands of the private owner. The chain-driven car has almost gone out of business. In England there is a strong tendency towards worm drive, in place of bevel gear. I particularly noticed that there is no boom in six-cylinder cars. I made a list of all the firms having formerly made six-cylinder cars in rather important numbers, and who did not show them this year. There were seven or eight firms who have abandoned the six.

"On the other hand, every firm of importance has brought out a small four-cylinder car, of about 12 to 20 horsepower, and in each case this small model is made the leading line. Where sixes are still shown they are very small engines, as the Delaunay-Belleville and the new Renault. Taking an average, the American engineering standard is quite as high as that of Europe, while in the matter of steels we have got far ahead of the European constructor.

"Business seemed to be good at the London show, and the Britisher was doubtless helped enormously by the absence for the first time of the rival show in Paris. This enabled him to secure a lot of outside contracts that he would never otherwise have got. Both in France and England the commercial vehicle business seems promising. All kinds of firms having any considerable amount of haulage to do have changed from horses to power vehicles. Taxicabs and motor omnibuses have put the horse variety entirely out of business. The European taxicab is a very light vehicle, generally with two cylinders in London, and often with only one cylinder in Paris. It is declared that owing to keen competition not much money is being earned by the London taxicab companies, although the vehicles are popular.

"There is a strong tendency in England towards the adoption of what is known as the torpedo type of automobile body. It is straight-line body, with as little resistance as possible combined with maximum protection against the wind. The cars have high side doors for both front and rear seats, while the seats are set very low to give the passengers full protection. Wire wheels, of the dismountable type, are also a popular feature in England.

"Although business generally seems to be good, the volume of trade is far short of that in the United States. Whereas we at home will doubtless turn out 200,000 cars next year, the estimated product of the combined English factories is only 12,000 cars. When the European buys a car it is generally kept for a number of years. There are scores of cars doing good service in Paris which came out of the factory six or seven years ago. They have had their body work changed from time to time, and often carry closed limousines, and they have been freshly painted when they needed it. Nevertheless, they are old-fashioned models that the American automobilist would be ashamed to drive.

"European touring is as popular as ever among Americans. As an indication, our own Paris branch has been in touch with over two hundred Packard parties during the present season. The transportation companies take care of the automobiles so thoroughly, and the various touring bodies have so simplified the formalities that there is nothing difficult about an automobile trip through Europe. There is a charm about foreign travel that appeals to our people, and will certainly cause them to visit Europe every year in increasing numbers. There are good roads, historic interest, fine scenery, architecture and quaint customs that cannot be seen at home.

"One point of interest to the American visitor is the comparatively small life got out of tires on the hard macadam roads of Europe. I was told in England that 2,500 miles out of a steel-studded non-skid tire was considered very satisfactory service. Being very hard and dust proof, the wear is naturally very much greater than on our softer American roads.

"There does not appear to be much possibility of business with Europe for other than the makers of cheap, popular cars. The market is so small that none of the first-class makers are likely to bother with it. Quite a number of American cars are sold in England, and appear to sell well. Practically none are sold in France. In every case those who have got the business are makers of the cheaper moderate-power cars."

THE AUTOMOBILE CALENDAR

Dec. 25-Jan. 1....Columbus, O., Automobile Show, Columbus Automobile Club.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Jan. 17-22........Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows' Building.

Jan. 24-29........Detroit, Wayne Hotel Gardens, Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19........Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dai H. Lewis, Manager, 760 Main Street.

Feb. 19-26........Newark, N. J., Essex Troop Armory, Automobile Show, New Jersey Exhibition Company.

Feb. 19-26........Salt Lake City Auditorium, Automobile Show, Utah Automobile Dealers' Association. W. D. Rishel, Manager, 1-5 East First South Street.

Feb. 21-26........Cincinnati, Music Hall, Automobile Show, Automobile Club of Cincinnati. Jesse Lippencott, Chairman Exhibits Committee, Gibson House.

Feb. 22-26........Kansas City, Mo., Convention Hall, Fouth Annual Automobile Show.

Feb. 22-27........Milwaukee, Wis., Auditorium, Second Annual Automobile Show, Milwaukee Automobile Club.

Feb. 24-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 24-Mar. 3....Toronto, St. Lawrence Arena, Canadian Automobile Show, Ontario Motor League. E. M. Wilcox, Secretary.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

March 12-19......Syracuse, N. Y., State Armory, Automobile Show, Syracuse Automobile Dealers' Association.

WHAT GENERAL MOTORS WILL DO IN DETROIT

DETROIT, Nov. 28—Some day some ambitious chronicler of facts stranger than fiction is going to write the romance of the automobile industry. When he does a little space might profitably be devoted to telling how Detroit finally came into its own, thereby adding another bit of testimony in support of the frayed old adage that all things come to those who wait.

Among those who hailed with acclaim the announcement that the General Motors Company would establish a central plant here, which will be the largest automobile manufactory in the world, few were familiar with a bit of hitherto unwritten history that at this stage of the proceedings makes decidedly interesting reading, although to loyal Detroiters the admission of early error of judgment may be a bit humiliating.

W. C. Durant, of General Motors

Six years ago David D. Buick was building gasoline engines in a little shop out on the west side of the city. He believed the automobile, then in an experimental stage, was facing a great future and decided to get in on the ground floor. He started out to organize an automobile company, but never got past the starting point so far as Detroit capital was concerned. Local men of means were not looking for investments in such hair-brained enterprises as this.

Perhaps their indifference was not strange. In those days they held automobile "races" on the old Grosse Pointe track, and thousands flocked there to witness the antics of the speed merchants with their "benzine buggies" and snail-like electrics that often expired before they succeeded in circling the mile track, and went away with serious doubts as to whether such an unreliable device as an automobile could ever be made practical.

Buick worked in his shop days and spent his nights trying to interest capital, being met with rebuffs on every hand. A few thousand dollars was all he required, and he had enough business in sight to cover the capital he was seeking several times over. About this time Flint, Mich., already famous as the Vehicle City of America, was casting about for new fields to conquer, and thither Buick went, shaking the dust of Detroit from his feet. The Buick Motor Company was organized, and a comfortable business soon established. Then W. C. Durant, who had made a fortune as a manufacturer of carriages and wagons, decided to enter the automobile field, and acquired an interest in the Buick Motor Company. The indefatigable energy and executive ability that had gained for him independence in one line immediately manifested itself in the new field, with the result that the automobile business grew by leaps and bounds. The history of the Buick Motor Company, and how in Mr. Durant's hands it furnished a nucleus for the General Motors Company, is all of such recent date that there is no use reviewing it.

What the Buick Motor Company might have amounted to had Detroiters interested themselves in the enterprise six years ago will never be known. Certainly similar concerns that followed on have exceeded the fondest expectations. However, the point of interest at this time is that without the Buick Motor Company there would probably have been no General Motors Company, and without the General Motors Company there would have been no central plant representing an investment of $2,500,000, and furnishing employment for from five to seven thousand men. It may be a long way around, but there is a certain degree of comfort to Detroiters in knowing that, chiefly because a proposition was turned down cold six years ago, the city's indisputable position as the hub of automobile industry is to be immeasurably strengthened by the addition of the largest plant of its kind in existence.

Details of the central plant for the General Motors Company, whose location in Detroit was announced exclusively in last week's AUTOMOBILE, have been made public, and are on an even more comprehensive scale than was anticipated. Fifty acres of ground has been secured in the northeastern part of the city, and here fourteen mammoth buildings having a total floor space in excess of one hundred acres will be erected. These include, according to the plans prepared:

One administration building, three stories, 90 feet by 296 feet.
One central machine building, with two wings, 90 feet by 256 feet, three stories.
One central pavilion, three stories, 90 feet by 436 feet.
One "saw tooth" section, one story, 206 feet by 256 feet.
One assembling plant, three stories, 90 feet by 1,096 feet.
Two assembling plants, three stories, 90 feet by 700 feet each.
One warehouse, two stories, 263 feet by 290 feet.
One wood shop, three stories, 90 feet by 290 feet.
One wood shop, three stories, 90 feet by 256 feet.
One wood shop, one story, 300 feet by 256 feet.
One paint shop, three stories, 90 feet by 550 feet.
One foundry, one story with monitor roof, 180 feet by 780 feet.
One power house, one story, 90 feet by 150 feet.

In addition there will be many smaller buildings, such as shipping sheds, plant offices, etc. All will be of fireproof construction, and embody the most approved ideas.

The site, which alone cost $300,000, is ideal, extending as it does for several blocks along the railroad, with sidetrack facilities.

At present there are some thirty-five structures of various kinds on the property. These will be torn down or moved as rapidly as possible, and work on the plant proper will begin early in the spring. It is the present intention to have everything in shape for the season of 1911.

Speculation has been rife since the first announcement of the new plant was made as to what effect it would have on the future of other holdings of the General Motors Company. While not caring to go into details at this time further than to state that the new plant will be devoted to the production of a general line of automobiles and parts, those back of the undertaking announce that it will in no way affect the other plants, further than, where deemed necessary, to relieve them of some of their burdens.

Heretofore the General Motors Company has confined its activities to the purchase of interests in other plants. It now holds the immense Cadillac plant in Detroit, the Buick at Flint, one of the largest in the country; Welch, Cartercar, Oakland, and Rapid, at Pontiac; and several others scattered about Michigan, as well as numerous accessory plants. Now it has taken the greatest forward step in its career, and the outcome is of the utmost significance to Detroit and the trade in general.

LEXINGTON SOON WILL BE A HOOSIER

LEXINGTON, KY., Nov. 29—The Lexington Motor Car Company has its fine new brick plant at Connersville, Ind., well under way, the first story being nearly completed. With good building weather such as is the rule at present, the middle of January will see the company comfortably installed. The Lexington plant is to be disposed of at a reasonable figure. The Commercial Club of Connersville has given a liberal bonus in return for the transplanting of the business to that city, and this, together with the footing gained during the past season, should establish the Lexington more firmly than ever both with customers and agents. The company expects to build 400 cars this season, and, like most others in the industry, has its total output already contracted for.

A. A. A. IN ANNUAL MEETING RE-ELECTS PRESIDENT SPEARE

NEW YORK, Dec 1—Placing itself strongly upon record as being unequivocally opposed to reckless and unfair use of the highways by inconsiderate operators of automobiles, the annual meeting of the A. A. A. to-day re-elected Lewis R. Speare to its presidency, expressing unanimous approval of his occupancy of the office during the unexpired portion of the term of William H. Hotchkiss, who resigned to become superintendent of insurance of New York State. This is the official list for the ensuing year:

President, Lewis R. Speare, Massachusetts.
First Vice-President, Robert P. Hooper, Pennsylvania.
Second Vice-President, Frank M. Joyce, Minnesota.
Third Vice-President, F. C. Donald, Illinois.
Treasurer, H. A. Bonnell, New Jersey.
Secretary, Frederick H. Elliott, New York.
Chairman of the Executive Committee—A. G. Batchelder.
Chairman of the Legislative Committee—Charles Thaddeus Terry.
Chairman of the Touring Information Board—Powell Evans.
Chairman of the Contest Board—S. M. Butler.
Chairman of the Good Roads Committee—George C. Diehl.

ADDITIONAL EXECUTIVE COMMITTEE MEMBERS

S. A. Miles	Edwin S. George	William R. Innis
H. O. Smith	Paul C. Wolf	A. D. Converse
Alfred Reeves	Frank G. Webb	A. E. Lerch
W. E. Metzger	J. P. Coglin	G. W. Allen
C. H. Gillette	H. M. Rowe	A. E. Coffin
James T. Drought	F. C. Battey	A. H. Knoll
John Bancroft	J. H. Edwards	
Oliver A. Quayle	Louis W. Hill	

On the first day of the meeting, the opening item was the dissolution of the old stockholding corporation under the New Jersey law, and the substitution of a more flexible charter under the Connecticut statute. The report of Chairman Terry was accepted in its entirety, and the necessary papers were signed by all the directors present at the meeting.

Reports of the various boards indicated that the work of the association has prospered substantially in the past twelvemonth, and the association is in a generally prosperous condition.

Chairman George C. Diehl of the Good Roads board referred to the successful Cleveland convention, and predicted something even more epochal at St. Louis next year.

Chairman Terry of the Legislative board presented a very exhaustive report and outlined the general plan that has been proposed for the First National Legislative convention which will be held in Washington, D. C., next February. At that time the National Registration bill will be re-introduced into Congress and it is expected that a public hearing on the measure will be secured during the week of the convention. The Uniform State motor vehicle law will also be brought prominently before the members and efforts will be made to secure its introduction into the legislature of those States which either possess no effective laws or those which in certain instances have been shown to be unreasonable in their provisions.

Chairman F. B. Hower, of the Contest board, told of the season's contests and indicated unmistakably that he did not desire a reappointment. In recognition of his indefatigable activities, a unanimous resolution of thanks was passed.

Chairman Powell Evans, of the Touring Information board, told of what had been accomplished in this direction and what was being outlined for the future.

Treasurer H. A. Bonnell's report gave a balance of over $12,000 in the treasury.

Secretary F. H. Elliott's figures placed the present membership at 25,759, represented in 30 State associations and 225 clubs. Six new State bodies have been formed during the past year.

Though President Speare, in his report, had referred to the inconsiderate use of the roads by the few, the following resolution, introduced by O. A. Quayle, chairman of the New York State Association legislative committee, was unanimously passed:

"Resolved, That the American Automobile Association places itself upon record as being unalterably opposed to the unfair use of the highways by criminal and lawless operators of motor-driven vehicles, and, furthermore, this national organization of automobile owners calls upon its various State associations to propose and secure the passage of laws which shall rid the highways of reckless and inconsiderate drivers even to the extent of revocation of licenses and jail penalties in proportion to the nature of the offences."

Among the recommendations of President Speare, was one concerning the disposition of the Glidden trophy, which will probably never be competed for again. The consensus of opinion is that the 1910 tour shall be known as the A. A. A. National Endurance Run, with rules so strenuous in character as to prove the undoubted reliability of the contestants, but minus a conclusion which shall positively require a single prize-winner.

It was decided that hereafter the fee for individual members shall be $5, the former price having been $3.

The association's offices will be continued at 437 Fifth avenue, at least for the next two years.

Due recognition was given of the assistance rendered by the National Association of Automobile Manufacturers, in the carrying on of the work of the national organization.

Powell Evans, of the Automobile Club of Philadelphia, desired that the association consider the possibility of extending its activities into the field of aeronautics, which, in its developments, he said, bade fair to be a kindred pastime to automobiling. This was referred to a special committee of which Mr. Evans was made chairman.

The nominating committee, of which J. P. Coghlin of Massachusetts was chairman, made its report at the Wednesday session, and no opposition candidates were placed in nomination.

N. A. A. M. DECEMBER MONTHLY MEETING

It was natural that Chicago show matters should occupy most of the attention of the executive committee of the National Association of Automobile Manufacturers at its monthly meeting held at 7 East Forty-second street Wednesday afternoon. Because of the presence in the city of many members at the meetings of the A. L. A. M. and the A. M. C. M. A., the attendance was much larger than usual.

A. M. C. M. A. HOLDS SPECIAL SESSION

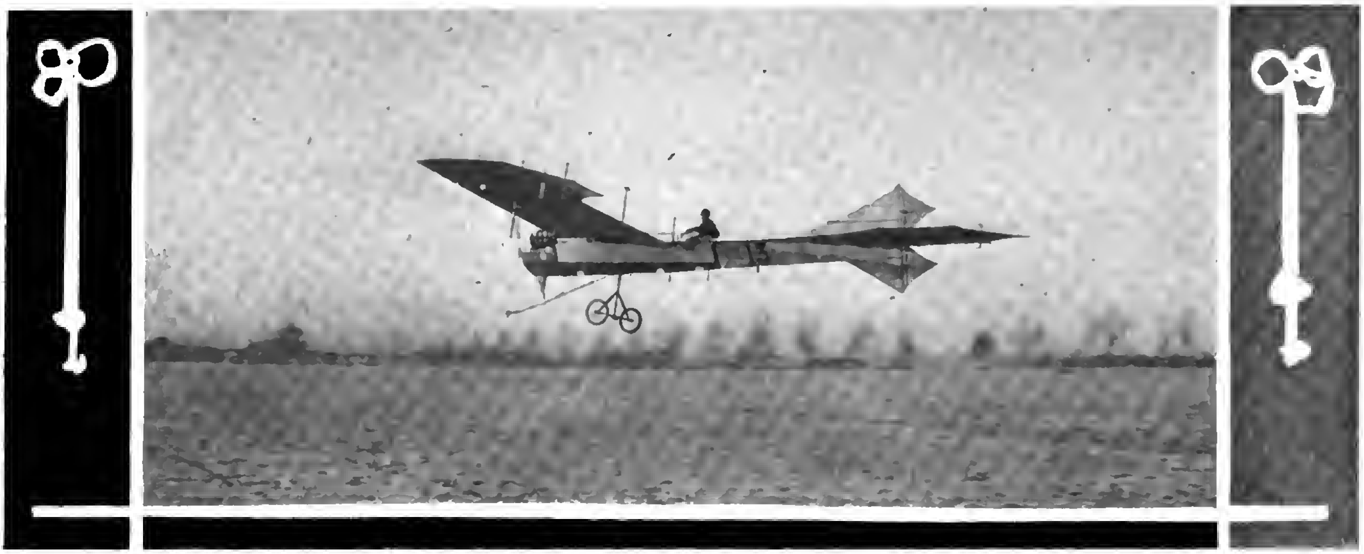
The Committee of Management of the American Motor Car Manufacturers' Association, with Chairman H. O. Smith presiding, held a session Tuesday at the association's headquarters, Fifth avenue and Forty-second street, its time being principally occupied with Grand Central Palace show arrangements. It is also understood that the Selden patent came in for some attention.

A. L. A. M. HOLDS BUSINESS SESSIONS

At its headquarters on East Forty-second street, the Association of Licensed Automobile Manufacturers, Tuesday, held a meeting of all members, with a most generous attendance. President Charles Clifton occupied the chair, as he did at the meeting of the executive committee on Wednesday. No information was forthcoming at the time of going to press, though it was intimated that all the members of the A. M. C. M. A. had been given opportunity to obtain licenses upon reasonable terms.

WRIGHTS ARRANGE DETAILS OF CO.

The officers of the $1,000,000 Wright aeroplane syndicate held a meeting Saturday at the office of Nicoll, Anable, Lindsay & Fuller, 31 Nassau street, New York, at which further details of the organization were perfected. After the meeting the brothers left for Dayton, O.



Küller Flying on an Antoinette Monoplane at Chalons Camp, in the Vicinity of Paris

AEROPLANE SCHOOLS ESTABLISHED IN FRANCE

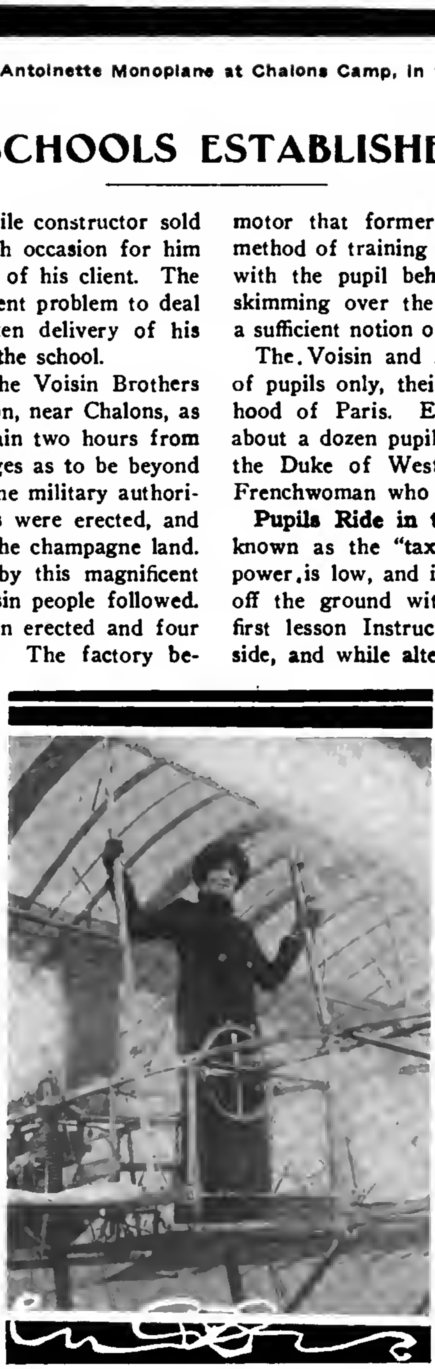
PARIS, Nov. 30—When the early automobile constructor sold a car to a customer there was not much occasion for him to trouble about the experience or otherwise of his client. The early aeroplane constructor has quite a different problem to deal with, for as soon as his customer has taken delivery of his machine he asks to be taught to fly. Hence the school.

When Henry Farman broke away from the Voisin Brothers he pitched on the military camp at Mourmelon, near Chalons, as the future scene of his activities. A vast plain two hours from Paris by rail, but so far removed from villages as to be beyond the reach of crowds, was loaned to him by the military authorities. Adjoining land was bought, workshops were erected, and the first aeroplane school was established in the champagne land. The Antoinette people were next attracted by this magnificent plain, with its surfaces like a lawn; the Voisin people followed.

Within twelve months one factory has been erected and four aeronautical schools brought into existence. The factory belongs to Henry Farman. It consists of four huge wooden sheds, capable of holding a dozen aeroplanes, complete with workshops, offices, sleeping rooms, etc. It is here that all the Farman biplanes are partially built and entirely assembled. The rapid growth of business makes it impossible to build entirely in the shops, and until enlargements can be made much of the wood has to be worked outside and assembled at the Mourmelon factory. The engines are built at the Gnome factory, near Paris, sent to Mourmelon after having been tested, and fitted to the aeroplane. When the machine is ready all that is necessary is to push it out of doors, start the engine and test it over the plain that spreads out for two or three miles.

Farman trains pupils in addition to building flyers. At present he has under his charge, among others, Van den Born, a well-known racing cyclist, and Sir Henry Rawlinson, a retired automobile dealer who was for many years connected with Darracq, and who has fitted his first flyer with a 120-horsepower Darracq motor that formerly did service on a racing car. Farman's method of training is first to test the machine alone, then mount with the pupil behind him. After an hour or two spent in skimming over the ground, the pupil has generally picked up a sufficient notion of the manner in which the levers are worked.

The Voisin and Antoinette companies undertake the training of pupils only, their respective factories being in the neighborhood of Paris. Edouard Chateau, the Voisin instructor, has about a dozen pupils, among them being the English sportsman, the Duke of Westminster, and Madame Delaroche, a young Frenchwoman who is proud of the title of the first lady to fly.



Mme. Delaroche, First Lady to Fly Alone

Pupils Ride in the "Taxi"—There is a special aeroplane, known as the "taxi," on which pupils are taught to fly. Its power is low, and its planes so adjusted that it can only be got off the ground with a certain amount of difficulty. For the first lesson Instructor Chateau mounts with the pupil by his side, and while alternately running over the ground and flying through the air explains the movements to his pupils. Then comes the first flight alone. Starting from the door of the shed, the machine runs up the rising ground without being able to rise into the air. Then the top of the slope is reached, and the downward run commenced. If the aeroplane is handled properly it will fly over the descending ground without any particular effort of the pilot. After covering about a mile, however, the rising ground is again reached, and as the power of the engine has not been sufficient to rise to a great altitude, the wheels touch, and the machine once more runs over the surface. When it is possible to fly round the course in this manner the pupil is sufficiently advanced to take his own machine, equipped with a more powerful motor and adjusted to rise from the sloping ground. Under this method of instruction very little time is lost in repairs. The "taxi" has covered several thousand kilometers, running over the ground and flying in the air in the hands of various pupils, without a single breakage. The time necessary to learn varies considerable, one pupil flying easily after a couple of lessons while another struggles for months. Instructor Chateau finds that the best pupils are automobilists who have had yachting experience. The automobile has made them familiar with high speed, while the gentle movements of the helm on a sailing vessel have prepared them for similar movements with the elevation rudder and warping planes of a flying machine.

For lack of a machine that would carry two, the Antoinette people have until recently been obliged to confine their instruction to theoretical explanations on land, leaving it to the pupil to make the best of his apparatus in the air. As the Antoinette monoplane is not the easiest machine to handle near the ground, there was generally a large amount of work for the repair men, and heavy bills for the pupil. Now a two-passenger machine has been made, on which Hubert Latham can take a pupil and while soaring through the air with him give practical exhibitions of the operation of the levers.

Assembling and repair work form a considerable portion of the activities of the aviation settlement. After the machines have been completely built at the factory, they are taken down to be sent by road or rail to the training school. If they are found defective, the necessary adjustments are made on the spot, a ten-mile demonstration flight is made before the customer, and the bill is ready to be paid. Antoinette in particular is well fitted up for extensive repair work. The big workshops are equipped with power-driven wood-working machinery, and a staff of thirty or forty machinists are constantly employed in this department making the delicately shaped framings for body and wings.

PAULHAN ASCENDS 2,000 FEET IN AEROPLANE

MOURMELON, FRANCE, Nov. 25—An icy breeze was blowing over the open plain when Louis Paulhan, fresh from his triumphs in England, brought out his Farman biplane lightened and equipped for high flying. His object was to beat officially the height record of 360 feet established by Wilbur Wright at Le Mans, exactly eleven months ago. The prize for the performance is offered by Lazare Weiller, the man who bought up the Wright patents in France and formed the French Wright company. Unofficially the Wright record no longer exists, for several aviators have during the year risen to a greater altitude than that attained for the first time by the American champion.

Rising against a wind that blew from 20 to 25 miles an hour, Paulhan quickly left the ground and commenced circles which took him further and further away from the interested groups of spectators. In ten minutes he had risen to a height of 984 feet, thus beating the record allowed to Count de Lambert in his flight over Paris. A few minutes later and the officers in charge of the instruments declared that he had attained a height of 1,181 feet. The machine was a mere speck in the sky, apparently immobile, and so far away that it was impossible to even distinguish the outline of the aviator behind the canvas wind shield.

Then the descent began, gradually at first, and in huge circles, then more rapidly. At 150 feet from the ground Paulhan shut off his motor and glided down in a wide circle, touching earth as lightly as a great bird.

A few minutes after the Farman champion had landed Hubert Latham soared away on his big Antoinette monoplane. He was not officially engaged for the height prize, and no official credit would be given him for whatever he might do. As the general in charge of the Chalons camp was supervising the work of the officers at the recording instruments, Latham did not wish to loose the opportunity of ascertaining exactly how high he could rise. Up and up he soared, until the graceful shape of the bird-like machine could no longer be appreciated, and the open exhaust of the eight-cylinder motor had become muffled in the distance. At the end of ten minutes the officers in charge gave the height as 1,345 feet, thus beating the record of Paulhan, and probably rising higher than any other aviators with the exception of Count de Lambert and Orville Wright. When Count de Lambert flew over the Eiffel Tower it was believed that he had a clearance of 300 feet. As this could not be certified, however, the Aero Club decided to allow him only the height of the tower, which is 984 feet. Experts are of the opinion, however, that the actual height was not less than 1,300 feet.

When Wilbur Wright made his height performance less than a year ago the world was amazed, looking upon the affair as the acme of imprudence. Now altitude has been conquered. Louis Paulhan declares that there is nothing whatever to prevent an aeroplane mounting to an altitude of one mile and remaining there for a considerable length of time. So long as he is sure of his motor the height can be readily attained, and even in case of a stoppage there is less danger with a good machine at a great height than near the ground.

With the Farman machine that had made the official height record, Louis Paulhan came out on the following day with other records in view. The small gasoline tank had been replaced for the big one used for long distance flights; and the lubricating oil tank, which, by the way, contains pure castor oil, was also of the largest size. The Gnome motor, excellent in every other respect, has the defect of being a rather voracious drinker of castor oil, with the result that the tank has to be of much larger size than is generally thought necessary for an engine of such power as this.

The objective point was the military town of Chalons, sixteen miles away to the southeast. But before making the long distance trip Paulhan gave an exhibition of high flying that entirely eclipsed his rival Latham and amazed the spectators. With a breeze behind the aeroplane quickly soared in the direction of Mourmelon-le-Grand, a couple of miles away. At a height of 600 feet Paulhan passed directly over his own hotel, in the center of the village, by the side of the church. Still he rose higher, until the aeroplane was a mere speck in the sky, that had to be watched very closely in order to be kept in view. According to the military officers the height attained was between 1,900 and 2,000 feet, heights which had never previously been attained except by spherical balloons. A landing was made in excellent style, then there was an interval of an hour during which the aeroplane was verified and the aviator and his friends partook of a hasty luncheon.

Soon after noon the Farman biplane was off again, Louis Paulhan at the wheel, and Henry Farman following with a few friends in a fast automobile. Aided by the wind the flying machine traveled rapidly in the direction of the town of Chalons. His height was about 700 feet, which was sufficient to get over all natural obstacles on the route. Farman's last words were that Paulhan should watch the hill outside the town of Chalons, which was much higher than might be supposed. Even in a 60-horsepower automobile, traveling over perfect roads, it was impossible to keep pace with the aeroplane. For a time it was lost to view. Then as Chalons came into sight it was seen once more making a round of the city. Paulhan described a complete circle of the town in full view of the large civil and still larger military population.

Then he commenced the return journey, sixteen miles in a straight line. But the wind was now dead ahead, with the result that it was impossible to make a straight line for the sheds on the Mourmelon plain. The task of the automobile was an easy one, so easy in fact that it got ahead of the aeroplane, which was tacking like a yacht working to windward. When at last he got over the plain Paulhan shut off his motor at a height of 700 feet and glided down to where Farman and the mechanics were awaiting him.

ROADS BUILDING NEWS FROM ALL OVER THE COUNTRY

MACADAM PAVING MAY BE DISCARDED BY JERSEY

TRENTON, N. J., Nov. 29—So great is the stress on the road surface or "metal" as the English call it, brought about by traffic consisting of automobiles only, that macadam has been found to be unequal to it. New Jersey has always ranked in the forefront of good roads States, not alone in advocating them, but also, in actually building and maintaining them when built.

It was indeed, this latter trait which caused Col. Frederick Gilkyson, State road commissioner, to decide that macadam would not stand up under automobile traffic as well as bituminous pavement, and that New Jersey will accordingly change her road-building methods.

This decision has been reached after much inquiry and many experiments which also have demonstrated that pavements superior to the ordinary asphalt may be laid in cities and suburban districts at from $1.15 to $1.50 per square yard, where they now cost from $1.90 to $2.50 per square yard. These are known as bituminous pavements.

The State has eighty-five miles of bituminous pavement at the present time, and specifications have been prepared for thirteen miles more. In this connection New Jersey leads the world. Colonel Gilkyson is now moving in connection with the federal authorities at Washington to bring about the formation of a paving commission to supervise this method of road building, thus avoiding conflicts with any of the patented compounds.

In this way, open bidding will be possible and the cost will be lessened. The bituminous road method is practically dustless, noiseless and rainproof, and at the same time wears well under all kinds of traffic.

FINALLY KENTUCKY WILL HAVE GOOD ROADS

LOUISVILLE, Ky., Nov. 29—Waiting until the last moment to make official denial of its frequently reported and greatly exaggerated decease, the Bosworth-Wyatt good roads amendment to the Kentucky Constitution carried by a majority of 5,490. The amendment, which provides for raising the necessary funds by the removal of constitutional obstacles is worth all of the uncertainty and needless regret of the past three weeks. Its adoption puts Kentucky fifteen years ahead of other southern States and is one of the most advanced steps of any of the others in the direction of substantial road improvement.

The counties in the central and mountain sections showed majorities for the proposition while those in the western portion showed majorities against it as a rule. The result was a great surprise even to Senator Thomas Wyatt, who had introduced the bill, providing for a vote on the amendment. He had hoped that the official tabulation would show a majority for the proposition, but even he did not expect that the majority would be so large.

Senator Joseph F. Bosworth, of Middlesboro, who was one of the authors and strongest champions of the good roads amendment, has publicly expressed his thanks to all friends who had so ably supported the measure. This, he said, would put Kentucky in line with sister States to the north. The amendment, he said, when fully understood by the farmers, would bring hearty thanks and support from them. The editorial obituaries written within the past two weeks, the chiding of Kentuckians for their lack of intelligent self-interest, and the resolutions announced by the press of the State to continue the fight until success was won, turn out to be nothing but practical jokes.

It is expected that a number of counties, particularly those which showed majorities for the bill, will at once set about to take advantage of its provisions.

SECRETARY OF AGRICULTURE REPORTS ON ROADS

WASHINGTON, D. C., Nov. 29—There is much of interest to motorists in the annual report of the Secretary of Agriculture submitted this week to President Taft. It is set forth that proper construction and maintenance of public highways engages public and official attention to a great extent, and the Office of Public Roads has proved its usefulness to the general public more emphatically than ever before. The adoption of State aid in the construction of public roads by more than half the States and the consideration of the question by the remainder, together with large bond issues by many counties, are indexes of the general interest being shown in the work, and have occasioned a great demand upon the office for advice and assistance. These have been given to the fullest extent compatible with the resources of the office, and have brought about more active cooperation and larger material results than ever before.

During the past year especial attention has been given to object lesson work. The purpose of these object-lesson roads was to give elementary instruction to local road builders and to demonstrate the possibilities of road improvement. The policy of the Department in this work leads neither to extremes of conservatism nor radicalism, but toward pointing out the most profitable use of material and means at hand in a given locality.

Second in importance only to object-lesson work is the experimental work of the office. The most important problem considered has been that of preventing the destructive action of automobile traffic on costly macadam roads. In working out this problem experiments have been made to secure satisfactory binders and dust preventives within reasonable cost. Excellent results have been attained in the use of asphalt, tar and other bituminous binders, waste from sugar refineries and wood pulp mills, and other by-products. It was largely to consider this question that the greatest road convention ever held was convened at Paris, in which 29 countries participated, the Director of the Office of Public Roads being chairman of the commission of three representing the United States.

PRIZES AWARDED FOR COMMENDABLE HIGHWAYS

NEW YORK, Nov. 29—By far the most practical and enduring outcome of the recent New York-Atlanta good roads tour lies in the awarding of the prizes for commendable roads as found in the territory met with. That is, not the prizes nor the awarding of them, but the roads which warranted the awarding of prizes, are the real practical benefit derived therefrom.

From New York to Atlanta, 41 counties were passed through. Two series of prizes were awarded to the counties, which should have made the roads through their counties in the best condition at the time of the tour. One series of three prizes amounting to $1,750 was offered by the New York *Herald* to the counties north of Roanoke, Va. Another series of three of the same amount was offered by the Atlanta *Journal* to the counties south of Roanoke. In addition to this, cash to the amount of $500 in the form of three prizes was offered by the Southern Bell Telephone Company, for road prizes to be awarded at the discretion of the judges in the territory south of the State boundary between Virginia and North Carolina, through which this company operates.

Awarding of the prizes was in the hands of a committee of three, composed of A. L. Westgard of the Touring Club of America; J. H. Pratt, State Geologist of North Carolina, and C. H. Hoyt, superintendent of road construction in the office of the United States bureau of good roads. This committee has just announced its verdict, which will be received with much enthusiasm in the South, but one prize going north of Mason's and Dixon's line. The awards were:

New York Herald Prizes

First, $1,000, to Mercer county, N. J., for general excellent conditions of its roads, maintenance and bituminous macadam.

Second, $500, to Jefferson county, W. Va., for macadam pike throughout the county and having abolished the toll system. The State of West Virginia has during the present year organized a State Highway Department, upon which much responsibility rests, and is entitled to loyal support.

Third, $250, to Rockbridge county, Va., for its notable improvement of earth roads.

Atlanta Journal Prizes

First, $1,000, to Guilford county, N. C., for wide, well-graded road and macadam in first-class condition.

Second, $500, to Spartanburg county, N. C., for its notable improvement of all its roads through the county.

Third, $250, to Henry county, Va., for the excellent condition of its earth roads.

Southern Bell Telephone Company's Prizes

First, $250, Greenville county, S. C., for its notable improvement of its highways throughout the county.

Second, $150, to Bessemer City Township, Gaston county, S. C., for relocating and grading road over mountain.

Third, $100, to DeKalb county, Ga., for the interest shown and improvement made in its roads throughout the county.

In reaching the above decisions, the committee took into account seven features of road construction, as follows:

(a) Alignment.
(b) Grading.
(c) Width of roadway between ditches.
(d) Width of roadway surfacing.
(e) Condition of surfacing.
(f) Slope of shoulders and condition of ditches.
(g) General appearance of roadside.

On the basis of the seven points, the awarding of first place to the roads of Mercer County, N. J., with special mention of the work done there in resurfacing the present macadam and of the laying of bituminous macadam, the latest type of automobile road construction, is or should be cheering to the Jersey road commission, which has just decided to abandon all other forms of road in favor of the newer bituminous macadam.

DISGRACEFUL CONTROVERSY OVER BERLIN TURNPIKE

Hartford, Conn., Nov. 29—The much-mooted Berlin turnpike is once again in the limelight and the situation to say the least is farcical. It will be recalled that the latter part of October this seven-mile stretch was formally opened by the Connecticut State highway commissioner, James H. MacDonald. The Automobile Club of Hartford jumped in and organized a sociability run for which various prizes were offered and in the evening, the most pretentious banquet ever held by the Automobile Club of Hartford was given at the Allyn House where the club quarters are located. The highway commissioner was the chief guest of honor. But so far so good.

Shortly after the formal opening of the road and the lauding of the commissioner, there were numerous complaints of the apparent poor condition of the new road, which was constructed by three different contractors, including one from Massachusetts. Now, then, although the commissioner opened up the road he has not yet accepted it in behalf of the State and the contractors were not, of course, paid for their labors.

One contractor, being well aware of the stress subjected by motor cars, asked that the road be oiled or tarred at his own expense, but the State highway commission did not grant the necessary permission so to do, at least this is the story said to have been told by the contractor himself to a newspaper man. The road has not apparently stood up under traffic in the manner that it should, and has been the chief topic of motordom for some time past.

The climax was reached, however, when one of the contractors who built the Hartford end of the road closed up the Hartford terminus by dragging large wagons filled with stone across it. The contractors have had to make such repairs as were necessary before acceptance by the State, at their own expense. The coming of the rain and snow moved the contractor to a decisive end and he blocked off the Hartford terminus so that further damage could not be done to the road at his expense. It was the contractor's intention to thus close the road until the commissioner had accepted it. Users of the highway, however, would not stand for this and the wagons were hauled off the road, and now it promises to be a merry war between the contractor, the commissioner, and the general public.

DEATH OF W. F. FULLER, OF CONNECTICUT

Hartford, Conn., Nov. 27—William F. Fuller, president of the Connecticut Automobile Association, and former president of the Automobile Club of Hartford, died of heart trouble at his home in this city this morning, after a lingering illness. Mr. Fuller was first taken ill last May.

In William F. Fuller the automobilists of Connecticut lost a champion who was ever zealous to further the interests of the sport and the industry. He was president of the Automobile Club of Hartford for two terms, holding that office until the last election, when he stepped down in favor of General Wallace T. Fenn, the present incumbent. He was re-elected president of the Connecticut Automobile Association at the last election. The Automobile Club of Hartford during his régime was marked by a rapid growth in both membership and influence.

Although his death was not unexpected, it nevertheless came as a shock to his many friends. His wife and two children survive him. Mr. Fuller was engaged in the leaf tobacco business with his uncle, under the firm name of E. A. & W. F. Fuller.

ORGANIZATION OF NEW BAY STATE CLUB

Greenfield, Mass., Nov. 27—The Franklin County Automobile Association has been organized, with an initial membership of one hundred. Its principal work will be agitation for the improvement of the roads in Franklin County. Rev. C. W. Merriam is president; Dr. J. C. O'Brien, vice-president; Dr. E. L. Major, secretary, and A. B. Allen, treasurer.

BUFFALONIANS FORM AN AERO CLUB

Buffalo, N. Y., Nov. 30—The Aero Club of Buffalo was launched this week at the Automobile Club of Buffalo's quarters. The officers are John M. Satterfield, president; H. A. Meldrum, Howard A. Forman and Robert K. Root, vice-presidents; George P. Urban, treasurer, and Dai H. Lewis, secretary. The board of directors includes the officers and E. R. Thomas, James How, George Bleistein and Ralph H. Sidway.

The club will be incorporated as soon as the necessary papers can be made out. The membership will be limited to 500, and the dues will be fixed at $5 a year. The initial membership is fifty.

The constitution will provide that the membership shall be composed wholly or in part of persons owning aeronautic inventions for personal or private use, and that it shall be the object of the club to encourage aerial navigation by promoting excursions, races, congresses and expositions. The meetings will be held for the present in the rooms of the automobile club.

SIGN POSTS ERECTED NEAR BALTIMORE

Baltimore, Nov. 29—The Automobile Club of Maryland is making rapid progress in the erection of sign posts along the roads leading from the city. Already many of the signs are in position along the Edmondson avenue pike, the Aanapolis pike and Belair road. The club has appointed J. B. Hutchinson as assistant secretary to Secretary Frank Darling.

Some Pertinent Hints on Adjustment and Care

By Stillman Taylor

WHEN a car is not running smoothly and powerfully, as every well-cared for automobile should do, something is wrong, and the driver should lose no time in tracing the car's indisposition to the probable cause. To diagnose accurately the list of possible troubles and their causes which may befall the several parts of an automobile, is a matter demanding considerable experience, but as the most prevalent troubles are common ones and not difficult to remedy when once located, the average driver who has even an ordinary amount of "gumption" should meet with no difficulty in setting things right when the nature of the failure is made clear to him.

Some of these troubles are, of course, impossible for the driver to repair, and require the services of a good mechanic with a well-equipped machine shop at his disposal. Others are more in the nature of a complete breakdown, which concern a very badly worn, bent, or broken part, and these difficulties are best solved by replacing the defective part with a new one ordered from the factory or the nearest agency. Such failures are naturally outside the scope of this article, which is only written with the idea of assisting the inexperienced driver to first locate the seat of trouble, and then to "tinker up" the offending part.

Importance of Bearing Adjustment and Care—Owing to the important duty which the bearings are called upon to perform, it is very necessary that these vital points should be given a periodical examination with a view of ascertaining the exact condition of the surfaces. Friction in a bearing implies wear and loss of power, and a machine cannot run at its best unless this adhesion and rubbing contact is eliminated as far as possible. This can only be secured by keeping the bearings clean, properly adjusted, and well lubricated.

Cleanliness is of the utmost importance, and if any dirt or other hard particles work into the bearing surfaces, no amount of oil will keep the bearing from cutting and rapid wear. Grit or other hard foreign substance on the rubbing surface will be certain to injure the polished metal of the bearing, and if cleaning is neglected, the surfaces will become rough and the metal badly scratched and scored. If this is found to be the case, it will be necessary to scrape and refit both the bearing and its shaft. This is a job which few amateurs care to attempt, as it is a phase of overhauling demanding experience and good workmanship to insure a good fit.

Looseness in a plain journal bearing is easily taken up by removing the brasses, and carefully scraping their faces until sufficient metal has been removed to make them fit more snugly. A plain bearing should be invariably adjusted to a snug fit, as any appreciable looseness will result in a continuous "knocking" in the cylinder. It is a good plan, however, to set up the crankpin and connecting-rod bearings with just a slight amount of side play, and a good mechanic will generally allow some 1-16-inches play in the engine bearings, that the required degree of flexibility may be secured.

Ball bearings are practically immune from trouble if ordinary care is taken, but a ball may break occasionally, and when this occurs an entire new set of balls should be inserted. If the grooved annular rings, or ball races, show any considerable wear, the whole bearing—rings, separator and balls—should be replaced with new. This is always the best plan, as the life of a ball bearing and its efficiency in reducing friction depends altogether upon the uniformity of the balls. In fact, the balls must be of the same size, as a very small difference in their diameter will tend to prevent them from rotating freely, and rapid wear of balls and races will result. It is very necessary that ball and roller bearings be kept clean and given ample lubrication, and if this is consistently attended to the bearings will perform their functions without trouble, and with maximum life.

The bearings of the transmission or change-speed gears, in particular, should be given good care. These gears are generally given hard usage, and more or less friction of their edges is unavoidable even if the gears are thrown in with a fairly skillful hand. Improper gear changing will, on the other hand, bring excessive wear on the gears, and this constant grinding of their edges before they finally mesh, will quickly wear off particles of metal which, being carried to the bearings by the lubricant, will have a marked tendency to cut and rough the bearings. It is desirable for this reason frequently to drain off the old oil from the gear case, and wash it out thoroughly with kerosene.

Cylinder and Piston Troubles—Although the cylinders should not as a general thing require much attention other than keeping them clean and well lubricated, there are nevertheless a goodly number of cylinder troubles which are primarly causd by carelessness on the part of the driver. A cracked water jacket is not a common trouble, although most garage men have a dozen or so burst jackets to repair every year. A fractured jacket may be caused by the water freezing and bursting the walls as it expands; or it may be caused by filling up the water-circulating system in the mistaken endeavor to cool off the motor when it has been allowed to become overheated. Both of these troubles may be easily avoided if proper care and attention is given the car while in operation, and troubles of this kind seldom, if ever, occur to a car driven by one who is particular and methodical in caring for his machine.

It may seem superfluous to warn the autoist that the water should not be allowed to freeze in the pump or pipes of the circulating system, yet many cars are laid up every winter through neglect in following what should be obvious to the most inexperienced tyro. Freezing may be avoided either by emptying the entire water-cooling system, by heating the garage above the freezing temperature, or by adding glycerine, calcium chloride, or some other anti-freezing agent to the water before it is poured into the radiator. When draining off the water, particular care should be taken to remove the filling cap of the radiator, and to open all the water cocks, not forgetting the drain cock on the under side of the circulating pump. When the pump or the connecting pipes have become frozen, they must be thawed out before an attempt is made to start the motor.

In the case of excessive overheating, cold water should not on any account be poured over the cylinders to reduce their high temperature, neither should cold water be poured into the radiator. If this is done, the rapid contraction of the metal will be almost certain to start a crack, which may be simply a fracture in the outside water jacket, or result in a rupture running through the cylinder wall.

Stopping Water-Jacket Leaks—A small exterior crack in the water jacket may be satisfactorily patched up by filling the aperture with one of the several iron cements sold for this purpose. A fracture of the inside walls can only be repaired by means of the autogenous welding, or other patent brazing process, which is, of course, a machine-shop repair.

Although a porous or spongy cylinder casting is rarely met with on any standard grade car, defects of this kind are occasionally met with in a few of the cheaper machines. In a porous casting, the minute holes—technically termed blowholes—will produce slight leakage, and moisture or sweat will gather on the outside of the defective cylinder when the motor is running. A leak of this nature may be permanently repaired by stopping up the outlet opening and filling the water jacket with a strong solution of salammoniac. Allow the solution to stand in the jacket for some forty-eight hours, then empty and rinse out with cold water. This strong alkali solution will form a rusty deposit on the inside walls, which will fill up the small holes and effectually prevent further leakage.

Ample lubrication of the cylinder walls is very important, as lack of lubrication may result in seizing of the piston, which being dry will score and roughen the cylinder walls. A loose-fitting piston pin will also score and scratch the bore, by working out sufficiently to rub against the walls. As a loose piston or wrist pin will produce "knocking" in the cylinder, this matter should be located and attended to at the first sign of trouble. If the cylinder has become badly scored, its compression will be poor, and the only remedy is to put in a new cylinder or to rebore the damaged one and fit a larger piston. As a new cylinder will cost anywhere from fifty to eighty-five dollars, and as reboring can only be done on a single-cylinder car, and requires expert labor at so much per hour, the proverbial "ounce of prevention" is an axiom well worth remembering.

Kerosene Is Good for Pistons—The pistons should give little if any trouble providing they are kept free of carbon and given proper lubrication. Many careful drivers make it a point to inject a small quantity of kerosene through the compression cock of each cylinder at weekly intervals, and by so doing prevent the accumulation of any considerable deposits of carbonized oil. This is an excellent plan, but it will, of course, thin the lubricating oil in the crankcase, and when this is done the sump should be drained off and replenished with fresh oil at least once a month. Before refilling the crankcase, it is a good plan to fill up the cylinders with kerosene and let them stand overnight—or a couple of days, if the car is idle—then drain off and refill with fresh oil to the required level.

Poor compression is frequently caused by worn piston rings, or rings which have worked around in their grooves until the joints are nearly in line, thus opening up a passage for the escape of the gas. In cases of this kind the cylinder should be removed and the piston rings closely examined. If the gas is escaping past the rings, a sooty mark across their faces will point out where the loss is occuring. That a reasonably high compression may be secured, the joints of the piston rings should be broken; that is, the joint or slot of each ring should be given a quarter turn away from the joint of the other ring. To avoid their shifting about, many makers are pegging the piston rings in their grooves, thus doing away with any possibility of the slots coming into line.

When a loud thumping knock develops in the crankcase of the motor, it may be taken as a pretty infallible indication that either the timing is faulty, or that the mixture is prematurely ignited. Excessive spark advance will start "knocking," and the same noise will be heard and felt if the high gear is kept in too long when taking a stiffish grade. Although the connecting rods and crankshaft are not easily broken, these severe internal strains and stresses are bad for the motor. Indeed, there is really no excuse for trouble of this kind, as it is mainly due to carelessness and downright abuse of the car, of which not even the novice should be found guilty. To start a car by racing the motor and throwing in the clutch with a bang, is a piece of foolishness only sanctioned by racing drivers, who must get speed at any cost. The average driver should not endeavor to emulate this spectacular professional manner of starting his car, but should stick to common-sense methods.

Choked Muffler and Exhaust Pipe—Muffler troubles are not so common as one would suppose, considering that comparatively few autoists seem to think that this part of the car ever is in need of attention. Although unimportant, compared to the other units of the machine, this end of the power plant should not be allowed to become choked up with soot. Explosions in the muffler—due to improper ignition and poor carburetor adjustment—should be avoided so far as possible, as this after firing subjects the muffler to considerable strain, and may even result in a rupture of the muffler walls. When the car is given an overhauling, the muffler and the exhaust piping should be removed, taken apart and thoroughly cleaned. When the baffle plates or silencer pipes are allowed to become encrusted with carbonized oil, a considerable amount of back pressure will result, and while this retardation of the exploded gases will soften the noise of the exhaust, the motor will show a marked loss of power.

Steering Gear Should Not Be Neglected—The steering gear is one of the most important units of the car, and the failure of this mechanism at a critical moment has been the cause of many serious accidents. Although accidents may occur through the sudden breaking of a defective part, mishaps of this character are more apt to be traced to neglect on the driver's part than to a flaw in the material. Ample lubrication is one of the chief requisites, and a little oil will contribute much to secure smooth and easy action of the control mechanism. Any appreciable amount of backlash or side play should be taken up as soon as the trouble is detected, and the adjusting nuts should be tightened up until the front wheels instantly respond to the motion of the steering wheel. The steering rods and levers should not be neglected, and if backlash is present, the matter demands immediate attention.

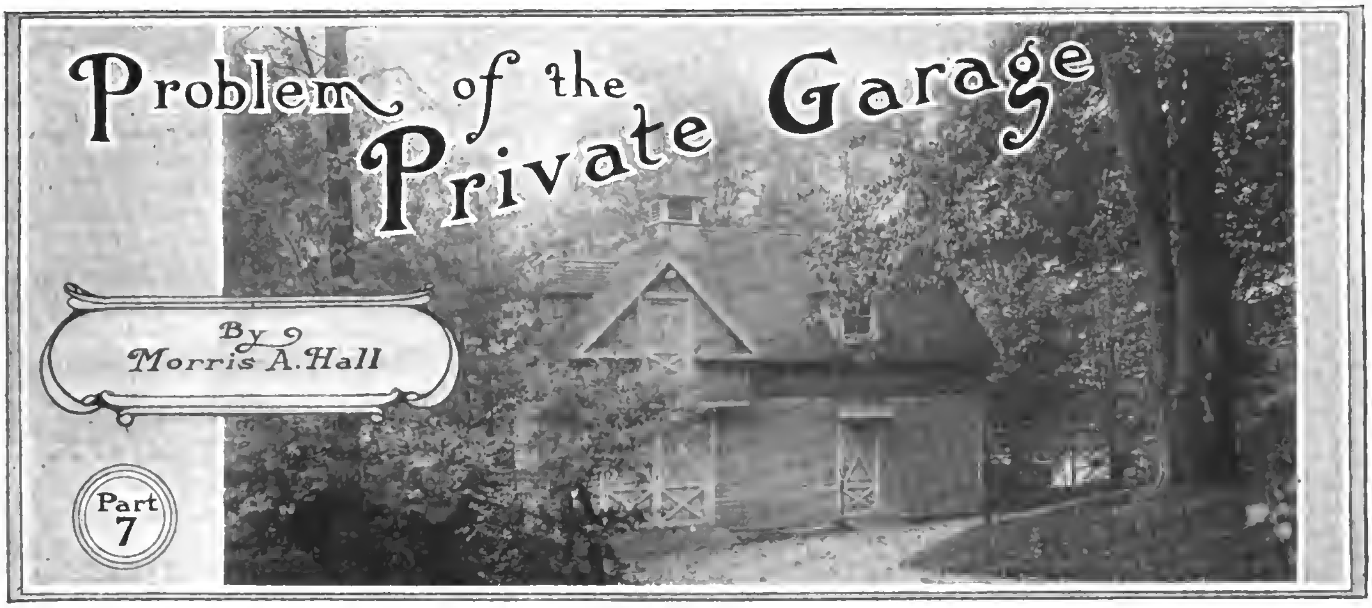
In the case of a ball joint, it may happen that the ball is considerably worn, and if this is found to be the case, it should be replaced. When pins are used, it will be found that they have worn too small for their holes, and the insertion of new pins of slightly larger diameter will solve the trouble. The swivel pins of the steering heads may likewise need adjusting, and any play in this part may be located by rocking the car to one side. Backlash may be also frequently traced to a loose wheel bearing, which may be due to a broken or badly worn ball or race, or it may require nothing more than adjusting. The wheels should rotate freely and the adjusting cones and lock nuts should be only screwed up sufficiently to prevent side play, but not so tight as to bring strain on the balls, which are easily broken.

Some Common Clutch Troubles—The clutch is a much-used member of the car and should upon this account be given a certain share of attention. If the motor speeds up and races and the car runs slowly, it is a sure sign that the clutch is slipping, and this characteristic symptom indicates grease or oil on the leather face, or a weak clutch spring. If oil is the trouble, a little gasoline injected between the two members of the cone will cure the trouble. In case the clutch spring is weak, the tension should be increased by removing the set screw and adjusting the clutch spring by means of the adjusting nut provided for that purpose.

Slipping may also be caused by a dry and hard clutch leather, but a leather in this condition will generally "bite" and take hold so suddenly that the driver will have no difficulty in tracing the trouble to the proper source. Of course, the leather should not be allowed to become hard and stiff, but given an occasional dressing of castor or neatsfoot oil. If this is done at regular intervals, only a small quantity of oil will be required to keep the leather in good shape. For best clutch results the leather should be soft and pliable, but not spongy.

A fierce gripping cone clutch may also be caused by the leather wearing down so as to expose the rivets with which it is fastened. In cases of this kind an examination may find the leather face badly worn, in which event a new leather should be riveted in place. If the leather is found to be in fairly good condition, the rivets should be reset about 1-16 of an inch below the face of the leather.

Clutches of the plate or multiple-disc type generally work in oil and seldom give trouble if supplied with sufficient oil. The old oil should be drained off about once a month, the clutch washed out with kerosene, and fresh oil put in. Many disc clutches consist of a number of cork-faced bronze discs running between steel discs, and through wearing down of the cork inserts, the clutch pedal may work backward until it rests against the slot in the flooring. When this occurs the clutch will slip and fail to hold properly, and the lever should be readjusted. A slipping disc clutch should be attended to at once, as it is likely to burn out and the plates seize or stick together.



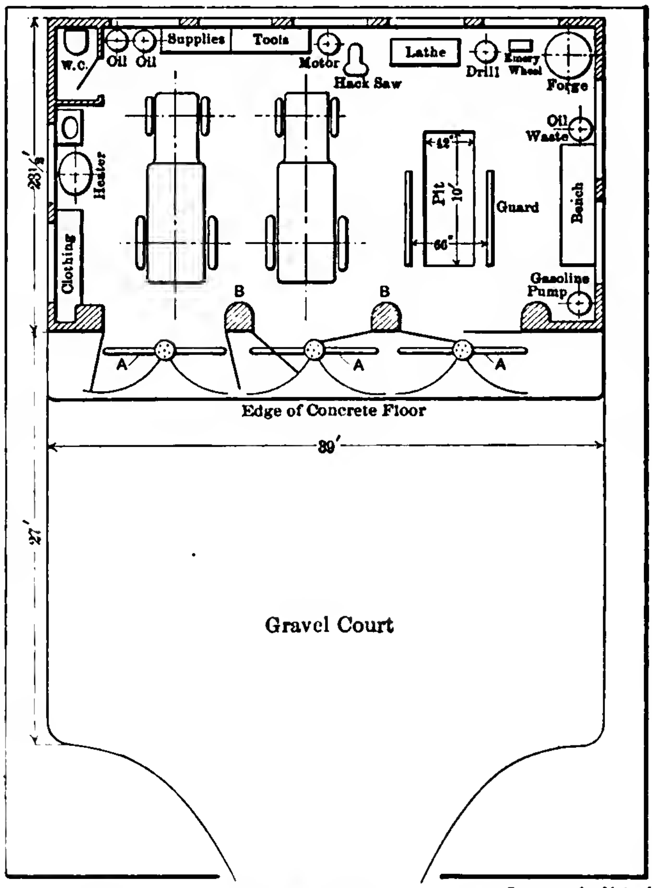
Tarrytown Garage on Historic Ground. In 1781, the First Continental Brigade Held a Line of Intrenchments on This Site

BEYOND the advantages which go with the solid concrete garage, that is comparatively solid, there is much to say for the structure built from some other material and surfaced with cement. This kind of building, when properly built has all of the advantages of the all-concrete, designated above as solid, and supposedly many more. Thus, the house of hollow tile, either terra cotta or other material, properly surfaced is said to be warmer in winter and cooler in summer, besides being more dry at all times, less liable to settle on account of lessened weight, and this, too, at practically the same cost.

Hollow tile making has advanced rapidly in the past five years under the stimulus of much building, so that it is now possible to obtain these in a variety of shapes and sizes. This enables the selection of the proper one for the work in question. In this way, it is now possible to obtain not only special corners, special lintel and sill tiles, but also, specially dove-tailed blocks. The function of the dovetail is to hold the cement or stucco in place.

More Concrete Examples—Before going into this hollow tile form to any great extent, perhaps it will be best to conclude the concrete chapter, that is, the all-concrete or solid construction as distinguished from the form in which the cement is but a surface covering, a coat of thick paint as it were. The function of a protective covering renders the cement a minor quantity in the reckoning, reducing its importance very materially. In fact, making it so small as to be insignificant, or at least, not worthy of consideration in an article of this scope.

Elsewhere on this page is shown (through the courtesy of *Motor*) a concrete garage, as planned for three cars. The scope of this house is a very wide one, showing that the question of money did not enter into its design or equipment.



Courtesy of "Motor"

Three-Car Concrete Garage With Full Equipment

In size, the inside dimensions are 38 feet wide by 23 feet deep. But both of these are reduced by the large array of tools around the walls, the width, perhaps more than the depth, since in the former there are tools or closets along two sides, the size of which must be subtracted, while as to the latter, those along the back only need consideration.

As the tools provided are very complete, more so than any one man would undertake to propel through his own efforts, a source of power must be provided. If electric power had been available for lighting, all of the tools might have been driven from a motor, which in turn was supplied with motive power from the lighting wires.

This was not the case, however, so a gasoline motor was provided, of the vertical type to save floor space, and located close to the tools to be driven. The latter include a power hack saw, a lathe, drill press, emery wheel, and dynamo to supply light. In addition to these tools, there is a very large work-bench, a forge for doing light forging or bending, a heater to keep the place warm in winter, and storage for oil, waste, gasoline, clothing, small tools, and supplies. The gas engine for power may be used to help out on the heating, the jacket water being furnished the heater or piped around the building separately. If it had been desired to utilize this to the full extent, the exhaust gases might have been led into a closed heater composed of large diameter coiled pipes around which water circulated, the heat of the exhaust within heating the water.

Provision was made for three cars, each with its own doors, and runway. In addition, there was a pit, but the maneuvering of the cars was all done outside on the large gravel court, directly in front of the building. This reduced the movement of the cars within the building to a straight in and out movement. The space is thus utilized to its fullest extent, all of the inside space around the cars being useful for working on them. To take any car to the pit, even if there was a car already over it was a simple operation consisting of but two motions. The car on the pit ran straight out, describing an S curve to the left side of the court, and stopping at the outer edge of the latter as far away from the house as the court extends. It was then in a position to back directly into the place vacated by the other car.

In bringing out the car to go to the pit, it described another S curve, this time to the right side of the court. Then, a simple straight backward motion brought it through the door and over the pit, as desired. This operation was equally simple whichever car was moved, and to whichever place inside of the garage it was intended to move it.

Another Set of Plans—To close out the concrete story, another set of plans will be given. These show the largest yet shown. In size, it is 30 feet long by 24 feet wide, sufficient to accommodate two cars easily, and if the doors are planned right, three. In fact, the actual floor space afforded by this design is but 15 per cent. less than shown for the three-car garage on the previous page. In height, a peaked roof, coupled with the large width and a normal slant, have resulted in a height of 18 feet 6 inches. With a mansard effect, this might have been reduced to 16 feet 6 inches, or by redesigning, with this object in view, to 14 feet 6 inches.

Both changes would, however, result in an increase in the cost of the roof trusses, these being four in number. Had the roof been planned of wood or other materials, this change would have turned out to be a money saver, but with the extra work of the structural roof trusses, the saving in material is more than offset and the result is increased expenditure.

To many, this, resulting in an improved appearance, would be well worth while, since a person constructing a two- or three-car garage, does not have to figure in the pennies. It will be noticed that the design calls for a structural framework, for which the natural covering would be some form of metal lath, covered with cement plaster. The exterior, however, might be given a smooth, a stucco, a pebbled, or other appearance as fancy dictated, the basic design being so as to allow any one of these, or combinations of them.

Provision is made for a small door and a window at one end, which may be varied for the other end to three windows, one in each bay. Or, the door-and-window effect may be duplicated. At the side, one large double door and two windows are shown, the other side being left to the builder's fancy. This would doubtless result in the most useful form, namely three large windows. The side shown, on the other hand, would be altered for two or three cars by the changing of one or both of the windows into additional means of ingress and egress for the cars. These would take the form of more double doors, duplicating the one shown.

Both the changes from windows to doors would reduce the expense of the steel work, as extra framing would be eliminated by the change. To replace doors by windows, on the other hand, would have the opposite effect, in that the framing would be increased, and with it, the cost.

Amount of Material Called For—In estimating the material necessary and the cost of the same, for this garage, the following result was arrived at:

Bill of Material and Estimate—Three-Car Garage

Roof, 1,150 sq. ft. of metal lath. 1,110 sq. ft. of 1½-in. concrete and plastering on inside. Waterproofing at 3 cts. per sq. ft.	$33.30
Walls, 1,220 sq. ft. metal lath...... 1,200 sq. ft. 2 in. plastering.	
Windows, complete in place.......	15.00
Doors, complete in place..........	29.00

By far the largest item has been left out, namely the metal lath and its covering. The cost of this might run up to ten times the other items, taken collectively, so that it is idle to try to estimate the cost from this scant data. As a rough guess, this garage should cost at least $1,500.

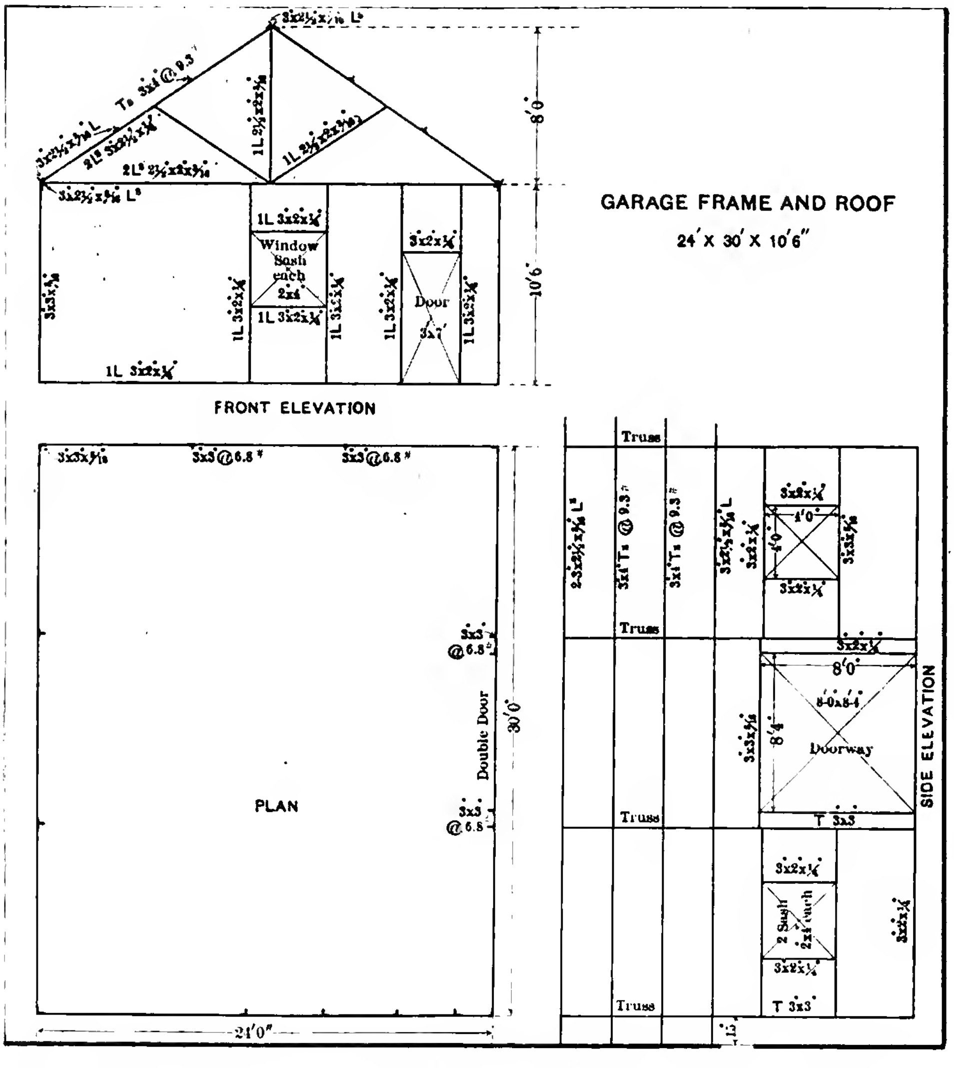
An estimate of the weight of this structure gives these quantities:

Frame and connections.....	1,370 pounds
Trusses, four at 500 each, with connections..........	2,000 pounds
Purlins, angles, tees and connections	2,130 pounds

Making the total weight without windows, doors, paint, blinds, floor, or interior equipment at least 5,500 pounds.

From this, the total weight on the foundations might run up to 8,000 pounds, or four tons, very easily, and in the case of a very thick, heavy floor, to 9,000 pounds or more.

One other noticeable fact of this design is worth attention. In the usual case, there is plenty of room for the garage, so that the matter of a proper approach, in connection with the doors need not be given a thought. There are cases, however, in which



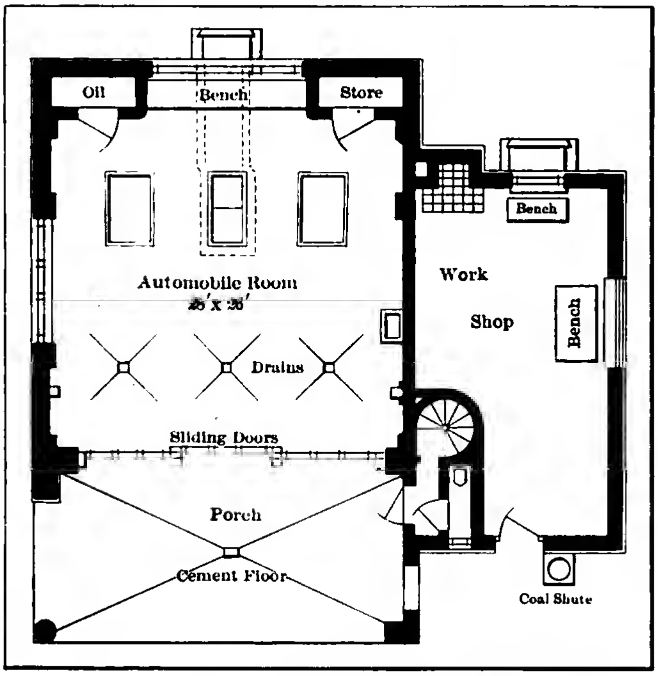
Framing Plans of Iron Work for Three-Car Concrete Garage, Thirty by Twenty-four this design might be favorably thought of, but under conditions that precluded the use of side doors. This has been provided for by leaving the left hand end panel blank, or plain. In a case where the side doors could not be utilized, this space would be large enough for any sized door, being 11 feet by 10 feet 6 inches. In the usual case, additional framing would be resorted to with the use of an 8 feet by 8 feet 6 inches double door.

Illinois Man's Design Presents Novelties—Elsewhere on this page is shown a garage (concrete) built by an Illinois man, which shows a number of novel and interesting features. The drawing shows only the ground floor plan, the second story being devoted to living rooms for the chauffeur. Since the arrangement of the latter has very little connection with the garage story, no attempt will be made to illustrate or describe it, other than to call attention to the winding stairway, reached from both inside and outside by separate doors. This is fully as effective as any other form, and economizes on space.

Three cars are provided for, although the owner has but two. The provision, in marked contrast to the usual case, is in triplicate, three pits and three washstands being provided, as well as three doors. The front end of the house includes a porch with cement floor and housed over by the living rooms above. This would, without doubt, be used for most of the washing done in fine weather, in preference to the washstands within. In fact, it would appear as if the designer, a well-known Chicago architect, had this idea in mind.

Most notable in the whole design is the large and very roomy workshop provided alongside of the motor room, yet entirely separated from the latter by a thick solid wall. Without a doubt, this would reduce the fire hazard very materially were the gasoline kept in the work room. The floor plan, however, does not indicate this, and the oil being in the automobile room, one is forced to the conclusion that the fuel was kept there as well. In that contingency, not only is the fire hazard not reduced, but on the other hand, all parts or units to be worked upon would of a necessity have to be taken out of the car, carried outside through the big sliding doors, and then back into the work room through the front door. The same process would have to be gone through after the repair had been effected. It sounds like a small thing, but this would mean lots of extra work, and looks like a real flaw in the design.

Among the good features may be noted the location of all work benches—there are three shown—in front of windows. The only work bench in the automobile room is placed at the back in front of the large and wide window there, while the two benches in the shop are placed directly in front of the only windows in that room. This will give lots of light for work that is to be done. Light is very important, and although the doors were intended to have windows set into them, it must be said that the provision for light in this case has been subordinated to architectural effect. Thus, the main room should have another window the size of the present one, the two being set equal distances from the front and rear. More than this, there should be another large window in the side of the work room, the present one being moved back so as to make room for it.



Lincoln, Illinois, Concrete Garage of Original Features


Two-Story Garage of Terra Cotta Hollow Tile Construction

Hollow Tile Concrete-Covered Garage—This fault, lack of light, is not found in the other garage illustrated on this and the next page. Not only are there many windows on each side, two being placed at each end of the room, but the ends are well lighted. The latter is effected by means of windows in the doors, and in addition a good-sized window on each side of the big doors. That this really results in a well-lighted interior may be seen in the interior picture, taken by natural light.

This building is constructed of terra cotta hollow tile, covered with cement, the latter giving it all of the appearances of a concrete house, while retaining the good features due to the hollow tile. One of the first questions raised in connection with any such form of construction is that of the cost. In answer to the unspoken question of costs, the following table shows an estimate of the costs of different systems of building, based upon an average dwelling located in the vicinity of New York City:

(a) $10,000 Frame.
(b) $11,000 Brick outside walls, wooden inside.
(c) $10,250 Stucco on expanded metal, wooden inside.
(d) $10,500 Hollow terra cotta blocks stuccoed, wooden inside.
(e) $12,000 Hollow blocks stuccoed—fireproof throughout except roof.
(f) $14,000 Hollow terra cotta block walls faced with brick, fireproof floors and roof.
(g) $15,000 Brick walls—fireproof floors and roof.

The above figures are based on an average taken from two architects and two builders, who have had experience with the methods of construction designated. Reducing these figures to small units, taking the frame dwelling as unity, we have: Frame, 1; brick (b), 1.1; stucco (c), 1.025; terra cotta stuccoed (d), 1.05; hollow blocks stuccoed (e), 1.2; hollow terra cotta, brick-faced (f), 1.4; and brick walls, fireproof construction (g), 1.5.

Applying these to an average garage ample for one car, and well designed, the resulting figures would be: (a) Frame, $1,000; (b) brick outside walls, wooden inside, $1,100; (c) stucco on expanded metal, wooden inside, $1,025; (d) hollow terra cotta tile blocks stuccoed, wooden inside, $1,050; (e) hollow blocks stuccoed, fireproof throughout except roof, $1,200; (f) hollow terra cotta block walls faced with brick, fireproof walls and roof, $1,400; (g) brick walls, fireproof floors and roof, $1,500.

This particular garage is built for one car, and as such the floor space allowed is unusually large. This being the case, the chauffeur's quarters above, occupying the whole second floor, are

Interior of Garage Part of Hollow Tile Building

also very commodious. This is the Morris garage at Westchester, N. Y., and is built of hollow terra cotta tile, covered with cement. The construction, in fact the tile themselves, may be seen in the picture of the inside shown elsewhere on this page.

These are set up on edge, so that the hollow or hole through the base layer carries clear up to the top. The ceiling, in this case also the floor for the second story, is made up in the same way, except that the tile are laid flat so that the interior holes progress across the building. The floor tile are laid between reinforced concrete beams, which form the supports. If desired, the supports could have been structural steel, either I-beams or channels, or wooden beams might even have been used. The latter would have the advantage of giving a good foundation to which to attach floors or ceilings of wood, but this would be completely overbalanced by the fact that their use would detract from the fireproof qualities of the structure.

In the foreground may be noticed the drain for the washstand, the interior of the garage at the time this picture was taken being bare just as the builder left it, and before it had been occupied by either the chauffeur or the car.

Terra Cotta Garage in Process of Construction—The two illustrations below show a garage-stable as completed and when but partly completed, a before and after effect. In the left hand picture the building is about half finished. The tile may be seen very plainly, the lines of demarkation between each tile and its neighbor being distinct.

In the second picture is shown the garage as finished, the tiles for the roof being in place, the walls covered with the cement plaster, and the dormer windows being coated as well. This picture is not taken from the same viewpoint as the first one, as the first shows the back, while the last one shows the front of the building with the entrance at the left.

It is a wide, spacious entrance, flanked by a pair of square posts of good height. The doors and windows used carry out the scheme of the rest of the building very effectively. This structure is located at Monmouth Beach, N. J.

A record was made in its construction, ground being broken on May 9, and the building being completed on July 3. This made the elapsed time but 55 days. The tile used varied somewhat. Those for the first story, that is, up to the eaves, were 8 inches thick. All tile used above that were smaller, of but 6-inch thickness. Despite the very ornamental character of this building, and the great haste in which it was erected, the cost was very low. This amounted to but 22 1-2 cents per cubic foot of contents, that is the whole cost, divided by the number of cubic feet in the walls, etc., amounted to this figure. The roof tile are a bright red in color, and in form are the S tile. That is, the section through the tile forms an S. In assembling or laying, half of each tile overlaps the one next to it, the water and weatherproof qualities being obtained by this overlap.

Strength of Hollow Tile for Floors—The idea that tile has no horizontal strength is somewhat prevalent. This idea is erroneous, as will be shown. Thus, a floor system composed of hollow tile set horizontally, with a 4-inch beam of reinforced concrete between each pair of tiles, the concrete carrying varying sizes of rods and of a composition of 1 part Portland cement to 3 parts sand and 5 parts gravel, has the following strength:

LOAD TABLE OF HOLLOW TERRA COTTA TILE FLOORS

Safe Live Load in Pounds per Square Foot—Factor of Safety=4

Span in feet	12-in. Tile, 1-in. Dia. Rod; Weight per sq. ft. 68 lbs.	10-in. Tile 7/8-in. Dia. Rod; Weight per sq. ft. 58 lbs.	9-in. Tile, 7/8-in. Dia. Rod; Weight per sq. ft. 57 lbs.	8-in. Tile, 7/8-in. Dia. Rod; Weight per sq. ft. 48 lbs.	7-in. Tile, 3/4-in. Dia. Rod; Weight per sq. ft. 43 lbs.	6-in. Tile, 3/4-in. Dia. Rod; Weight per sq. ft. 38 lbs.	5-in. Tile, 3/4-in. Dia. Rod; Weight per sq. ft. 30 lbs.	4-in. Tile, 5/8-in. Dia. Rod; Weight per sq. ft. 26 lbs.
5	2512	1942	1608	1377	934	692	477	294
6	1722	1327	1100	942	636	470	220	196
7	1247	962	796	680	456	334	230	127
8	941	725	596	509	338	248	168	99
9	729	559	461	392	258	188	127	73
10	577	442	363	308	202	145	97	54
11	466	355	291	227	158	113	75	40
12	379	289	236	199	126	89	58	30
13	312	238	192	163	101	70	45	21
14	261	197	160	134	80	56	35	14
15	218	164	132	110	65	43	26	9
16	184	137	110	91	48	33	19	5
17	155	115	92	75	41	25	14	...
18	131	96	76	62	31	18	9	...
19	111	81	62	51	22	11	...	...
20	93	67	52	41	17	8	...	...

For a floor of cement, 1 1-4 inch thick, laid on top of this as a finish, the size of rods is increased by 25 per cent., all other figures being the same. The strength of the floor system is then increased by about 75 per cent. above the figures given in the table above, and from that figure on upward, to as high as 160 per cent. in some cases, the exact figures not being of sufficient interest to warrant repeating the table here.

(To be continued.)

Hollow Tile Garage in Process of Construction

Same Garage as It Appeared When Completed

UTILITY AND IMPORTANCE OF PROPER ENGINE TESTING

BUFFALO, N. Y., Nov. 29—The E. R. Thomas Motor Company has inaugurated a system of block testing that ranks with the best in the country. In the past, many factories have regarded the block-testing department as unimportant, and except the function of running in the engine, so that it could be turned over or started easily in the road test. This being the case, the department set aside in most factories is a dark room, poorly kept and lacking in attention in every way; not only is it disgusting to the visitors to go into such a department, but to the workmen as well, with the result that the general contrast between this department and the other departments makes the men feel that they are of less importance to the concern.

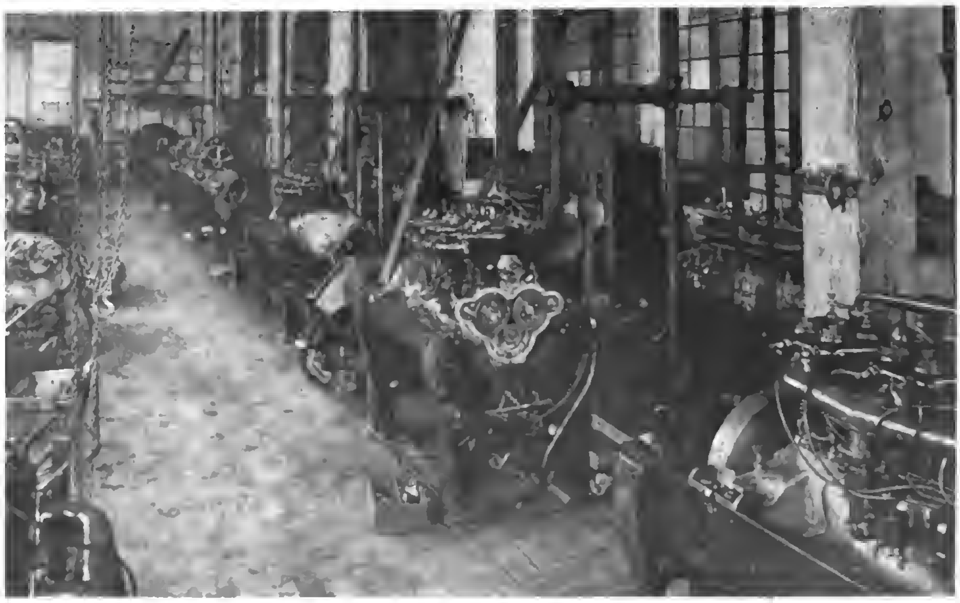
Thomas Engine Testing Department from East, Showing "Little Six" in the Foreground

It was early realized by the Thomas company that the dormant opportunities of well-kept and carefully managed departments invariably yield in return a more finished output. Their designers visited the different factories in the United States for the purpose of inspecting and acquiring all the good points and means of eliminating their bad points. The result is that the motor-testing building is modern in every particular. Visitors are impressed upon entering this department with the large amount of light, the general cleanliness of the floor, and the alert activity of the men, so that it is possible to regard this department as a laboratory where the design of the engineering department and the practice of the shop come together for a test of practical use. For instance we might regard the twenty units or blocks as twenty individual power plants, each of which is to be brought to its highest working efficiency before it is turned over to users; each one is treated in a similar way, so that any change in the general performance is easily noted by its contrast. This is of the greatest benefit, not only to the engineering department, but to the customer, for it implies a concentrated attention to every detail, no matter how small, is seldom found.

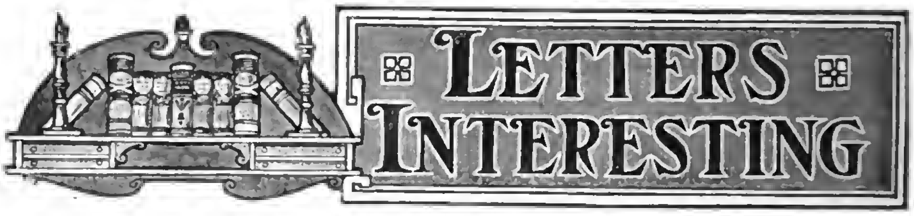
Before the engine is allowed to go to the brake test it is brought into the department and thoroughly inspected, then it is "run in" for a period of five hours to determine if the assembling has been correct, and also to limber the engine preparatory to runnning under its own power. The engine is then run under for a period of 50 hours, after which it is "torn down."

Each motor is mounted on a heavy framework, cast iron and steel, in such a maner that every part is accessible and easily observed. The water and gas connections are attached in exactly the same manner as they are on the cars, so that as far as possible the performance of this same motor can be interpreted upon the road before it is assembled in the chassis. The water, for instance, as it leaves the motor is at all times observed; in this way it can be told whether a motor is overheating or requiring an excessive amount of water to keep it cool. Directly connected to each motor, and in the same frame, is a hydraulic testing dynamometer or brake so regulated that any desired load can be "thrown upon" the motor. Starting at a low speed and going up to 1,500 revolutions per minute, the horsepower is noted, and the "characteristic" curve plotted from this data. These curves are plotted upon regular cross-section paper, with the average performance, so if the motor falls below the average performance, it is instantly detected, and either is tuned up during the test or entirely gone over at a later time.

The character of the assembly work and all of the parts are inspected and defective ones are immediately replaced. After the engine has been assembled it is run-in for a period of five hours and then put on its severe brake test. It is then rigidly inspected by a man not connected with the department—one that has an unbiased opinion as to the finished product. No engine can go out of the department until it develops the horsepower specified at all speeds by the engineering department. The cards that contain this data are at all times kept on record and open for inspection by all interested customers of the concern.



Testing Room from West, Displaying Large Number of "Fours" Under Test at One Time



CAR HARD TO CRANK

Editor THE AUTOMOBILE:

[2,101]—I have a 45-horsepower Lozier car which I cannot crank because of a lack of strength and which almost kills my man if he has to turn it over more than once or twice. I have written to the Lozier people about it, but they tell me that they can do nothing to help me out. Other cars (Alco and Packard) have devices that overcome this kind of trouble, and I would like to find out if any users of the Lozier cars have succeeded in getting anything that makes the car a possible car to run. Can you suggest any way for me to obtain this information?

Paterson, N. J. C. S. J.

As we have never heard of this trouble among Lozier owners or drivers previously, we cannot advise you what others have done.

Speaking generally, the reason why your car is hard to crank is because it has high compression and tight piston rings which retain the compression. Both of these are inseparable from high power and high speed. On the other hand, both of these should make starting on the spark an almost invariable performance.

In case you have not been able to start on the spark and are still unable to crank the engine readily, the thing to do is to obtain a device which will relieve the compression in part and which may be worked at starting time and then moved back so that the full compression is obtained for running. This may be effected as follows:

This engine, like every other one, must have compression relief cocks on top of the cylinders. Take out all of these, and with hack-saw or other tool cut a 1/8-in. slot about 3/8 in. deep into the handle of each one. Then drill through the slotted parts—that is, at right angles to the slot and about half way down into it—a 1-8-in. hole. Screw all cocks back into place, turning them until all slots lay parallel and in the fore and aft direction—that is, parallel to the crankshaft.

Either obtain or make a long, flat bar of steel about 1/8 in. or slightly less in thickness by 1/2 in. wide. This set into place in the slots in the cock handles, and after marking the position of the holes therein drill the four necessary holes. When the bar is put back into place, put in four 1/8-in. pins to hold it to the cock handles. This bar may be made long enough to reach through the radiator, the front end being turned down to a small enough size to pass through one of the radiator tubes in a lathe. When this has been done the protruding front end may be bent over to form a handle.

Now, what you have just done is to connect up all of the cylinder relief cocks in such a manner as to allow of relieving the compression in all four cylinders, without lifting the bonnet. To start the engine, the bar will be pulled forward slightly, thus relieving the compression in all cylinders, the amount of the motion of the bar being judged by experience, since too much movement will result in lowering the compression to such an extent that the engine will not start. Your man will soon learn how to manipulate this, notches in the bar being provided so as to insure the same amount of movement each time, so that, when the best starting position has been found, it may be kept for future use.

If desirable, a fine job may be made by adding a fancy handle at the front with a quadrant to work over, etc. This, however, would work no better than the one described.

The whole thing should be made and applied to the car by your man at an expense not to exceed $1.50.

WHO'S THAT A'KNOCKING?

Editor THE AUTOMOBILE:

[2,102]—I have a 1910 Model T Ford, on which the valves are clean, the pistons have no carbon, the engine runs well and has plenty of power, but it has a knock that is very plain.

If I hold down the second or third vibrator of the coil the knock disappears. The engine has been taken down and crank bearings tightened. Adjusting the needle valve of the carbureter makes no difference. If you can explain this difficulty it will help me very much.

A SUBSCRIBER.

Massena, Iowa.

Your description of the trouble seems to suggest its own remedy. If holding down vibrators two and three causes the knock to disappear, is it not a truism that the trouble is confined to those two? Similarly, if changes in the fuel system have no influence on the knocking, while simple changes in the ignition system remedy the objectionable feature at once, is it not plain that the trouble is not in the fuel, but in the ignition system?

With this to start with—trouble confined to ignition of second and third cylinders—it ought not to take you very long to find it and fix the trouble.

Now, pounding or knocking may be caused by uncertain ignition. This in turn may be a weak coil, a loose connection, or a short circuit in the coil due to oil or water. The first may be proven by borrowing a coil for a long enough time to try if the knock will cease. The second may be found by inspection, and seems unlikely. The third and last can be remedied by taking out the sections which give trouble (two and three), drying them in an oven or over a radiator, care being used to have a very slow, gradual heating process, which will not harm the delicate coil. As far as the weakened action of the coil, the first named trouble, is concerned, you might try new springs for the tremblers on cylinders two and three, the offending ones. The simple expedient suggested of borrowing a friend's coil long enough to test it will show you quickly if the coil is at fault. If you find this to be the case, and cannot fix it, a new coil will soon put you right.

GENERATOR COOLING

Editor THE AUTOMOBILE:

[2,103]—Will you please answer the following questions through your valuable department, "Letters Interesting, Answered and Discussed"?

1. Will wood alcohol mixed with water be safe to use in a carbide light plant, or is there any other cheap mixture which could be used in the Winter?

2. Would filling the water jacket of the carbide chamber with wood alcohol be of any benefit in cold, freezing weather?

I would gladly receive any other suggestions relative to the prevention of freezing in this system of lighting.

Bagley, Iowa. R. J. NAYLOR.

Both systems of preventing the freezing up of the carbide generator could be used to good effect. The method of putting the anti-freeze in the water jacket seems more reasonable than the other way, although as described by an old subscriber elsewhere in this issue (letter 2,108), this method is very effective, and, if anything, seems to improve the light obtained rather than the contrary, as one would think.

If you wanted to use the anti-freeze in the water jackets instead of inside of the generator, a cheaper mixture than alcohol could be made, using common salt, with which a temperature of minus 5 deg. may be maintained without the mixture sensibly thickening. If your part of the country is not subject to long spells of cold weather, in which the temperature goes below minus 10 deg. Fahr., this salt mixture would certainly be as useful as any other, and infinitely cheaper.

STORAGE BATTERY FREEZING

Editor THE AUTOMOBILE:

[2,104]—Will you please advise me through the columns of "Letters Interesting, Answered and Discussed," at what temperature the electrolyte of a storage battery will freeze, also the time required?

CECIL E. PATTERSON.

St. Marys, Ont.

This is a trouble of which we have never heard, from which we are forced to conclude that at any ordinary temperature the liquid of a storage cell is practically unfreezable. More than this, your question is too indefinite. Electrolytes are of differing densities, one at charging, another at discharge, and still others without number in between. At every different density, the freezing temperature (if there is one) and the time required would be different. So, even if we were able to answer your question by means of exact figures, a very long table would be necessary in order to give all of the possible densities to be met with in storage battery work. The average temperature of charging runs from 100 deg. F. on up, according to the speed of charging and the condition of the battery and acid at that time.

Answered and Discussed

BLOWING HIS OWN HORN

Editor THE AUTOMOBILE:

[2,105]—I have a Ford 15-horsepower runabout and wish to blow the horn on the same by compressed air. Could I have a tank, about 12 in. by 6 in., placed somewhere on the machine, with a pipe leading from, say, the rear cylinder to the tank. I would put a check valve in the pipe and tap into the exhaust valve cap for my supply. When the engine is running gas would be forced through the pipe and into the tank. When the pressure there was equal to the pressure in the cylinder at the time of explosion no action would take place. The gas could not leave the tank on account of the check valve.

Could I use this same tank of gas to inflate tires? Please answer through "Letters Interesting, Answered and Discussed."

Warren, Mass. LOWELL S. ELLIS.

The answer to your questions is yes to both. The tank could be rigged up as you suggest, but it would be advisable to use a much larger tank, say, about 12 in. by 24 in. This gas could be used for pumping the tires as well as for blowing the horn. But the action of exhaust gases or even highly compressed unburned gases from the cylinder previous to explosion upon the rubber composing the tires has not yet been fully explained. As you will find by referring to the files of THE AUTOMOBILE for last Spring, when this subject was discussed, this is open to argument. Some claimed that the cool, moist gases previous to explosion were beneficial to the rubber, while others said that it was impossible to do this without getting some gasoline either as a liquid or as a vapor into the gases. Gasoline is well known as a solvent for rubber.

You would find the attachment of this tank well worth your while, as the compressed gases could be used for many purposes, even to the starting of the engine. The latter, however, would call for a timing apparatus which would have to be driven off of the engine, and so might result in more complication than you would care for, having a small and easily started engine.

TWO-BEARING ALIGNMENT

Editor THE AUTOMOBILE:

[2,106]—On a number of cars brought out this past season the motor is fitted with a two-bearing crankshaft, fitted with plain bearings. Is it not a fact that a shaft having but two bearings, and plain bearings at that, will, sooner or later, be thrown out of alignment? GEORGE CHRISTMAN, JR.

Spring Lake, Mich.

Nearly all of the very small engines cast in a block—that is, the four cylinders in one casting—have the two-bearing shaft. However, most of them use ball-bearings. The argument in favor of this practice is that the elimination of the middle bearing shortens the length or distance between the end bearings by a very large amount, varying upward from 2 1/2 in. This shortened shaft is then stiffer because of the decreased length between supports, while the majority of builders go farther and make the two-bearing shaft of larger diameter throughout. This also adds to the stiffnesss and reduces the liability to bending or to lack of alignment.

Now, with ball-bearings the two end supports give the shaft but point contact—that is, it is supported upon two points, one at each end. In case anything should tend to throw the shaft out, or in case of excessive strains tending to bend the shaft, the point support would allow the shaft to vary slightly, which would not be the case with plain bearings. The latter would grip the shaft for a distance equal to their length, preventing any variation at that point. Strains set up in the shaft then, in the case of the plain bearings, would result in actual shearing off, or, in a milder case, in the bending of the shaft.

This being the case, then, the only resort for the makers using the plain bearings is the enlargement of the diameter to such a size that bending is impossible. In case this is not done, or if the shaft is of small diameter, the buyer should be careful. There is a certain relation between the diameter of the cylinders, or power, if you prefer, and the section of the crankshaft, the strength of the material being known. Knowing this relation for a successful and perfectly safe motor with three or more bearings, you should add to the factor of safety a certain amount for the two-bearing shaft. This, then, would give a size for the two-bearing shaft which, in the absence of definite knowledge, might be considered safe. In that case it would not be advisable to buy an engine with a shaft smaller than the one decided upon as safe.

In weighing the merits and demerits of the two-bearing crankshaft, you should take into account the fact that length means weight, so that every inch saved—and this construction saves upward of five—means many pounds weight eliminated. This saving in weight is taken off the tires. As a result, the tire expense is lessened. Since this is by far the largest factor in the cost of upkeep, the latter is materially reduced. More than this, less weight with the same power spells either greater speed or improved gasoline economy. In this latter, you must take your choice, for you can not have both.

This weight saving, for instance, carries farther than one would think. Thus, not only does the cylinder casting itself weigh less, but also the exhaust pipe, inlet pipe, both inlet and outlet water pipe, crankcase, and many others.

PNEUMATICS FOR SOLIDS

Editor THE AUTOMOBILE:

[2,107]—The solid rubber-tired wheels of my 16-horsepower automobile are 34 inches in diameter. The felloes are 1 1-2 by 1 1-2 inches (not counting iron and rubber). Hubs are artillery, 16 spokes. Would it be possible to remodel them so as to use a 36 by 3 pneumatic tire? Would this affect the running? The machine is friction-drive, side chains, sprockets 8 and 52 teeth, and capable of 30 miles an hour.

Ruston, La. B. F. DUDLEY.

The change should considerably improve the riding qualities of your car, as it is bad designing to use solid tires of the ordinary type on wheels as small as 34 inches. Further, we believe the change would be thoroughly practical. A 36 by 3 pneumatic goes on a fellce 29 11-16 inches in diameter, not counting the rim. You do not say how thick your present solid tires are, nor how large is the diameter of the felloe, but it should be approximately that figure. A 36 by 3 1-2 pneumatic requires a 28 11-16-inch felloe. We would recommend the 3 1-2- inch size if your wheels will permit the use of it, unless the car is very light.

The difference in gearing due to the use of 36-inch wheels instead of 34-inch would be very slight; it would be higher in the ratio of 34 to 36. That is, with your car geared at present for 30 miles an hour, the change would gear it for slightly less than 32 miles. If you have hills or soft roads in your vicinity which would make this gearing too high, you might change the rear sprockets to, say, 55 teeth.

Larger sizes than 36 inch would be special and require a special wheel, in all probability. The last-named change, from a 52 to a 55-tooth rear sprocket, keeps the speed the same as at present with 36-inch tires.

ANTI-FREEZE CAN BE USED

Editor THE AUTOMOBILE:

[2,108]—I note that in your answer to Letter No. 2,083 asking for an anti-freeze solution for generators, you say there is nothing which can be used for the upper tank. The writer has used as high as 40 per cent. wood alcohol solution without apparent effect on his lights. If anything, they seemed somewhat improved. Enough water will flow to make gas, and the alcohol is vaporized by the heat, and burns.

With regard to anti-freeze for the radiator, the writer used a 50 per cent. glycerine solution ten years ago on a one-lung Winton, and has used it ever since on a dozen cars, with thermo-syphon circulation and all kinds of pumps. The strength of the solution has been gradually reduced, on account of expense, to 25 per cent., which in this climate is enough. A little slush will form at temperatures near zero, but it will go through the pump readily, and never cause any trouble. If it harms rubber, as it is reputed to do, it is not noticeable in a season's use.

One year a ready-made and widely advertised solution was used which ate out all the aluminum it touched (name forgotten). The alcohol and alcohol glycerine solutions were tried, but were found to boil too easily, and to seek out the smallest leak, while the glycerine forms a jelly when exposed to the air and will actually stop small leaks.

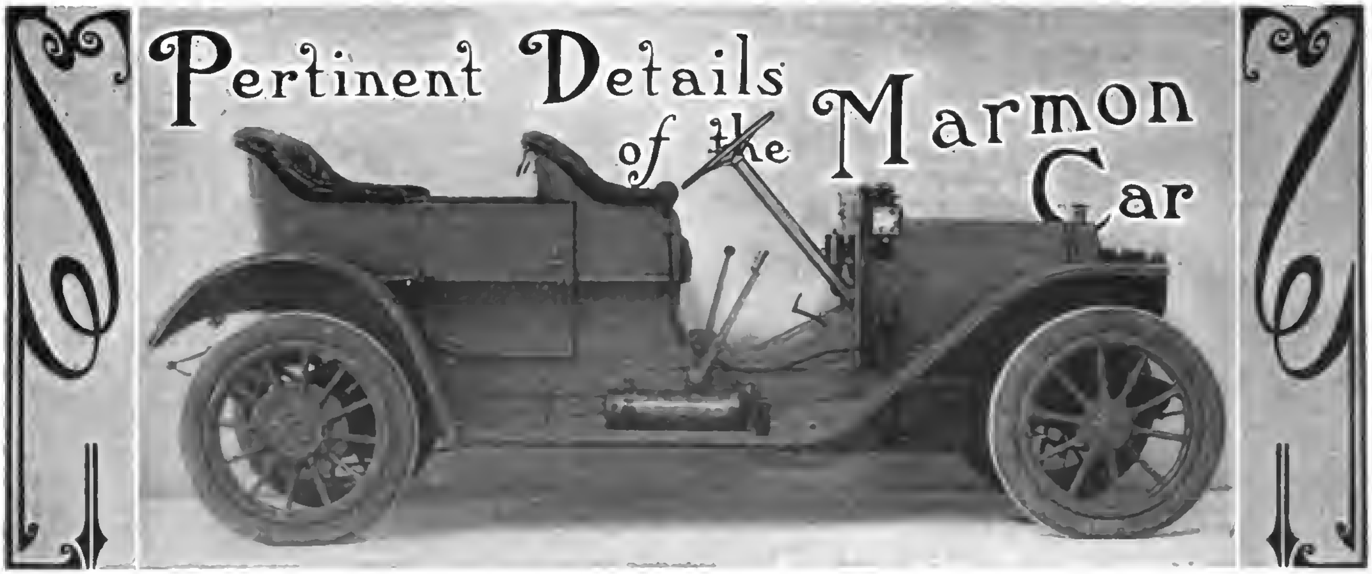
The writer's experience with glycerine has been so wide and so satisfactory that he would not hesitate to say that it is absolutely satisfacory for any case.

For the benefit of our friend who wants names, it has been used by the writer and his friends on a 1900 Winton, 1903 Olds, 1904 Cadillac, 1906 and 1909 Gaeth, 1908 Garford "30." 1908 Ford, and 1907 Packard.

AN OLD TIMER.

Cleveland.

Pertinent Details of the Marmon Car



Marmon "Thirty-Two" Suburban Touring Car, with New Four-Passenger, Short-Coupled Body

FROM the year 1851 down to the present time the Nordyke & Marmon Company, at Indianapolis, Ind., has been practising up for what would now seem to be an absolutely standard effort, as represented in the Model Thirty-Two car for 1910, and while it is not the purpose here to claim that the automobile has been on the tapis all these years, even so, the plant has been devoted to a refined class of work, and "micrometer rule" has dominated the situation from the very inception.

When the company added an automobile department to its large plant it went into the matter rather cautiously, and by dint of a good deal of preliminary engineering work evaded many of the pitfalls of other pioneers. The result is that the present car, while it is up to date in every particular, is not so different from the last year's model as might have been supposed, which is another way of indicating that a standard product changes with the standard, and while there are many who fail to appreciate that standards do change, the fact remains.

Model Thirty-Two, which is the Marmon chassis for 1910, has a little longer wheelbase than last year's car, and the motor is suspended by a separable (flanged and bolted on) arm at the end of the crankcase, between it and the flywheel. The arm, as secured into place, takes the flywheel gyrations more perfectly, and the facility of a three-point suspension adds to the value of this method. As a further advance with the standard, the steering linkages at the front axle are so nested that they are out of harm's way. Some advances in material and methods of treatment have also been made.

The product of this well-known plant for many years was mill machinery, and long before the automobile was a noticeable factor in industrial life the company used micrometers instead of carpenters' rules, jigs instead of approximations, and system became a habit.

Some Technical Features Taken at Random—The scheme of design is outlined in Figs. 1 and 2 of the chassis, in side elevation and plan, respectively. While the specifications cover all that the chassis drawings depict, even so there are certain accentuated points in design that greet the eye and demand further recognition. The drop frame F, of the channel section, is 4 1-2 inches deep, gives good clearance at the axles, especially at the rear, where the motion is the most pronounced, it being fully 4 inches at C, Fig. 1, between the underside of the frame and the top of the bumper; the give of the bumper B adds to the clearance. The rear spring suspension, S, is full elliptic, 42 x 2 inches, which is indicative of easy riding qualities, and the material used is claimed to be superior for the purpose.

The four-cylinder, water-cooled motor M is provided with a high raiser, R1 and R2, with a flexible connection, H1, between the two pairs of cylinders and H2 from the front pair of cylin-

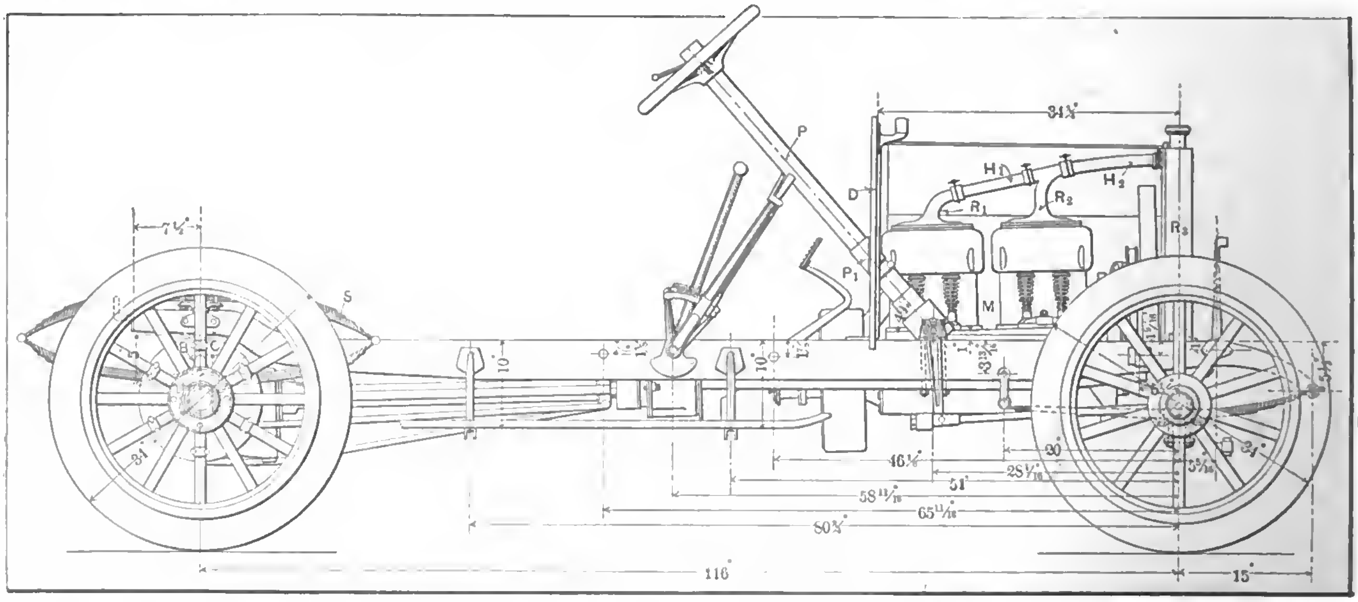


Fig. 1—Side elevation of chassis, showing position of motor, radiator on center line of front axle and drop frame suspended on full elliptic rear, and semi-elliptic front springs

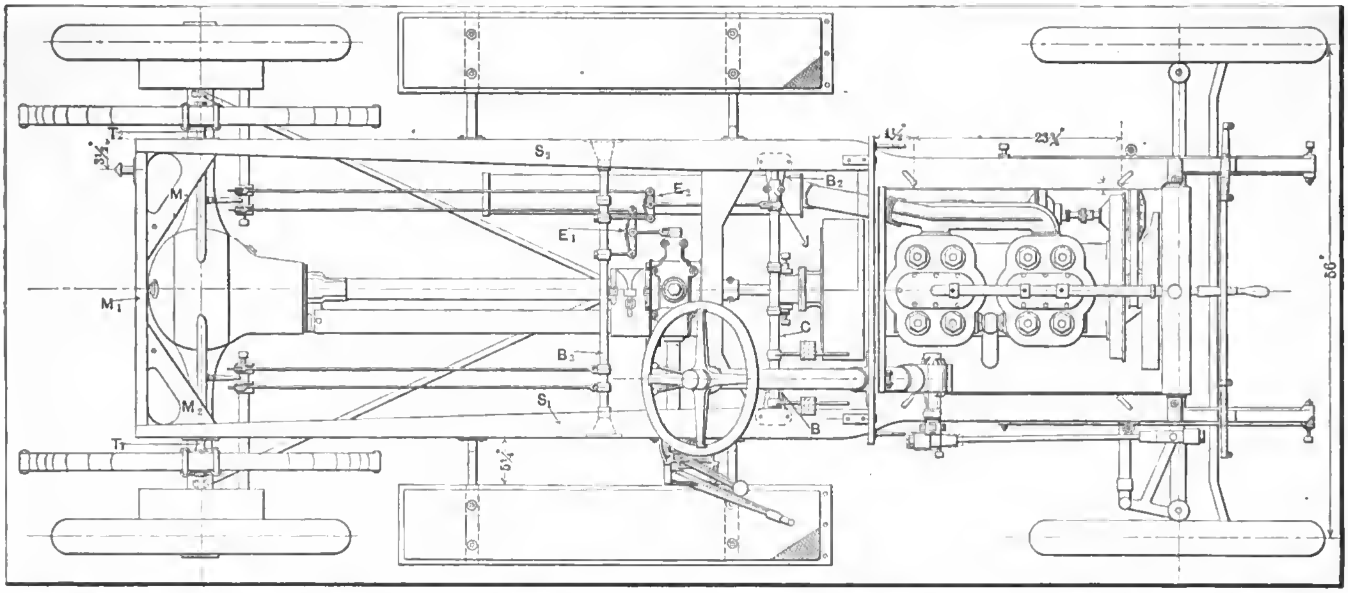


Fig. 2—Plan of chassis, offering evidence of strength and stability, with widened flanges of side members at point of narrowing

ders to the radiator, R3. The radiator is in a line above the front axle, and the over all distance from the center line of the front wheel to the front edge of the mahogany dash D is 34 3-4 inches, which length is enough to balance the general appearance of the car. The steering column, P, is securely braced at the point where it passes through the dash D, and held in secure relation by means of a plate P1.

The plan of the chassis presents evidences of strength, as, for illustration, the flanges of the side members S1 and S2 are widened as the dash is approached, and where the frames are narrowed in, supports are close at hand to tie up the work. The clutch shaft C passes clear across, and the brackets B1 and B2 are securely riveted to the frame, while the journals, one of which shows as J, are long and well fitted. What is true of the clutch shaft C is also to be said for the brake shaft B3, and in the same figure the equalizers for the brakes, at E1 and E2, will be easier to discern than in any other view available. The rear cross member, M1, is provided with unusually liberal corner braces, M2 and M3, and the rear spring trunions, T1 and T2, are provided with wide flanges and securely riveted to side-frames

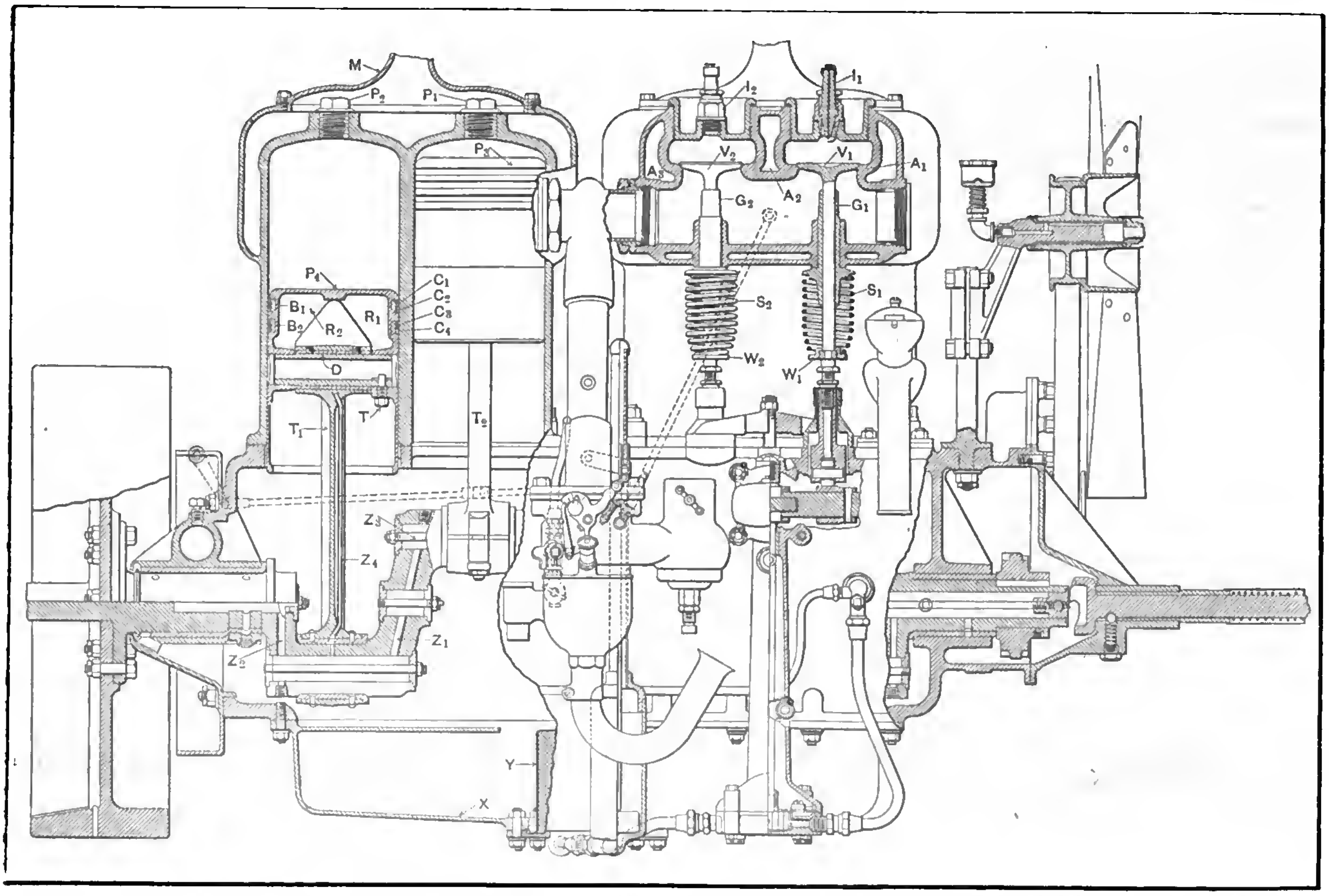


Fig. 3—Right side of the motor, in part section, disclosing light reciprocating parts, a competent oiling system, and nice details

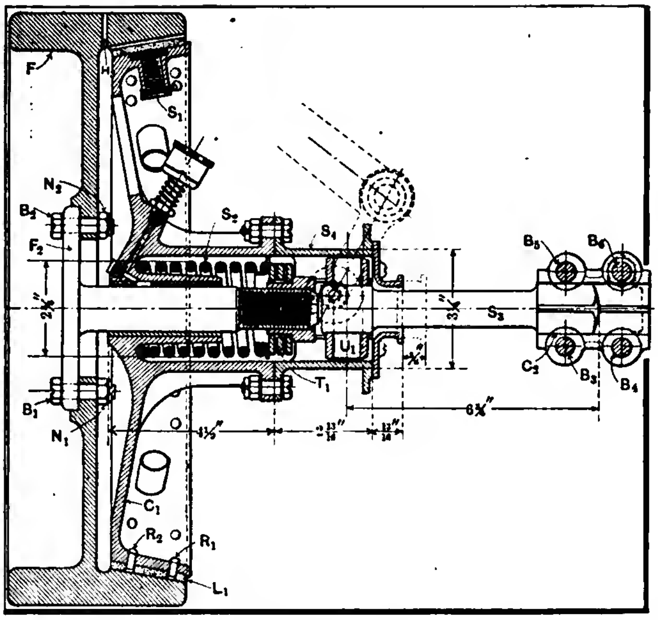


Fig. 4—Section of flywheel and cone clutch, presenting such details as mushrooms with springs behind them to press leather facing out, etc.

Refinements in Design of the Motor—Referring to Fig. 3, of the motor, looking at the intake side, which is the right-hand side when the motor is in place in the chassis, the front pair of cylinders is shown in part section cutting through the intake valves V1 and V2. The valves run in sized guides, G1, G2, etc., and the valve springs S1, S2, etc., press against a flange turned on the guides G1, G2, etc., while the other ends of the springs rest on a concentric support, washer-like, W1, W2, etc.

The spark plugs, 11, 12, etc.. of which there are four on the intake side, are directly over the valves, and sooting or heating is eliminated. The water jacket extends all around the valve seats, as shown at A1, A2 and A3, for the first pair of cylinders, which plan is, of course, duplicated in the second pair of cylinders. Referring to the second pair of cylinders in the same figure, the plug in the head P1, P2, etc., is threaded in, passes through the inner wall only, and is submerged in water. The water jacketing is augmented by the bell-like shape of the water piping makeup, M, which is the same for each pair of cylinders, and the volume of water thus stored above the hottest part of the cylinders is insurance against cooling trouble. More than that, it aids very materially in the matter of efficient lubrication.

The pistons P, P1, etc., have flat heads, are strongly supported by ribs R1, R2, etc., and the packing is done, to maintain compression by means of compound rings, B1 and B2, in grooves for each piston, which rings support auxiliary rings C1, C2, C3 and C4 on each piston. The method of packing is one that has long been favorably considered in steam and other work, and the continued tightness in service is its best recommendation.

The piston pin D in each cylinder is hollow, of alloy steel, hardened and ground, and is prevented from floating by a cap screw, T, threaded into the boss and turned to fit in a hole in the piston pin. The connecting rods J1, J2, etc., are of the I-section, drop-forged from suitable grades of steel, and a bushing of bronze assures a good bearing at the piston pin in each case, while proper journal members, split and securely bolted, take care of the crankshaft crank bearings.

The reciprocating mass is reduced to a minimum, due to light pistons, connecting rods and a sufficient stroke to reduce the angularity to a safe point. Lubrication, which is positive and worked out to a nicety, does what is left by way of accounting for the fine performance. This lubrication, as the design reproduction indicates, is rendered positive by means of oilways reaching up from the oil in the "sump" X. After the oil is strained through the strainer Y it is pumped into the oiling system, and as an indication of the means afforded, attention is called to the oilways in the crankshaft Z1, Z2 and Z3, also in the connecting rod Z4, leading up to the piston pin.

Before departing from the discussion of the motor as suggested by Fig. 3, a glance at the fan detail, at the front, will disclose a point or two: The fan is large, is driven by a wide, flat belt, and the bearings are lubricated by a greasecup pressing hard lubricant in through the passageway Z5. The fan support is strong and is to the crankcase. There are additional details, to be sure, but enough has been said to enable the reader to take up the burden.

Simplicity Resides in the Clutching Mechanism—Fig. 4 refers to the flywheel F1, made of selected gray iron, cast in the Marmon foundry, at the plant where the cars are made, and instead of keying on, the flywheel is flanged to the crankshaft at F2, and is held in place by means of through bolts B1, B2, etc., with nuts castellated and locked, N1, N2, etc., by cotter pins. Any oil that accumulates within the flywheel is driven out by centrifugal force through holes around the periphery, one of which is shown at H1. This is a very practical preventive against that bogy of the novice, clutch slipping.

The cone clutch C1 has a dished spider, as shown in section, is made of aluminum, and because of its shape, all internal strains are removed and safety is assured. The leather face L1 is of a selected variety of clutch-leather, and rivets R1, R2, etc., hold the leather to the cone-face. Leather, when used in cone clutch work, if it is not pressed out by means of springs, is likely to give trouble, and the practice in this case is to cause the leather to press out by placing coil springs S1 behind mushroom-shaped members M1 around the periphery.

The clutch is pressed into engagement by the concentric coil spring S2, and the reaction is taken by a ball thrust bearing, T1. The shell S4 is flanged to the extension of the cone-spider just over the thrust bearing, and a universal member, U1, takes the power on its way to the live rear axle, passing it through the stubshaft S3 to an accommodation coupling, C2, which is split and held together by means of four large bolts, B3, B4, B5 and B6.

Unit System Obtains for the Whole Car—The motor and clutch, making up one unit, leaves the transmission, attached to the live rear axle, as the second unit, and the section, Fig. 5, which is taken through the propeller shaft center, will show

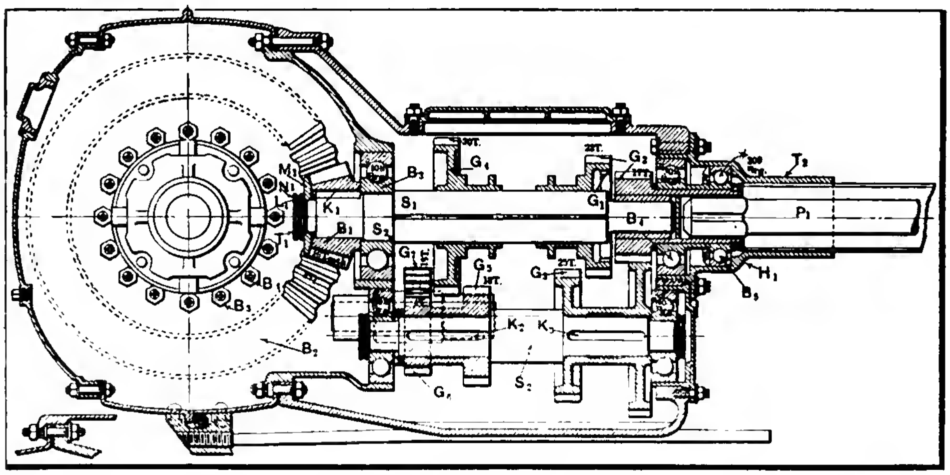


Fig. 5—Section through rear axle and transmission gear, showing annular ball bearings, well-designed gears, and short, stubby shafts

enough of this system to bring out the points to be made plain.

The transmission gear is of the selective type, with three forward speeds and reverse, and direct drive on high speed is brought about by sliding the internal gear G1 into mesh with the teeth of the pinion G2. Hill-climbing gear is let in by meshing the external teeth of G1 with the teeth of G3, when the gear ratio is unity, due to the fact that both gears have the same number of teeth; this leaves the bevel drive as the only means of gear reduction in intermediate speed, which reduction is that due to 53 teeth in the bevel gear and 16 teeth on the mating pinion, and 53/16 = 3.31. Low gear, used for accelerating, is let in by meshing G4 with G5, and the reverse requires that G6 and G7 engage with G4.

The bevel drive, involving B1 and B2, with the latter flanged to the differential housing by bolts B3, B4, etc., is held in rigid relation by the large-diameter shaft S1 and the large annular ball bearing B3, which is a sucking fit, and presses against the shoulder S2, is held on by pressure of the bevel pinion B1, and the end of the shaft is threaded, T1, so that the nut N1 is screwed up against the washer W1, locking the whole system in place. The pinion is prevented from turning by a key, K1, and the nut N1 is locked on by means of a wire in a groove, L1.

The lay shaft S2 is of large diameter, relatively short, hence rigid in the extreme. The gears are keyed on at K2 and K3, are of hardened special steel and of a shape to resist deformation in the process. The prime shaft S3 is a square, and the sliding gears are, like the fixed gears, hardened and of a shape to stay put. At the telescoping joint the gear G2 serves as a sleeve, and annular ball bearings B4 and B5 carry the load. Dirt is excluded by means of the housing H1, which engages the torsion tube T2, which is in concentric relation with the propeller shaft P1, and encloses it completely.

Novelty and the Rear Axle are Companions—The jack shaft S1 is flanged at its end F1, and a supplementary flange, F2, bolted to the flange of the jack shaft, is faced off and fits against a face on the hub member, H1, of the rear wheel on each side of the car. The hub H1 is bored out to take a single annular ball bearing, B1, and this bearing, while it does all the work, is dead on the center line of the wheel, so that it is in a position to assume all the responsibility. The ball bearing is a sucking fit on the reduced diameter of the bronze sleeve S2, and this sleeve fits over the drawn steel tube T1, which is concentric with the jack shaft.

The ball bearing is held securely in place in the most approved manner by means of a locked threaded shell, S3, and the jack shaft, which is of the semi-floating type, is prevented from floating off by the interference of the petticoat P1 of the hub member H1, acting in conjunction with the flanges F1 and F2, they, in turn, being secured in place by means of the hub flange bolts B1, B2, etc., and the rivets R1, R2, etc. The hub cap C1 fits over the flange F2, and is held in place by cap nuts N1, N2, N3, etc., and the appearance of the wheel is somewhat unusual, due to the elimination of the conventional hub.

The brake drum D1 is fastened to the spokes S3, S4, etc., and the drum, while it is of unusual diameter, is also very wide, there being room, side by side, for the two sets of brake shoes S5 and S6. The shoes are faced with asbestos fabric, F3 and F4, which is heatproof and possesses a high coefficient of friction. The shoes are prevented from dragging by the springs S7 and S8, and when it is desired to apply the brakes it requires but a torsional effort on the brakeshaft S9 or the concentric tube T2 for the other set of brakes; this torsion, applied to either set of members, will actuate the respective cams C2 or C3, expanding the bands and applying the necessary pressure to arrest the motion of the car. The brakes are powerful, and, all told, the area of contact of brake shoes is close to 352 square inches, and while the area of surface is not the main factor when effectiveness of brakes is to be determined, it is true, nevertheless, that the life of the brakes will depend upon this area of shoe contact.

Objects Attained in Complete Design—Passing to the front axle, which is of the I-section, with Timken roller bearings, it

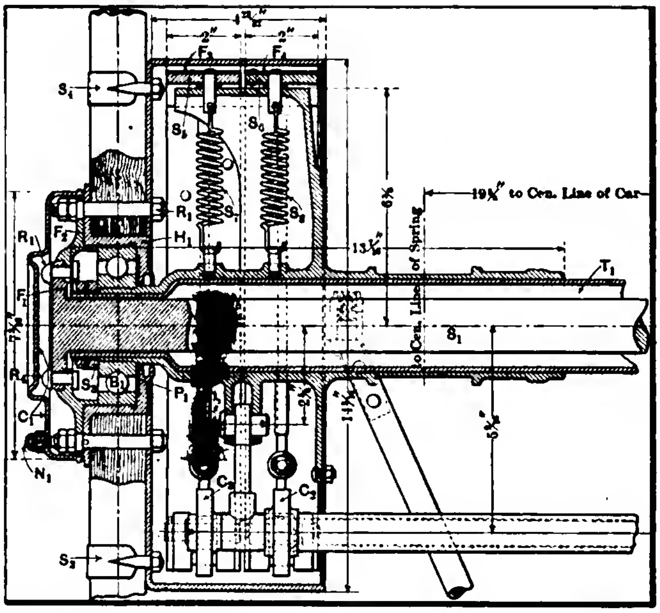


Fig. 6—Section through rear wheel, depicting a single annular ball bearing in the center line of the spokes to take the load, and means for locking at every point

is at once apparent, even without illustrating the axle, that the designer took account of the enormous side strains to be encountered, and what was regarded as perfectly suited for rear axle work was not necessarily in keeping with the requirements as they have to be met in steering road wheel work. This close study of the several parts and units throughout the car is one of the features to be noticed, and it is believed that the car has been sufficiently illustrated in detail to render the whole situation patent.

In conclusion perhaps it will be timely to say a word for standardization, especially of the steering gear, spark advance mechanism, throttle control, foot pedals and side levers of cars. Perhaps it is too much of a subject to ramble into; let it simmer, then, with the simple illustration of how the Marmon spark and throttle lever mechanism is placed on the top of the steering wheel; not without calling attention to the use of a 17-inch diameter wheel. Sitting in the seat, the spark lever is on the right side, and to advance the spark it is necessary to advance the lever. What can be more simple or natural? Likewise, the throttle control, which is on the left-hand side; to advance the throttle it is necessary to advance the lever; advancing the throttle is equal to giving the motor more gas.

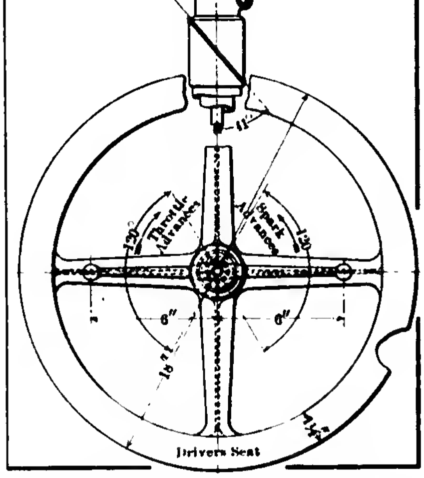


Fig. 7—Plan of steering wheel, with spark lever on right, and throttle on left side, and logical methods of control

Prompt Debut of the Parry

Fig. 1—Touring car for five passengers, ample power, m. b. leather upholstery, carriage finish, and easy riding qualities

THE dawn of another day is but the rhythmic repetition of a normal expectation, but the dawn of another automobile manufacturer is quite another matter; the one is bereft of novelty because it is reoccurring and always the same, while the other is all novelty, due to the ambitious advance over the last effort and the certainty with which a host of uncertainties are mastered.

It is not believed that anyone, even engaged in building automobiles, can reach a fair understanding of the vastness of the automobile industry without spending months, continuously, in quest of information, and in painstaking research, delving deep in hidden recesses, for, as experience is teaching, the largest undertakings, betimes, are hidden away, perhaps in long-abandoned factories that none would have supposed would ever again throb with human interest and bear the brunt of industrial activity on a plane as never before.

The title illustration to this story represents a car that the author had never seen before, and out of curiosity, to some extent, tracked it to its lair. Made in Indianapolis; the "Parry"; rated at 32-36 horsepower, for the motor, which is of the water-cooled type, with a bore of 4 1-4 inches and a stroke of 4 1-2 inches. The cylinders are cast in pairs, of gray iron, with valves in the head as depicted in Fig. 2, and the radiator, which is on the center line of the front axle, is so spaced as to afford room for a commodious fan, so that the air current through the radiator is adequate for the needs.

The tappet rods, for the valve-motion, run in long and well-fashioned guides, have liberal bearings where the rockers engage, and the camshaft, with integral cams, is of special steel, with "ground" cams. The flywheel is large, with an adequate flywheel effect, and the main bearing of the motor, in view of this, is of unusual projected area. The crankshaft is a die forging of "toughened" special steel, has three main bearings of die-cast white metal, and is best understood by glancing at the open crankcase with the shaft in place, as shown in Fig. 3, which also tells that the lower half is not required to carry any of the crankshaft load, since journal caps are used instead.

Fig. 2—Right side of the motor, showing magneto, centrifugal water pump, valves in head, well designed fan, and commodious radiator

The half-time gears are housed in, are accurately cut, set to run on the pitch line and are noiseless. Ignition is by means of a magneto which sets on the right side of the motor as Fig. 1 portrays, and the water pump, of the centrifugal type, is just in front of the magneto on the same side. The steering gear is fastened to the chassis frame at a point between the magneto and the water pump, and the spindle passes through the chassis frame just in front of the anchorage of the rear end of the front spring suspension.

Fig. 4 is of the front axle, and this, in conjunction with Fig. 2 is enough to clearly indicate the character of the steering equipment, taking it as a whole. The linkages and arms are of suitable grades of fabricated steel and straight-line designing is the rule. The front axle is of the I section, die forged in one piece and Elliot type of knuckles add to the line of attractions. The spring perches are integral with the axle, and half elliptic springs are made to take the constant front load.

At the rear of the chassis, owing to the variable nature of the load, the designer has taken advantage of full elliptic scroll springs, besides using an adequate volume of good material. The chassis frame is of steel, hot pressed to a channel section, and the aim has not been to skimp in material at this point; absence of castings or other heavy parts at other points has enabled the designer to see his way clear to afford a rigid chassis frame.

The rear axle, unlike the front, is clearly brought out in Fig. 5, showing a liberally designed tubular construction with a shapely bulb at the center in which the differential gear and the bevel drive is housed. The torsion tube is concentric with the propellor shaft and terminates in a universal joint at the unit transmission gear, back of the motor, resting on the chassis frame.

Referring again to Fig. 5, notice may be taken of the brakes, of which there are two sets, one of which is internal expanding and the other is external construction; both are faced with thermoid, the nature of which is such that any amount of heating such as it will get in this service fails to destroy its good working qualities. The bands are of steel, and the levers are

Fig. 3—Crankcase up side down, depicting crankshaft, three good bearings, and journal caps of strong design

not only of good section but they are fashioned with long bearings, and grease cups are placed at accessible points so that there is no reason why the original noiseless operation of the car may not hold out.

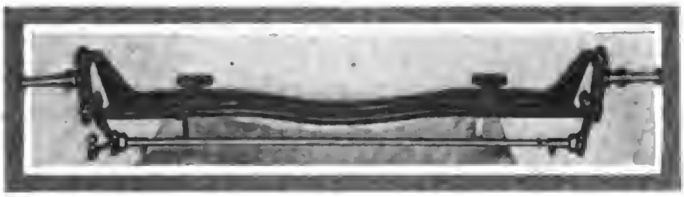


Fig. 4—Die forged I section front axle with integral spring perches, stout knuckles, straight arms and a well-designed cross-rod

Wheels are of the artillery type, made with care from second growth hickory, and the rims for the tires are quick detachable, to fit 32 x 3 1-2-tires. The tread is standard, and the wheelbase is long. There are other nice features to be noticed, as a 17-inch steering wheel, and the side levers, one of which is for the emergency brake, and the other for the three-speed (selective) transmission gear (including reverse), are shapely, strong, work with ease and precision, and are forged from a good quality of steel.

In the direction of long life and stability, there are several points that will receive the barest mention at this time; Fig. 6 showing the chassis just back of the flywheel, presents evidences of this stability. The cross member at this point is deep, and the sub-frame, which serves as a foundation for the motor, terminates at this member. All bearings and supports for the pedal and brakes fasten to substantial members, and no cantilever parts can be seen at any point, so that bending or other distortions will scarcely be a companion to the owner of such a car.

What the author found was the old Standard Wheel Company's buildings, completely filled with machinery and parts for

Fig. 5—Rear of chassis with one wheel removed to present brakes, live rear axle, and full-elliptic (scroll) springs

the making of automobiles, of which the above is but a brief description. Then, there are new buildings in course of erection. The new structures are of steel, and, while they look a little hasty, even so, they are of a substantial character, and the wonder is that they can be put up in such a short time. The entire time taken by this company in doing all this work, including the delivery of model cars, has happened within ninety-six days.

Five Thousand Cars This Year—There is every evidence that the company will put out 5,000 cars this year, which is the number that President D. M. Parry figures upon. These cars will be in two models, *i. e.*, a roadster at $1,285, and a touring car at $1,485. Just what it means to do so many things in less than one hundred days is a matter that can not easily be word pictured, and the camera was used instead, rather with the hope that it would reflect the exact situation. Fig. 7, for illustration, was taken of a big Bowser gasoline tank just rolled into the yard on a flatcar from the nearby railroad. The tank just fits comfortably on the flatcar so that it will not be necessary to describe it further. What any one would want with such a comodious gasoline tank, however, would be difficult to reason out, unless it is that the company intends to test out a considerable number of automobiles.

Magnetos are difficult to procure this year owing to the brisk demand. The Parry engineers, being alive to this situation, have them in hand, one row of which is shown in Fig. 8. In one of the new buildings the line of live rear axles tells still another tale of the early bird and the manner of building automobiles and preparing for the work at the same time; accessory makers,

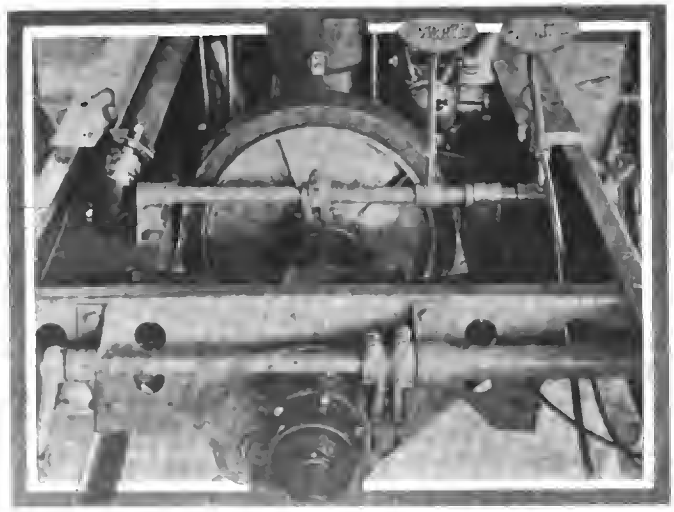


Fig. 6—Chassis just back of flywheel, presenting deep cross-member, universal joint at end of tube, termination of sub-frame, etc.

Fig. 7—A Bowser gasoline tank, on a flat car, in the yard of the Parry Auto Company at Indianapolis

it is plain to be seen, have been called upon to contribute a quota. Fig. 9 depicts one of the long rows of rear axles.

Machining Process Catching Up Rapidly—It might be supposed that, in a new plant such as this, assembling would be the

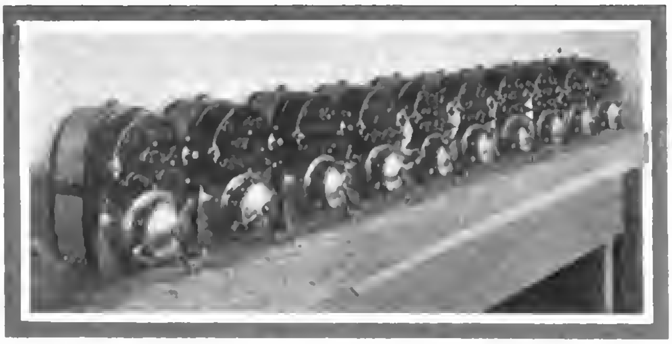


Fig. 8—Magnetos in stock awaiting the propitious time

main activity, but such is not the case. Fig. 10 is of a big new boring bar caught in the act of boring a crankcase, and this is the character of machine tools that is rapidly filling the plant.

In the forge all is activity, parts are being fashioned from bars and billets of steel, and a little to one side the frames are being riveted together. At another point, not far distant, motors are being assembled, and while the building is still ringing with the hammers of carpenters and house-smiths, the motors rapidly assume shape and the sharp exhaust reports of well-timed motors swell the din of noises that are all the more accentuated because the plant is being built and the cars are being made at the same time; what will these men do when they have but one task to perform, *i.e.*, make automobiles?

In conclusion, in view of the statements of President Parry, of the Parry Auto Company, to the author, it is inferred that the ground around the plant, of which there is enough to more than double the present situation from the point of view of

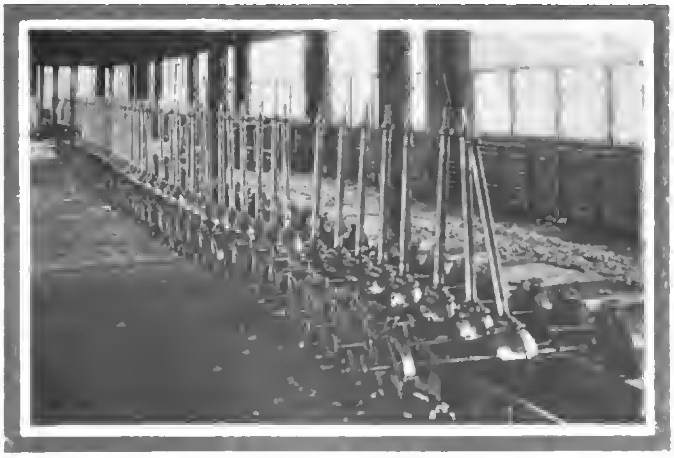


Fig. 9—Live rear axles in rows, in one of the new buildings, ready for instant use

buildings, will be covered with new buildings long before the enterprise is crystallized, and this is but one of the strong situations that center at Indianapolis, which is now an automobile center of first magnitude.

AUTOMOBILE CREATING ITS OWN MARKET

By D. M. PARRY, President Parry Auto Company

The future of the automobile industry is to be regarded in no other than an optimistic way. In the United States in the past ten years about two and a half million vehicles per year have been sold, and a very large percentage of these vehicles will inevitably be replaced by the automobile.

Several hundred thousand machines are now in use, but this number comes nowhere near exhausting the market possibilities. For next year the estimate of production is 200,000 machines, but while this estimate should doubtless be somewhat discounted, there is no question, I think, but what the production will be larger, much larger, than ever before. The automobile means a revolution in means of transit, and this revolution is now in progress. But it cannot accomplish itself in one or two seasons, though in truth it is going forward very rapidly. In fact some seem to think it is moving too rapidly, fearing as they do that too much labor is being abstracted from other pursuits and too much capital diverted from other channels of investment. The readjustment necessarily involved in the development of any extensive industry, such as that of the automobile, is likely to have transient effects here and there which are not desirable, but if the industry itself represents a social need the ultimate results must be to the general benefit.

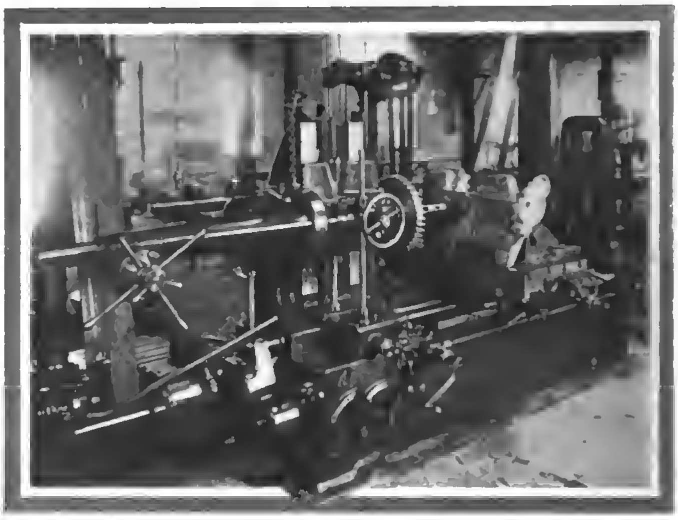


Fig. 10—New horizontal boring mill used in crankcase work for almost every operation

The automobile is the latest word in human progress, and because of its perfection as a vehicle for both business and pleasure, its use is certain to grow. It is not a luxury but a necessity of the times, and the fact that it is a necessity gives legitimate warrant to the use of capital and labor required by it. But granting that the automobile is a thing to be welcomed, the question arises whether there is a too rapid absorption of capital and labor in its production, and we hear some dark forebodings lest a financial panic may ensue because of it.

The automobile industry has reached a vigorous growth, but this is a very large and a very wealthy country, perfectly competent of taking care of any demands likely to be made on it by the development of the industry. The shifting from horse-drawn vehicles, an inevitable process, is going ahead rapidly, but not so rapidly as to test the resources of the country or come anywhere near doing it. From the labor standpoint it is quite evident that the industry is developing many new means of employment and increasing the purchasing power of the thousands at the present moment engaged in it.

NEW ELECTRIC DISPLAYS NUMEROUS DIFFERENCES

ASIDE from the natural interest in things new and different, the electric car recently brought out by the Rae Electric Vehicle Company, Boston, marks a distinct advance in the electrical and mechanical construction of this type of car. The first machine, as shown at the electric show in Boston last month, had at that time run over 16,000 miles. In operation, it is claimed that this car will cover from 100 to 130 miles per battery charge, and irrespective of the number of stops. The latter feature is a new one, previous long radius cars obtaining that mileage only by making fast continuous runs.

By means of the control of this car, just brought out and patented, the starting and accelerating effort is produced by a normal discharge current, thus conserving the energy stored in the batteries and making a larger percentage of it available for mileage, which is the desideratum.

In appearance, as the illustration shows, the construction of the gasoline machine is followed very closely. So, too, with the mechanical features. The power unit is located at the front under the hood, the drive from there is by shaft to the rear axle, the latter being of the full floating type.

Of course, the batteries must be carried, but these are located in the center of the car, below the floor boards of the car. In this way, they do not affect either the appearance of the car, or interfere with the mechanical construction. More than all that, weight is thus placed over the rear wheels, from which they derive increased tractive effort. In addition, the simple lifting of the floor boards allows access to them for charging, inspection, or repairs. This latter feature of accessibility is fully as important as the others.

Not only is accessibility of the batteries made a feature, but the location of the motor and controller forward under the hood is also very accessible. By raising the hood, both are exposed. By removing four bolts, and disconnecting two wires, the power unit is removable. The separation of motor and battery into two separate and distinct units located at some distance apart is also effective in reducing battery leakages.

Sixteen speeds, varying from 3 to 20 miles per hour, are furnished by the controller in its various positions, the operation being such as to vary the field of the motor without external resistances. Noiselessness is made a great feature, being secured by the use of special gears, on short shafts, the latter being mounted upon radial ball bearings. They are well enclosed and run in oil at all times. This enclosing the gears in an oil bath, not only makes for noiselessness but materially aids the longevity of the gears themselves, to say nothing of the matter of reducing friction losses to an absolute minimum quantity.

Floating type of rear axle is an up-to-date feature of gasoline automobiles which has been borrowed to make this quiet running electric more perfect. The absence of driving chains makes the car even smoother and quieter in operation.

In the line of brakes, too, gasoline construction is followed very closely with the best of results. A set of rear wheel brakes,

Rae Electric Victoria, a New Car of Merit

operated by foot lever, is provided, but in addition, there is a shaft brake, controlled through the continued movement of the same lever. Thus, to stop the car, the pedal is pressed lightly. If this is not effective, more pressure puts the shaft brake on, and a determined push of the pedal to the limit of its movement will put both brakes into instant use, resulting in the rapid stopping of the car.

Eighty-inch wheel base is the standard, with a 56-inch tread. Wheels are 32-inch diameter in front and 4 inch in the rear, equipped with either solid or pneumatic tires as desired. The springs are full elliptic both front and rear. The battery equipment is 40 Helios 15 A cells, divided into trays of four cells each, and suspended by steel racks from the laminated wood frame. The individual trays are each removable separately, while the supporting of the racks below the frame results in a very low center of gravity. The usual very complete equipment of tools, lamps, meters, etc., is provided.

Besides the victoria shown, the company will have ready for the 1910 season, equally well-designed coupé and runabout types of the Rae electric car. The factory is located at Springfield, Vt., but offices have been opened at 747 Bolyston street, Boston, from where orders will be filled.

"JACKSON MUD HEN'S" TRIP FROM MICHIGAN TO MAINE

MONDAY morning, November 22, a mud-spattered automobile ploughed through the streets of Bangor, Me., and stopped in front of the City Hall, where Mayor John S. Woodman and a corps of city officials greeted it. The car was the "Jackson Mud Hen," driven by E. P. Blake, of Boston, and Charles Percival, of New York, who for the second time were carrying an official message from the mayor of Jackson, Mich., to the mayor of Bangor, Me. Last year Messrs. Blake and Percival made the same trip in the rain and snow in seven days and eleven hours, and this year, though they started three weeks later, were determined to lower their existing record.

Starting from Jackson at 9:22 a. m., on Wednesday, November 17, in a driving snowstorm, the two men made Toledo, 152 miles, through axle-deep mud and clay without a stop, arriving there at 4 a. m. After a hearty meal the run to Cleveland was resumed with the same road conditions, but a worse storm, the rain turning to snow. Cleveland was reached at 5 o'clock and when food had been partaken of, the 218-mile rough and hilly run to Buffalo was started. At Erie, Pa., a driving snowstorm was encountered which grew to 6 inches of snow by the time Buffalo was reached, in just 12 hours. Albany, N. Y., found them 42 hours ahead of record, and then the long climb over the famous Jacob's Ladder in the Berkshire Hills confronted them. This was made successfully, and midnight brought the "Mud Hens" into Springfield, Mass., where good roads to Boston awaited them. Reaching Boston Sunday morning the car started for Portland, Me., and made their stop for supper at Lewiston.

The all-night ride to Bangor, 165 miles, over the worst roads and mountains lay before the tourists, who successfully made it the next morning at 10:20, beating last year's mark by 2 days 12 hours and 45 minutes and establishing a mark for continuous driving of 123 hours.

THE AUTOMOBILE

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THE DUTY OF THE MOMENT

Lawless and criminal users of the road must be driven from it, and in the accomplishment of this imperative duty of the moment the law-abiding autoists must come squarely into the open and aid in the suppression of the few who cast discredit upon the great army of motor vehicle owners.

Recent fatalities, intermingled with narrow escapes and numerous minor incidents, have aroused in New York City an unreasoning antagonism toward automobiles which has caused thousands of considerate owners great inconvenience and, in some cases, positive persecution. The startling rapidity with which horse-drawn vehicles are being replaced by motor-driven cars brings in its wake a daily chapter of accidents that come from the participation of incompetent drivers in the congested traffic of the metropolis. Along with these are the skillful ones who take chances with slight regard to the other occupants of the streets, the poor pedestrians suffering the most as a natural sequence of their inability always to escape the savage assaults of these murderously-inclined beings who belong behind prison bars.

The New York State law may have answered well enough when the number of automobiles was small and their increase comparatively gradual, but the needs now call for a law which would compel the licensing of every person who sits at the wheel, with penalties severe and a cell in sight for those who trespass upon the rights of other occupants of the highways. A permanent revocation of license should follow a third offence, for this repeated disregard of the law would be proof sufficient that the guilty one was not a suitable person to be entrusted with the driving of an automobile.

And, furthermore, the automobile should carry identification marks which would insure prompt apprehension whenever its steersman violated the law knowingly. The miles-per-hour clause, however, should be eliminated from the statute, for its continuance in a drastic law unquestionably would bring injustice and unfair treatment to many whose only offence would be in exceeding ridiculously low speed limits without harming or endangering anyone.

New York State is a criterion for many other commonwealths, but its automobile law, for various reasons, has fallen behind the times, and the evidence of it painfully exists in the appalling list of accidents in the largest city of the country.

There is a temper which bodes ill for all users of the automobile in the Empire State, unless its State association comes forward with an amended law which shall make possible the punishment of the guilty and their permanent disappearance from the highways. Revocation of licenses and licenses for all drivers, with legible identification both day and night, will rid the highways of those who should not be at large, and will place these runners-amuck where they belong.

Some day the American Automobile Association will be successful in obtaining a uniform federal law that will apply to the whole country. In the meantime, each State will have to do its own regulating, and New York has lagged behind the procession, and, though it has been owing to an involved train of circumstances, behind this commonwealth is, and should be brought up to date in its automobile law.

WHAT OLYMPIA'S EXHIBIT SHOWS

At the great Olympia automobile show, which has just closed in London, and which might well be called *the* foreign show of the year, there was no sensation like last year. Then, it will be remembered that the now-famous Knight engine was brought forth with much rhetoric as to the future disposition of all other types, the scrap heap being the place for them according to the Knight.

After a year's trial, it may be said that the slide valve has held its own, that is, there has been some slight gain in the number of makers which have taken it up. The gain, however, was far from the predictions of the inventor. So, the scrap heap is a good ways off yet.

On the other hand noticeable gains have been made by many forms of construction, and these, too, of a nature which means lowered first cost, reduced upkeep, and greater simplicity. As exemplifying this may be cited the fact that the greatest gain of all was in the class of small cars, powered with four-cylinder engines of from 10 to 18 rating. Nearly all of these had all four cylinders cast in a block, thermo-syphon cooling, fan type of flywheel eliminating the forward fan, improved accessibility of all parts, more attention paid to carbureters and the carburetion problem, and a marked tendency toward the torpedo body even for but two passengers.

PALACE SHOW WILL HAVE 325 EXHIBITORS

NEARLY 325 exhibitors will be in their respective places when the doors of the Tenth International Automobile Show in the Grand Central Palace, New York, are thrown open for the private view at 3 o'clock on the last day of the old year. A better array of automobile and accessory exhibits was never gathered under one roof.

Among the big makers of automobiles who will be present at the Palace are: Premier, Maxwell, Ford, Reo, Stoddard-Dayton, Mitchell, Brush, Jackson, Mora, National and Marmon. The foreign cars will, as usual, be lined up with the Americans, and their ranks will include Panhard, C. G. V., Renault, Fiat, Delahaye, Delaunay-Belleville, Lancia, Clement-Bayard, De Dion, Isotta and Hotchkiss.

Altogether there are 84 exhibitors of automobiles, by far the greatest number ever shown before in New York. Of these 72 are American and 12 foreign. The foreign importers say that they will have the best exhibit of foreign cars ever before seen in this country. The European makers are rushing their 1910 models to completion, and some of them will be shipped to America within the next two weeks.

So great has been the demand for space by the accessory makers that every available square foot of floor space has been brought into play. One hundred and one of the biggest concerns, members of the Motor and Accessory Manufacturers, have been allotted space, and considerably over a hundred independent concerns have had their wants filled. There is no question in the minds of those who have followed the expansion of automobile shows that this is the greatest number of exhibitors ever housed in this country. A feature of the show will be the unusually large number of new makes which have never before been shown.

THE GARDEN VARIETY OF SHOW GIRL

In the search for an attractive poster for the Tenth National Automobile Show, which will be held in Madison Square Garden, New York, January 8 to 15, the managers have hit on one which is not half as bad as the usual run. Instead of the usual winged Mercury or other allegorical figure, the Garden poster is simply a typical American girl, clad in complete automobiling costume. The picture is in keeping with the plans of the committee to make the exhibition and everything connected with it truly national in character.

Madison Square Garden Show Girl

The poster was made by an artist, so it is said, and from a life study. According to the story, the model was a woman well known in automobiling circles, whose pictures have appeared in the trade columns more than once during the past year or two. Because she objected to having a full-face portrait made and would permit only a profile, the artist was much perplexed to find a pose that would take the place of the one he had planned. The young woman, who is something of an artist herself, solved the situation by striking a graceful posture that was immediately approved. She seems to be drawing the beholder's attention to the sign: "Tenth National Automobile Show."

The color scheme is built around the girl's long automobile cloak of brilliant scarlet, with flowing veil and the latest in automobile head-gear. She is expected to be known as "Miss Posy," not because of her attitude, but because she is the real Garden variety of show girl.

MONTREAL SHOW WILL INCLUDE 'PLANES

Montreal, Nov. 27—Montreal will have an automobile show just after the horse show, which would bring it in the week March 26 to April 2. The show will be held under the auspices of the Canadian Automobile and Aero Club. A new feature this year will be the exhibition of a number of dirigibles and aeroplanes. The decision to hold the show was reached at a meeting held recently, and further meetings will be necessary to decide on the details.

MANY CARS DEBUT AT DETROIT SHOW

Detroit, Nov. 29—From the standpoint of varied exhibits the forthcoming show under the auspices of the Detroit Auto Dealers' Association will have but two rivals, New York and Chicago. The Atlanta show set a strong pace in the matter of comprehensiveness, for there were but few less than fifty different makes of cars shown there; but Detroit has already passed this mark. With the show still a month away, fifty-two manufacturers have made application for space, either directly or through their agents.

Detroiters will be able to gain even more satisfaction from the show than has been the case in the past, for here will be shown the progress made during a twelvemonth in the hub of the automobile industry of the world. Last year twenty-six makes of cars were on exhibition. This year there will be more than that number of new ones alone. Cars that will be shown locally for the first time include the Lion, Krit, Warren-Detroit, Detroit-Dearborn, Paige-Detroit, Demot, Anhut, Parry, Paterson, Michigan, Hudson, Studebaker-Flanders, Everitt and VanDyke.

Manager Gillespie and his aides are already busy on the details. Contractor Buelow, who was responsible for last year's decorative efforts, is again in charge, and promises to eclipse all his previous records. The Wayne Hotel Gardens will again be utilized. Every available foot of space has already been taken by exhibitors; in fact, the demand was so great that the customary motorcycle exhibit had to be dispensed with.

DATE APPOINTED FOR HARTFORD SHOW

Hartford, Conn., Nov. 29—At a meeting of the Automobile Dealers' Association last week a permanent show committee for the season of 1910 was appointed, and the show dates were set at from February 14 to 19 inclusive. Fred W. Dart, E. G. Biddle and W. L. Ledger form the committee. Messrs. Dart and Biddle served on the show committee last year, and did good work, as did also Samuel A. Miner, the retired member. The committee has cast longing eyes at the new State arsenal and armory, but it seems to be a case of "nothing doing" here. Foot Guard Hall will therefore probably be the selection, this year as last, and plans for decoration are already under way. The last show was a beauty, from the decorative point of view, but the committee assures the dealers that the coming show will outstrip all previous efforts, both as to beauty and utilization of space.

Grand Forks, N. D.—This city is to have its first automobile show when the farming-implement men of North Dakota and Northwestern Minnesota meet for their annual convention during the first week of February.

TWO BUSY AUTO MAKERS IN ST. LOUIS

St. Louis, Nov. 26—The Dorris Motor Car Company has its plant well equipped wtih special machine tools and such jigs, fixtures, etc., as are characterized to afford interchangeable work, and according to President H. B. Krenning, of the company, the product for 1910 is placed and deliveries will be made on time. Dorris Cars, as they are to be placed in the hands of 1910 users, will have many little refinements, and the care with which the work is done, nearly every part being made in the Dorris shop, offers splendid assurance of satisfaction.

The Moon Motor Car Company, with a shop full of the latest and most capable machine tools, is pushing the work on the new model, which is a "Thirty." Attention is called to the road wheels, which are of special design, with spokes so shaped that they are not only capable of taking the load at the felloe, due to liberal bearing surfaces, but they are fashioned as the Indian's bow, to give at a certain point, the object being to prevent loosening up at the miter.

Among the parts-makers, the More-Jones Company, is now busy on a line of brass, bronze and aluminum castings for use in automobiles. It is the claim of the company that all its work will be up to a high standard, due to the use of new brass, selected aluminum (without scrap), and methods in the foundry that years of experience made possible.

The Medart Patent Pulley Company is specializing on automobile motor flywheels, and due to the character of the mixture used, as well as the process employed, it is found by experience of makers of automobiles who have tried this product, that the flywheels are up to a high standard. The facilities of the company are such that a considerable trade can be accommodated and deliveries are prompt.

The Maxwell-Briscoe Motor Vehicle Company is now located on Twelfth Street, between St. Charles and Olive. This location, in St. Louis, is regarded as advantageous by knowing ones, and "Maxwell," in a big electric sign, heralds the location to all who read.

The Anti-Selenite Company, manufacturers of carbon remover, has been succeeded by the Parham-Goudy Company, and is pushing out for business with its well-established product.

The Petrie-Phillips Company has just received the Parry demonstrating car and is rapidly filling demonstrating engagements, and from appearances, will put out all the cars of this make that can be assigned to this territory; the Parry car is attracting notice.

New London, Conn.—Carruthers & Keeney have opened the Thames garage at 123 Bank street, where they have the agency for the Mitchell. For Mitchell owners they have a proposition to keep cars oiled and adjusted for $5 a month; this includes grinding of valves when necessary, and a complete monthly inspection of the car.

PROSPERITY RULES IN INDIANAPOLIS

Indianapolis, Nov. 26—The Cole Motor Car Company has completed its plans to increase the 1910 output by 300 cars; this concern, due to skill displayed in meeting the wants of discriminating buyers, is finding it quite easy to dispose of all the cars it is in a position to produce, and it prefers to limit the output to that number of cars which can be built right.

The Diamond Chain Company, with largely increased facilities, is putting out more chain than ever, and in its attempt to maintain its high standard, offers aid, of a character which counts, to every user of sprocket wheels and chains, even to the extent of furnishing properly cut sprockets.

The Superior Machine Tool Company, of Kokoma, builder of milling machines, is now, according to Raymond Ruddell, president, preparing to build transmissions, of a high character, for makers of automobiles; details of the plan are well in hand.

NEW KRIT CAR, BUILT IN DETROIT

Detroit, Nov. 27—Though only incorporated two months ago, the Krit Motor Car Company is already established in its factory, with 25,000 square feet of floor space available, and is turning out cars. The company, which is capitalized at $100,000, has for president Claude S. Briggs, and W. S. Piggins, B. C. Laughlin and Kenneth Crittenden as secretary, treasurer and designer, respectively. The officers, together with Charles E. Kanter, F. J. Armstrong, P. F. Luyster, C. W. Whitston, William Reed-Hill, Thomas Harris and Hugh Barry are the directors.

The Krit is a roadster, of rakish lines, 22 horsepower and weighing only 1,250 pounds. The body is finished in a new and distinctive shade of burnt orange. It is low hung, with liberal leg room, and the steering column and levers are on the left side.

The motor has four cylinders, 3 3-4 by 4 inches, cast *en bloc*, and forms a single unit with the change-gear. The clutch is multiple-disc, running in oil. A Bosch high-tension magneto is furnished regularly. The front axle is a neatly designed I-beam, and the rear, being live, is ball bearing throughout. Two sets of internal-expanding brakes are provided. The wheelbase is 96 inches, and the tires 32 by 3. The car complete sells for $800.

NEW YORK TRADE NEATLY VICTIMIZED

Already feeling the Christmas spirit, a number of tradesmen along New York's automobile row responded generously to the appeals of an alleged Western Union messenger boy for donations to the "messenger boys' holiday fund." The fraud was detected hv A. K. Ainlay, manager of the Western Union office at 1771 Broadway, and a general warning has been issued. The offender is described as short and thick-set, about thirty years old, and using the name of James Collins. He is believed to have got away with $180 of the row's hard-earned money.

Four of the Maxwell-Briscoe Motor Company's Busy Plants Grouped Together Show Magnitude

Stearns Landaulet of the 15-30 Model on a Picturesque Road Near Cleveland

The body, of the combination limousine-landaulet type, is one that has found favor through its roominess and elegant appearance. The photograph also shows the demountable rims which are now stock equipment

Auto Carries Telephone—In a reliability run between San Antonio and Dallas, Tex., D. A. Walker, the president of a local telephone company, was among the entrants, and his car, a Rambler, carried a portable telephone. By means of a long fishing pole with a hook at the end, Mr. Walker was able at any time to make connection with "central," and talk from the instrument in his car. Points ahead were kept informed of the progress of the cars in the run, and in case of break-down messages to bring assistance were sent. One day arrangements were made for the Governor of Texas to be entertained by the tourists.

Trip of Inter-State "Bulldog"—An Inter-State car reached Syracuse, N. Y., Wednesday afternoon after a thousand-mile run from the factory at Muncie, Ind. Fred Fisher drove the car, and the rest of the party was composed of Mr. and Mrs. George J. Arnold, Miss Marion Coogan and Harry S. Brockway. As a result of the trip the George J. Arnold Company has placed an order for 150 Inter-State cars to sell in this district. Frightful road conditions were encountered in Indiana and Ohio, and near Bucyrus the car became so badly bogged that boards had to be used.

Franklin to Run a Garage—The H. H. Franklin Mfg. Co. has leased the former Crosby garage at Montgomery and Water streets, Syracuse, N. Y., which will be used for repair purposes and the display of second-hand cars. The building has three floors, equipped with the most modern machinery and electric power, with a two-ton elevator. It is stated by officers of the company that this is the forerunner of a model garage and show-room which will be erected later. It will contain the offices of the selling force of the Syracuse branch and will be open for business in two weeks.

First Badger Appears—The Badger Motor Car Company, of Columbus, Wis., on Thanksgiving Day shipped its first finished product, a four-cylinder, 30-horsepower Badger, to Webb, Jay & Company, Michigan avenue, Chicago. The company expects to be turning out fifteen or twenty cars a week as soon as its new factory is completed. Considerable difficulty has been encountered in obtaining material promptly. The Badger is finished in Brewster green, with dark-red running gear.

Federal Rubber's Capital—The Federal Rubber Company, of Cudahy, Wis., has increased its capital to $620,000, all paid in, and is contemplating a further increase to $750,000 by January 1. A new building has been completed and put in operation which has a capacity of 250 tires and 500 inner tubes a day. The factory is running till 9 p. m. in all departments. Agencies have been opened in Atlanta, Ga., with the Dunham Rubber Company, in St. Louis with the Phœnix Auto Supply Company, and in Kansas City, Mo., with the Motor Tire & Supply Company.

Atlanta Trophy in New York—The $10,000 City of Atlanta trophy, which was won by Louis Disbrow on his Rainier, has arrived in New York and is on exhibition at the Rainier showrooms, Sixty-fourth street and Broadway. The trophy is of gold and stands 30 inches high. Disbrow's Rainier made the 200 miles necessary to win the trophy in 173 minutes at the rate of 69.4 miles an hour. The car did not make a single stop, but reeled off lap after lap without varying five seconds.

To Make Magnetos—The Whelchel Electric Company, of Anderson, Ind., was organized August 20 to make medium-priced magnetos, and the company's product is just appearing on the market. Bert Whelchel, who has been engaged in magneto manufacturing for seven years, is president of the company. John W. Jones, A. S. McCall and John Rickes, all prominent business men of Anderson, are vice-president, secretary and treasurer respectively. The company has secured a plant at the corner of Third and John streets.

Auto-Car Now Atterbury—The Auto-Car Mfg. Co., of Buffalo, N. Y., one of the oldest builders of commercial cars in America, has changed its name to the Atterbury Motor Car Company. The company's product will continue to be known as the "Buffalo" cars. One object of the change was to avoid the confusion of names with the Autocar Company, of Ardmore, Pa. The Atterbury catalog is now out, showing a complete line of gasoline and electric commercial vehicles.

"Pop" Lowe Sells Midlands—The agency for Midland cars in New England has been taken by the Henderson-Lowe Company, of 117 Massachusetts avenue. This company is composed of Dr. Chas. R. Henderson, who is well known in and around Boston as an automobile enthusiast, and George H. Lowe, familiarly known as "Pop" Lowe. Mr. Lowe has been in the automobile trade for many years, and will have the active charge of the management.

Heating System of Milwaukeean—The new $500,000 plant of the A. O. Smith Company at Milwaukee, Wis., where pressed steel frames and other parts are made, will be heated by a new system invented by Jesse C. Coogan, of Milwaukee. The exhaust from the gas engines in the power plant will be conducted through the factory into radiators filled with water. The system is being installed in several other factories in different parts of the country.

New Muskegon, Mich., Company—The Henry Motor Car Company has been organized at Muskegon, Mich., to take over the business of the Gary Taxicab Company, formerly of Chicago. It is capitalized at $200,000. D. W. Henry, the general manager, says that the company will make for the coming season a thousand cars to sell at from $1,600 to $1,700. A factory building, 110 by 550 feet, has been completed, and deliveries are expected to begin January 1.

Automobile Garage Located Under the Bleachers of a Baseball Park

The new Pittsburg branch of the Studebaker Company is built directly under the seats of Forbes Field, the home grounds of the world's champion Pirates. Naturally much business is done with the Pittsburg fans

"High Wheel" Now "Muncie"—The High Wheel Auto Parts Company has changed its name to the Muncie Gear Works, as the old name proved misleading. In addition to parts for high-wheelers, the company makes differentials, steering and change-gears for standard-type automobiles. The company continues in its former location at Muncie, Ind., with H. L. Warner as manager.

Ferro Foundry Banquet—The Ferro Machine & Foundry Company gave a banquet to its foundry organization to celebrate a record of 1,100 castings a day, which is thought to be a noteworthy feat. The company has built an entirely new machine shop and a new core room, and has enlarged other departments; the working force has been increased from 700 to 1,100 men.

American Trucks Abroad—There seems to be quite a demand for American-built commercial cars abroad. The Grabowsky Power Wagon Company, of Detroit, reports the sale recently of three Grabowsky sight-seeing or passenger cars in Corunna, Spain, and says there are a number of other prospects which may be favorably closed up soon.

Wright 'Planes in Germany—Wrights, Ltd., Berlin, are busy turning out aeroplanes at the works at Reineckendorf, which will be extended as soon as occasion permits. The motors are being manufactured at various German plants, an order for ten having been placed with the Neue Automobil Gesellschaft at Marienfeld.

Meteor Plant Sold—The Bettendorf Axle Company has bought the factory and land of the Meteor Motor Car Company in Bettendorf, a suburb of Davenport, Ia. The building, which was badly damaged in a fire last Summer, will be used temporarily for storage purposes.

IN AND ABOUT THE AGENCIES

Speedwell Agencies—George L. Baker, sales manager of the Speedwell Motor Car Company, of Dayton, O., has secured the following agencies: The Speedwell Company of Cincinnati, 228 East Sixth street, Cincinnati; Electric Construction & Motor Company, Findlay, O.; Central Motor Company, Hamilton, O.; Canton Motor Car Company, Canton, O.; S. Siegert & Sons, Coshocton, O.; Park Motor Car Co., 10215 Superior avenue, Cleveland, O.; Kimmel Bros., 170 North Fourth street, Columbus, O.; Frank Hilt, Tenth and Madison streets, Toledo, O.

Continental Tires, Los Angeles, Cal.—The Continental Caoutchouc Company has arranged for an agency in Los Angeles, Cal. This will be in charge of the E. A. Featherstone Company, 1018 South Main street. The territory will include Southern Colorado, Arizona and a portion of Nevada.

Palmer-Singer, Detroit—The Palmer-Singer will in the future be represented in Detroit by the Bemb Motor Sales Company, which was recently organized. Walter Bemb, who for many years has been connected with the J. H. Brady Company, is general manager.

Rainier, Georgia and Alabama—Paul N. Lineberger, vice-president of the Rainier Motor Car Company, announces the appointment of W. H. Johnston and H. H. Tift as Rainier agents for the States of Alabama and Georgia, respectively, with headquarters at Birmingham and Atlanta.

"Times Square," Philadelphia—The Times Square Automobile Company, of New York, which deals in second-hand automobiles, has opened its fifth branch house, this one in Philadelphia, at 238 North Broad street. The show rooms and repair shop have some 9,000 sq. ft.

Ford, Pittsburg—The Ford Motor Company has opened temporary branch headquarters in the Rittenhouse block on North Highland avenue, with F. E. Weir as local manager, and is seeking a permanent location.

Premier, Reo and Sterling, Pittsburg—The Premier Sales Company, Ltd., which handles the Premier, Reo and Sterling cars, moved December 1 to its new garage at Beatty and Mignonette streets, East End.

Buick, Syracuse, N. Y.—Strait & Shaw have succeeded to the business of the Syracuse branch of the Buick Motor Company, at 223 West Genesee street, with seven counties in central New York as their territory.

Studebaker, Warren, O.—Vanwye and Hitchcock, of Warren, O., doing business under the title of the Hitchcock Motor Company, have secured the agency for the Studebaker cars in Trumbull County, O.

Mercer, Philadelphia—Frank Fanning has secured the Quaker City agency for the Mercer, built by the Mercer Automobile Company, of Trenton, N. J., and is looking for a "row" location.

Hupmobile, Houston, Tex.—J. F. Sigmond has been appointed agent for the Hupmobile, and for the present will be at the Palace Automobile, Company, Rusk and Louisiana streets.

Stoddard-Dayton, Chicago—The McDuffee Company, Chicago, agent for the Stoddard-Dayton, will remove December 1 to a new building at Twenty-third street and Michigan avenue.

Cole and Paige-Detroit, Philadelphia—The Colt-Stratton Company will within a few days establish an agency in Philadelphia to handle the Cole and the Paige-Detroit.

Austin, Atlanta, Ga.—The Atlanta Motor Agency, of 91 North Pryor street, has been appointed local representative for the Austin, manufactured in Grand Rapids, Mich.

Pullman, Philadelphia—While awaiting completion of its building at 257 North Broad street, the Longstreth Company has opened an office at 912 Chestnut street.

Courier, Philadelphia—The Stoddard-Dayton Company, of Philadelphia, has contracted to handle another Dayton product, the new Courier.

Parry, Philadelphia—The Continental Motor Car Company, agent for the Speedwell, will also represent the Parry in Philadelphia.

PERSONAL TRADE MENTION

S. L. Nicholson has been appointed general sales manager of the Westinghouse Electric & Mfg. Co., with direct charge over the sales policy of the entire company. He has been with the company for 11 years, in various capacities.

A. B. Cordner, formerly the head of the A. B. Cordner Motor Car Company, has been appointed New York manager of the Rapid Motor Vehicle Company, and will open an office at Broadway and 64th street this week.

"Billy" Crawford, known in Philadelphia through his work in various endurance runs, in which he drove Franklins and Cadillacs, has signed with the sales force of the Jackson Motor Company.

Eugene R. Mertens, for eleven years associated with the Columbia Motor Car Company and the Electric Vehicle Company, has left for Detroit, where he will continue in the industry.

"Wally" Owen, who drove the Rainier No. 8 in the last Brighton 24-hour race, has signed a contract to sell Rainier cars at the Rainier New York branch, Sixty-fourth street and Broadway.

Frank F. Weston is now manager of the automobile parts department of the U. T. Hungerford Brass & Copper Company, of New York, which makes novelties in brass and copper.

G. Brewer Griffin is now manager of the detail and supply department of the Westinghouse Electric & Mfg. Co., of which he has been assistant manager for six years past.

A. N. Bentley has been made manager of the Southern sales office of the Electric Storage Battery Company, of Philadelphia, in place of H. H. Seaman, resigned.

Charles Robbins, who for several years has been in the industrial motor section of the Westinghouse Electric & Mfg. Co., has been appointed manager of this dept.

GOODYEAR CONTROLS DOOLITTLE RIM

AKRON, O., Nov. 27—The Goodyear Tire & Rubber Company has secured the exclusive American rights to sell the Doolittle demountable-detachable rims, which have shown up well in several racing events of the past season. It is said that during one of the Brighton Beach 24-hour races, in which two cars were equipped with these rims, 54 tire changes were made, some of them taking as little as 28 seconds.

The feature of this rim, which is the invention of Dr. Perry E. Doolittle, of Toronto, is the ease with which tires can be changed on it; an advantage not often found in connection with a demountable rim. The steel rim proper is divided at one point, and is arranged to be expanded or contracted by means of turnbuckles, the first operation removing the rim from the wheel and the second removing the tire from the rim.

As a result of its investigations the Goodyear Company concluded to adopt the Doolittle rim. Negotiations have been finally completed, and within a few days the rims will be on sale at all the Goodyear branches and agencies. Demonstrating wheels are being prepared to show the operation of the rim. The Goodyear Company will also exhibit the rim at all the shows this winter.

RETIREMENT OF W. HILDRETH

CHICAGO, Nov. 27—After seven years of close application to business as vice-president and manager of the Holsman Automobile Company, W. Hildreth has resigned to take a long-deferred vacation. He expects to spend several months in travel and recreation before taking up business again.

Mr. Hildreth's retirement was the occasion of a farewell banquet given at the Chicago Automobile Club to the directors and office employees of the Holsman Automobile Company last Monday. In the photograph Mr. Hildreth is seen at the head of the table, with Mr. Holsman at his right hand.

Seven years ago Mr. Hildreth helped organize the Holsman Automobile Company, and has been its vice-president and general manager ever since. He has always been a firm believer in hill-climbs and reliability runs, and has entered machines in them whenever possible; he has also been a strong advocate of advertising. As a member of the ways and means committee of the Chicago Association of Commerce he was a delegate to the National Tariff Commission convention in Indianapolis, and served on the "foreign trade" and "automobile" committees of the same body. Mr. Hildreth has always carried membership in the various automobile clubs and trade associations.

ANOTHER SYRACUSE, N. Y., FACTORY

SYRACUSE, N. Y., Nov. 27—Unless some unanticipated hitch occurs in the final construction work or the installation of machinery, the new automobile factory, built by Harvey A. Meyer at Wolf and Park streets, will start operations with 100 men soon after January 1. Mr. Meyer has planned to market 200 automobiles next year, and the working force will be increased by degrees with that end in view. The site and buildings involve an investment of $50,000.

The main building is 150 by 60 feet, four stories high, and the smaller one 117 by 30 feet, one story high. Both are of brick and modern in every way. Mr. Moyer has some vacant property adjoining which may be used in the future for more buildings.

NEW CAR TO BURN KEROSENE

DAYTON, O., Nov. 29—Business men here are forming a new concern known as the Kero-Car Motor Company to build an automobile driven, as the name indicates, by a kerosene engine. The new engine is said not to be a freak, either in appearance or operation, closely resembling the standard automobile engine. It will burn, however, either gasoline, kerosene or alcohol.

Farewell Banquet Given by Manager Hildreth to Holsman Office Staff

Information for Auto Users

U. & H. Dual Ignition System—In connection with the latest U. & H. magneto intended for dual ignition, as imported by the J. S. Bretz Company, a coil box and switch for the battery circuit is furnished, to be mounted on the dash. With this magneto practically two systems of ignition are secured. Both use the same set of plugs, thus simplifying the wiring and avoiding the fouling of the idle set, which often occurs when two sets are used.

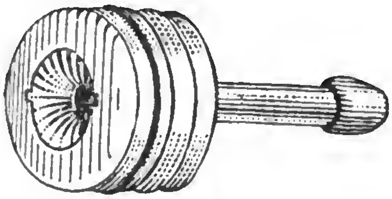
The magneto, like all U. & H. magnetos, is of the true high-tension type; the coil is used only in the battery circuit. The battery timer is incorporated in the magneto, as an integral part. The distributor handles both magneto and battery current, and is of a type which

NEW U. & H. COIL BOX AND SWITCH

prevents the burning of the insulation by sparks playing across when an attempt is made to start the motor on the spark.

The magneto is furnished with the regular U. & H. design circuit-breaker, which is said to require no adjustment, and with the U. & H. timing-pin device, by means of which the magneto is set in correct relation with the motor when first being attached, preventing any likelihood of error in this little understood operation. The magneto shafts are mounted on ball-bearings. This dual system is particularly valuable for motors which are too large to be easily cranked for starting, allowing as it does the motor to be started on the spark even after stops of considerable length.

New Pump Attachment—The lack of universality in pump attachments has at various times been the cause of much confusion, not to say profanity. This trouble will be obviated by a new device just placed on the market by H. K. Austin & Company, Reading, Mass. It is called a patent flexible coupling, from the fact that it is used to couple the pump to the valve of the tire to be inflated. The construction is such that it

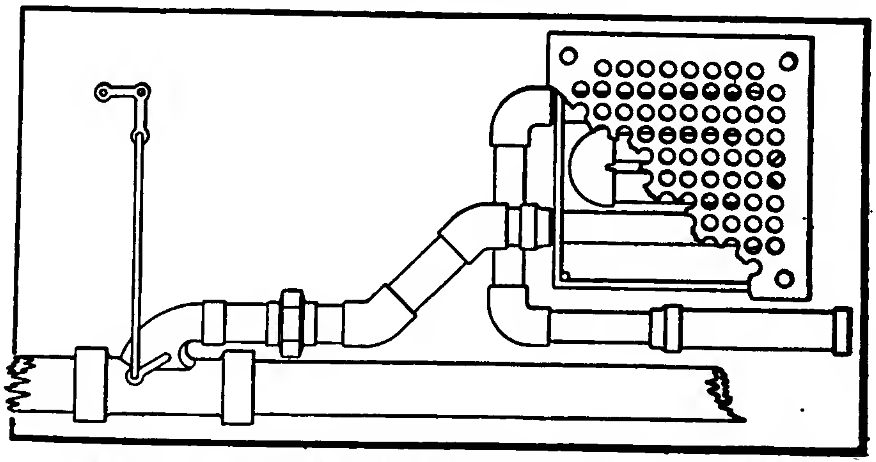

AUSTIN FLEXIBLE PUMP COUPLING

fits all tire valves, and may be used with any make or size of pump. This makes it universal in two ways. This universality is obtained by the use of a rubber nipple, which has a peculiar opening through it. The outer end of this nipple has a rounded or beveled hole leading to an interior hole of apparently one size. This is not the case, however, as the inside expands again, forming a Venturi-shaped interior chamber. Beyond this the aperture is of one diameter through the rubber and the brass cap holding it. The object of the expanded chamber and peculiar shape of the interior is twofold. First, it slips over the tire valve readily, and, second, it not only grasps the latter tightly, but in locking over it the hole is constricted so that air may not escape through it. In this way, if the tire valve was leaking, the sides of the air chamber would lock and hold the air.

New Light Type Front Axle—To go with the light weight rear axle, suited to the lightest types of cars, and described in these columns recently, the Long Arm System Company, Cleveland, have brought out a front axle of similar light weight which incorporates a number of most excellent features. This, as the cut shows, is forged up in a single piece with the spring seats forged integrally. The latter are given a broad space for the spring to rest upon. The thrust of road shocks is well taken up by this construction, while the load stresses are sustained by a single ball of very large diameter. Though shown with ball bearings, this axle may be had with rollers or any form of bearings preferred. The reach rod is placed in the rear of the axle to protect it from inequalities of the road, but on special order they may be had, without additional expense, placed at the front.

"American" Auto-Heater—This is a device for heating the car in Winter by the exhaust gases. It consists of a receptacle 10 inches square by 3 inches deep, fitted in the floor of the car, which contains a coil of radiating tubes. One end of the coil connects to the exhaust pipe, in front of the muffler; a valve is provided which is clamped over a small hole cut in the pipe, without disturbing the fixtures at either end. The valve flap which, when the device is out of use, covers the opening into the coil, swings down into the main exhaust pipe when opened, so as to deflect more or less of the gases into the coil. The other end of the coil has a small muffler to deaden any sound. The heater valve is operated by means of a small hickey which is usually placed on the riser of the front seat.

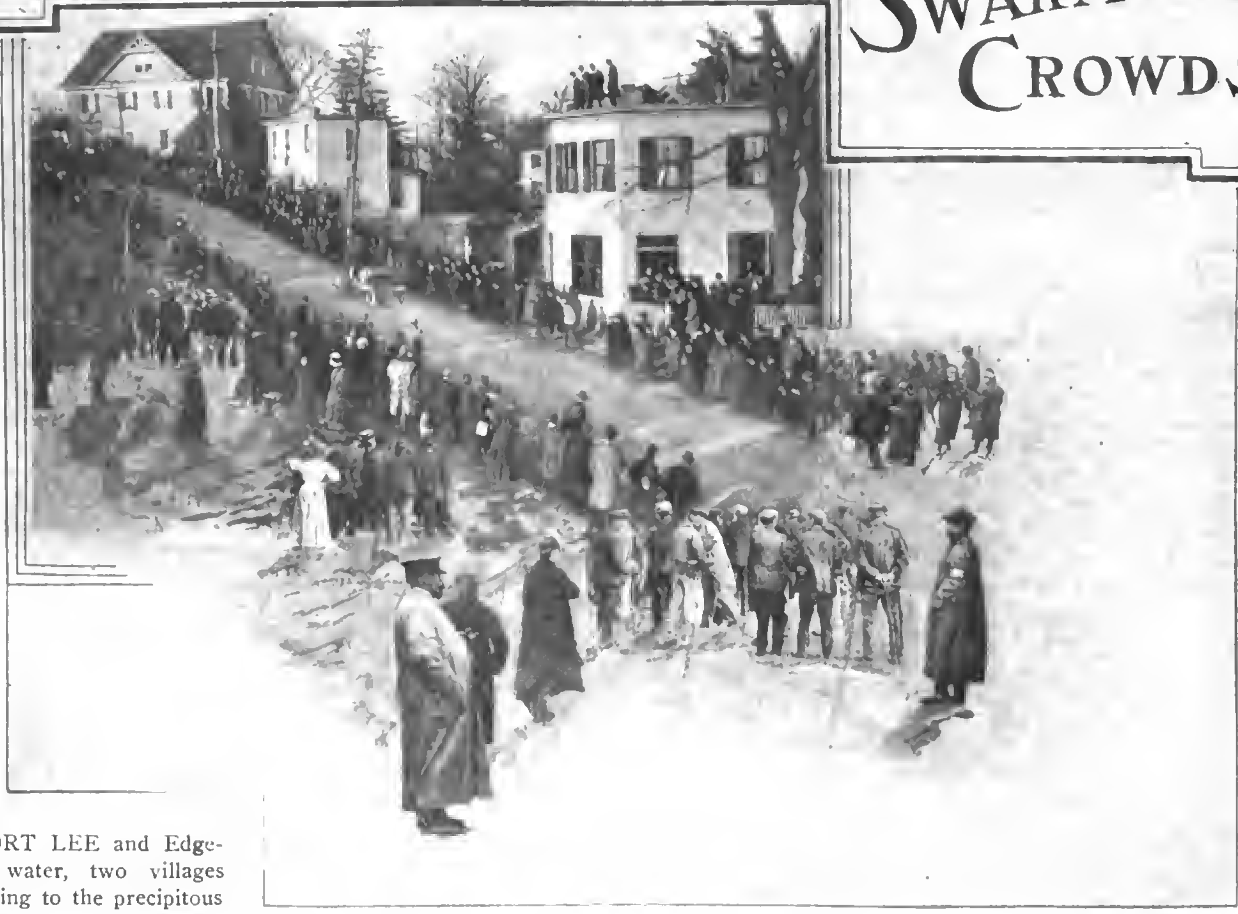
In any of the closed types of automobile bodies the temperature in zero weather can be brought up to 70 degrees in a few minutes. In an open car, of course, the heat is not so well retained, but by keeping the heater constantly turned on the car can be made quite comfortable. The heater is sold by Flavius C. W. Sudrow, 15 West Swan street, Buffalo, N. Y.


AMERICAN CAR HEATER FOR USE IN WINTER UTILIZES EXHAUST GASES

VOL. XXI NEW YORK—THURSDAY, DECEMBER 9, 1909—CHICAGO NO. 24

THE AUTOMOBILE

FORT LEE'S CLIMB ENDED BY SWARMING CROWDS



FORT LEE and Edgewater, two villages clinging to the precipitous slopes of the Palisades opposite up-town New York, made their appearance on the automobile map last Saturday. The steep and winding road between them, some seven-tenths of a mile in length, proved the best hill-climb course that has yet been discovered on the lower Hudson. Unfortunately, the haphazard management was unable to obtain the exclusive use of the course, and the unruly crowds forced the calling of the event before the higher-powered cars could show their mettle.

When the contest was started, the hill was crowded with spectators attracted by the alluring press notices sent out from the office of the promoter, and also by the clear Winter afternoon which invited outdoor exercise. These spectators were all over the road, and of course in plenty at the most dangerous turns. In such numbers did they overspread the course that those whose business it is to attend automobile races freely predicted a serious accident before the competition concluded. There was slight attempt to keep people off the road, and every car, in climbing the grade, passed through lanes of humanity apparently wholly unconscious of danger.

The hill is a public highway, and there was no way of preventing those who desired to use the road; the contestants say they were told that the hill would be closed to traffic during the contests. It was a foregone conclusion soon after the start that the events could not be completed before dark. Interspersed with the climbing drivers of horse-wagons would come along, and knowing their rights, would insist on going up or down the road. Then everything would come to a standstill until the course had become clear again.

One saving feature of the afternoon was the ingenious time arrangement devised by C. H. Warner, of the Warner Instrument Company. This mechanism automatically indicated the start and finish of each car, and without it, it would have been impossible to time accurately the few cars that did go up the hill.

One driver, after waiting around for several hours, voiced the

Ford, Winner of the Smallest Class, Took the "S" Turn at Speed

On the other side of the road steep slopes led down to the Hudson, glittering under a brilliant Winter sun. From across the river the dwellers in the big apartment houses which line the crest of Washington Heights might have watched the scene through field glasses.

Above the starting line the road swings away from the river into a deep ravine which leads it toward the top of the Palisades. Here a dangerous S-turn, bordered by a stone wall, gave zest to the competition. The grade of this part of the course was said to be 12 per cent. High banks on each side offered vantage points to several thousand spectators, and here and there were perched automobiles, which had made their way to apparently inaccessible crags.

opinion of the rest of the contestants when he said: "I have contributed my last dollar to this sort of thing; they are all alike, no head nor tail. Get the entrance money, and let your friends do the rest. I'm through."

Of the thirty-five cars, including the delivery wagons and trucks, which made timed trials over the course, the National with Kincaid at the wheel was easily the star. The red and black machine, in touring trim, made the ascent in 56.57, the only time recorded under the minute mark for any of the four-wheelers. Chappelle, however, on a little Indian motorcycle, secured a record of 50.15. With the big Fiat and the Simplex trio eliminated by the early close of the competition, the most interesting climbs were undoubtedly those of the commercial cars, which went up loaded to their full capacity. The composition of the loads ranged from pig-iron to pianos.

New York Trade Well Represented—Although held in New Jersey, a good half of the spectators, both *en auto* and on foot, crossed over from the big city opposite via the Edgewater ferry, which plies between One Hundred and Thirtieth street, just above Grant's Tomb, and the village of Edgewater. The salesrooms on "Automobile Row," which nowadays is all Broadway, between Times Square and Seventy-second street, closed their doors early, and their population led the general exodus.

Half a mile north of the ferry house at Edgewater the timers for the start set up their apparatus. The timers' box was a vacant lot, marked off from the road by a wall of rough stone. Finally the road takes a sharp right-angled turn, on a grade of 20 per cent., and leads into the main street of Fort Lee. Fifty yards further on the officials watching the finish line had established themselves on the front porch of Dr. Hueger's residence.

The road surface, of macadam, was generally in good condition. The only noticeable bad spots were at the turn just before the finish line. These might have troubled the big cars, but made little difference to the lighter ones.

Seventy Entries Made Good—The scene just below the starting line left little doubt that the promoters' claim of seventy entries had been fulfilled. The only place for the contestants to line up was the road, by no means capacious. By 1 o'clock, the available margin had been pre-empted by a double line of cars, and the few policemen were hard put to it to maintain a passage for traffic. The big Fiat, which was to have been piloted by Frederick K. Burnham, was the center of attraction. The lifting of the hood over its engine quickly drew a crowd.

The commercial cars turned out in good number, and divided attention with the stripped racers. The Walter truck had four pianos on board, but declined to provide any music. The American was loaded with sugar in barrels, and the two Couple-Gears carried huge crates, supposed to contain furniture, the size of small houses. The operation of the latter was the cause of much speculation, as the driver had at his side a contrivance exactly resembling the controller-box of an electric trolley car. As a matter of fact, these cars were driven by gasoline engines, connected to dynamos; the electric current thus generated runs motors located one in each wheel of the cars.

There was one newcomer which even the denizens of automobile row failed to recognize; it turned out to be the Simons, a one-ton steamer but recently put on the market.

Motorcyclist Bumped a Wall—The motorcycles led off, and put up some fast times. Goerke, on an Indian, was spilled at the final turn, and lost a pedal off his machine. A few minutes later Kledes, on a Reading Standard, came up at a fast clip—so fast, indeed, that he could not get around the turn, and shot off at a tangent. The crowd scattered just in time, and Kledes went head-on into the stone foundation wall of a house on the opposite corner. He managed to slip backward off the machine just before it struck, and escaped with a bad shaking-up. His

Cameron Featherweight On the Stretch Before the Final Turn machine smashed a section of sewer pipe which was lying against the wall, and this probably helped to break the shock.

The commercial cars were the first of the four-wheelers to tackle the climb. Their progress was naturally slow, but by no means uninteresting, as few of the spectators had ever before seen such a demonstration of weight-carrying ability. Owing to some blunder on the part of the starting officials, the Renault and Buick got off at close intervals, and had a neck-and-neck race. The Buick finally caught up and passed the Frenchman just below the final turn. As the timing device could not handle more than one machine at a time, the Buick alone was clocked. Its figure of 2:34.48 turned out to be low enough to win. The Simons, in the same class, was slow on the lower part of the hill, but finished in good shape. For some reason its time, too, was not forthcoming.

Kincaid, Whose National Made the Record, on the Final Turn

The Walter, American, and two Couple-Gears furnished good competition in the heavyweight class, although the former was an easy winner in little more than half the time of the runner-up, the American. The last Couple-Gear was steaming badly at the finish.

Little Cars Made Good Time—Owing to the lateness of the start, it was 2:20 o'clock before the first pleasure cars got their signals. The Ford, driven by J. J. Berthoff, was first away, and its quick dash up the course showed everyone that it was a dangerous competitor. It took the final turn so fast that its outer front wheel could be seen to bend under the strain, yet the car held the road with scarce the semblance of a skid. F. F. Cameron then took up his little air-cooled namesake, but could not equal the Ford's mark of 1:07.15. The Empire apparently went the whole distance on middle gear, and was half a minute slower.

Cameron tried again in the next higher class, and clipped six seconds off his former time, which proved good enough to win. Easter, the featherweight of the drivers present, brought a Buick in second, and Ainslie placed his Hudson with a run in 1:16.20.

After the Auburn and Petrel had made consistent, though not particularly fast runs, Arthur Warren driving a Buick 30 made a dash up in 1:02.70. He skidded badly on the final turn, and gave the spectators assembled there a fright that sent them tumbling back in confusion. Another member of the Warren family drove a Selden into second place, and two Pullmans got the next berths.

In the stripped chassis class four Lancias got a corner on the good places, and crowded the Nagant, a newcomer to the metropolitan market, into fifth position. The little Italians all made good runs. F. Strobel turned out to be the winner. Harry Fosdick was the slowest, and in accordance with an ante-race agreement was forced to set up the dinner for the other members of the team.

Kincaid Set the Best Mark—James Westervelt, with a Knox, was the leader-off in the $2,001-$3,000 class, but could not place himself. Tom Kincaid, the next up, electrified the crowds with a dash that was clocked in 56.57. His driving was the prettiest performance of the day, and he seemed to be able to hold his car on the road no matter how great the speed or how sharp the turn. After several slower machines had made the climb, Richard Carter with a Selden and Frank Hurmance with another National made trials which netted them third and second places respectively.

During the progress of the meet conditions had been steadily getting worse. The police force was entirely inadequate to hold the crowds in check. At the final turn into Main street, Fort Lee, two lone policemen attempted in vain to keep spectators from invading the road. To add to the confusion at this point, two men from the lighting company attempted to replace a carbon in an arc-light suspended over the middle of the course. After several ineffectual attempts, they broke the globe of the light and scattered fragments of glass on every side.

Drivers of trucks and wagons insisted on crossing and traveling up and down the course from time to time, often narrowly escaping collision with the competing cars. Between nearly every trial one or more non-competing cars would attempt the climb. When the turn of the fast cars came, therefore, Referee A. H. Whiting and Alden McMurtry of the Technical Board decided that it would be courting danger to allow them to start, and the climb was accordingly declared off.

As soon as this decision was announced a dozen of the cars which had been waiting their turns began a mad free-for-all scramble and accidents were narrowly averted. Summary follows:

Confusion Reigned Supreme at the Starting Line in Edgewater

Couple-Gear Gasoline-Electric Three-Ton Truck—Loaded

Car and Driver.	H.P.	Time.
GASOLINE STOCK CARS, SELLING AT $850 OR LESS		
Ford, J. J. Berthoff	20	1:07 15-100
Cameron, F. F. Cameron	24	1:14 60-100
Empire, E. C. Walker	20	1:46 60-100
GASOLINE STOCK CARS, SELLING AT $851 TO $1,250		
Cameron, F. F. Cameron	24	1:08 83-100
Buick, E. C. Easter	18	1:13 31-100
Hudson, G. Ainslie	20	1:16 20-100
Cartercar, A. E. Bloom	22	1:17 20-100
Hudson, R. W. Fulcher	20	1:18 11-100
Maxwell, ——	—	1:31 20-100
GASOLINE STOCK CARS, SELLING AT $1,251 TO $2,000		
Buick, A. Warren	30	1:02 70-100
Selden, L. Warren	36	1:10 30-100
Pullman, McIntyre	—	1:11 42-100
Pullman, F. Cimiotti	30	1:16 70-100
Auburn, J. J. Myer	35	1:22 40-100
Petrel, H. H. Boyce	30	1:27 60-100
STOCK CHASSIS, 300 CUBIC INCHES PISTON DISPLACEMENT OR LESS		
Lancia, F. Strobel	20	1:06 1-100
Lancia, W. M. Hilliard	20	1:11 53-100
Lancia, C. H. Tangeman	20	1:15 27-100
Lancia, Harry Fosdick	20	1:20 12-100
Nagant, Stuart Otto	24	1:29 48-100
COMMERCIAL MOTOR VEHICLES		
A, Delivery Wagons Up to One Ton Capacity (Net); B, Truck, Up to Two Tons (Net); C, Trucks, Three Tons or Over (Net).		
Wagon—Class A		
Buick, E. H. Taylor	20	2:34 48-100
Trucks—Class B		
Walter, E. Walter	24	2:56 26-100
American, A. Defrietas	55	5:15 27-100
Couple Gear, Howard Green	40	6:15 98-100
Trucks—Class C		
Couple Gear, H. C. Murch	—	10:59 92-100
GASOLINE STOCK CARS, $2,001 TO $3,000		
National, T. Kincaid	40	0:56 57-100
National, F. Hurmance	35	1:08 97-100
Selden, R. Carter	36	1:12 10-100
Pope-H., J. E. Blakeslee	40	1:13 27-100
Grout, P. H. Johnson	40	1:20 22-100
Knox, J. Westervelt	38	1:26 90-100
Walter, W. Walter	24	1:43 50-100
GASOLINE STOCK CARS, $3,001 TO $4,000		
American, L. C. Howard	40	1:04 47-100

AGAIN SAVANNAH

Savannah, Ga., Dec. 6—Savannahians feel so confident now of having another big race that the convicts are being put to work to put the course in better condition. If another race is held a whole new course will be found here, and much faster time will be possible. Instead of having twenty odd turns only seven are now to be found. The lengthening of Ferguson avenue straightaway to LaRoache avenue offers a five mile stretch. This also allows the worst turns of the old course, at Isle of Hope, to be done away with. Then the loops around the County farm will be eliminated and some of the curves in Whitefield avenue will be cut out, making this practically a straightaway, while an even more radical change than any other will be in leaving out the White Bluff road and using Waters road instead. The change will shorten the course from twenty-five miles to eighteen or twenty miles, which is long enough.

It has been decided by the Savannah Automobile Club to have the endurance run to Jacksonville the latter part of next March. The Jacksonville club and a local paper will cover that end of the run. It has also been decided to run to Columbia, S. C.

WORCESTER WILL HAVE WINTER RUN

Worcester, Mass., Dec. 6—The date of the second annual endurance run of the Worcester Automobile Club has been fixed as December 17. The rules will be substantially the same as last year, which called for five runs of about 40 miles each over rough and hilly Massachusetts roads.

Penalties are imposed for lateness at the Worcester control, for road repairs, adjustments or replacements, and for the repairs necessary, as judged by the Technical Committee, to put the car in perfect condition after the finish of the run.

AWARDS IN FLORIDA ENDURANCE RUN

Tampa, Fla., Dec. 4—The contest committee of the Tampa *Times* has officially announced the winners in the recent Tampa-Jacksonville-Tampa endurance run. First prize in the touring class goes to Mr. Williams, who drove an E. M. F., and second prize to Perry G. Wall, Chalmers-Detroit. In the baby tonneau class Dr. J. S. Helms with a Premier won the first prize, and Henry E. Snow, Chalmers-Detroit, the second. Ambrose Davis and V. A. James, with Maxwells, took the runabout prizes.

REPUBLIC CO. LICENSED BY SWINEHART

Youngstown, O., Dec. 6—The Republic Rubber Company, of this city, has taken out a license to make crosswire truck tires under the patents of B. C. Swinehart. These tires will be made in all sizes, and will be fitted to the wheels by clincher side flanges bolted on. This will permit a driver to change tires in a few minutes, without the use of special tools. B. C. Swinehart, formerly vice-president of the Swinehart Company, will take charge of the Republic Company's new truck tire department.

Where the Timers Officiated at the Finish Line, Fort Lee

James J. Jeffries and Carl Fisher Took a Spin Around the Indianapolis Speedway in the Latter's Stoddard

INDIANAPOLIS SPEEDWAY NOW READY FOR ITS REOPENING

INDIANAPOLIS, IND., Dec. 6—The initial meet over the new brick course of the Indianapolis Motor Speedway will be held December 17-18. Sanction has already been granted for the meet by the A. A. A., and plans for the program are progressing and will be completed this week.

It is expected that the brick pavement will be completed Wednesday or Thursday of this week, and after standing two or three days, will be thrown open to practice for the drivers who are to compete. The completion of the pavement will be marked by sealing it with a gold-plated brick, which incidentally, will mark the last of a total expenditure of about $700,000.

In addition to the brick pavement, many other improvements have been made since the August meet. A three-foot concrete wall, twelve inches thick, has been built around the course and the stands have been enlarged, while others have been built.

Ernest A. Moross, director of contests, states that the coming meet will include speed trials of practically all usual racing distances from one-fourth to 1,000 miles. They will include one-fourth, one-half and one mile, as well as one kilometer trials. In the match events, there will be races for cars of all classes coming under the rules of the A. A. A.

The coming meet will not be held in the expectation of it being especially profitable from the standpoint of the speedway management. The management, however, hope to close the year with the record of holding all of the records recently established at Atlanta.

Lewis Strang has shipped his 200 h.p. Fiat and Walter Christie his Christie car to this city, and these drivers will be among the first to practice over the course. Harroun, Aitken, Oldfield, Chevrolet, Burman and other well-known drivers are expected to compete. Attractive prizes will be hung up and the meet promises to be of more importance than was the August meet.

During his recent visit to this city James J. Jeffries had a tryout of the new course in company with President Carl G. Fisher, who gave the champion pugilist the fastest journey he has ever had in an automobile, equalling Jack Johnson's best records.

QUAKERS ABANDON NEW YEAR'S RUN

PHILADELPHIA, Dec. 6—At a meeting of the contest committee of the Quaker City Motor Club last week it was decided to abandon the annual New Year's run, which it was decided had become more of a test of the endurance of drivers and passengers than of the competing cars themselves. A number of entries had already been received, but so many of the ease-loving Quakers expressed their preference for warm firesides that the committee decided to spend New Year's day at home.

The $7,617.34 balance remaining after all expenses were paid was last week handed over to the four beneficiary institutions by the committee which managed the recent Fairmount race.

Now that the Quakers have abandoned their New Year's run, the Century Motor Club, Philadelphia, infant automobile organization, has decided to have a single day's roadability run on Saturday, January 1. The route selected will include Wilmington, Chester, Norristown, and Doylestown—about 150 miles.

CHALMERS WINS A $1,000 MATCH

PHILADELPHIA, Dec. 6—Leading from the start, Harvey Ringler, in his Chalmers-Detroit, on Saturday last at Point Breeze, easily won a 50-mile thousand-dollar match race from Ira Brown, president of the Brown Auto Top Company, who drove a Buick. The latter was in trouble almost from the start, first a balky magneto and then a leaky radiator keeping him back. The numerous stops necessary to remedy the trouble put the Buick so much to the bad that at the completion of his thirty-fourth mile, when nine miles behind the Chalmers-Detroit, Brown withdrew, hopelessly beaten, and abandoned the prize.

CADILLAC WINS OKLAHOMA RACE

OKLAHOMA CITY, OKLA., Dec. 1—The cup offered by the Oklahoma Automobile Association for the run from Oklahoma City to El Reno and return was won by Norman Smith, driving a Cadillac, who covered the 67 miles of rough roads in 1:53:13. A Franklin driven by Colcord finished second in 1:57:00, and an Oldsmobile with Baird at the wheel took third in 2:02:00. There were several accidents. The Ford entry turned turtle, and its driver, Fred Winkle, is now in the hospital. The Velie and Salters were ditched and put out of the running early in the race.

Indianapolis Dirigible Shed, 290 by 80 by 75 Feet

LOCAL ORDINANCES YIELD TO STATE LAW

PHILADELPHIA, Dec. 6—Where a local automobile ordinance conflicts with the new State law, the latter takes precedence, is the opinion handed down by Judge William B. Broomall, in the Delaware County Court at Media, in the case of Borough of Swarthmore vs. Wilmore B. Taylor. At about 7.45 on the evening of July 21 last, Mr. Taylor was operating his car in the borough mentioned, when he was arrested by a constable for driving without lights. Taken before Justice of the Peace Charles W. Burnley, Mr. Taylor was fined five dollars and costs, which he paid under protest and took an appeal. He contended that under the State law, which provides that lights shall be carried "from one hour after sunset to one hour before sunrise," he was not guilty, as the sun had set but half an hour.

The prosecution insisted that the borough ordinance, which required that automobiles operated on Swarthmore's streets and roads shall carry lights "from sunset to sunrise," had been violated. Attorney J. B. Colahan for the defense, cited the State law on the subject, and further called the attention of the court to that section of the act which reads: "No city, county, borough or township shall have power to enforce or maintain ordinances, rules, or regulations inconsistent with .... this act, ... and all such local ordinances, rules or regulations now in force shall expire and shall be null and void."

In his opinion Judge Broomall calls attention to the confusion and trouble which would result if each borough and municipality had different and changing regulations on the subject, and says: "That the State has the power to legislate upon the police regulations of its highways is without question." He then quotes the State regulation as to carrying lights from one hour after sunset to one hour before sunrise, and says: "This confers upon drivers of vehicles the right to proceed without lights during the remainder of the 24 hours. . . . Therefore, the (borough) ordinance, in imposing a longer time for the display of lights than that which is imposed by the (State) act, is manifestly inconsistent with the spirit of the statute and is consequently invalid.

CHICAGO COUNCIL MAY REGULATE TAXICABS

CHICAGO, Dec. 6—An ordinance drawn at the suggestion of City Sealer Kjellander has been recommended for passage by the judiciary committee of the Chicago City Council. The ordinance eliminates the hour rate, except by contract, and directs that the taximeters be inspected annually. The text follows:

"In the absence of a contract to the contrary, no person, firm or corporation owning, operating or controlling any taxicab shall let the same for hire or reward for a fee or charge to be fixed and determined by the hour or fraction thereof, but the fare demanded shall, excepting for waiting time as herein provided for, be computed by the distance traveled and according to the following rates: "For the first one-half mile or fraction, 40 cents. For each four minutes of waiting, 10 cents."

WATCH YOUR TAIL-LIGHT IN HARTFORD, CONN.

HARTFORD, CONN., Dec. 6—According to automobilists residing in other towns who have been arrested in this city for not properly illuminating the rear number at night, Hartford is about the only place in Connecticut where this feature of the new State automobile law is enforced. But Hartford means to curb the speeders and intends that everybody shall know it.

MASSACHUSETTS WILL INSPECT TAXIMETERS

BOSTON, Dec. 6—Acting under the provisions of the law relative to the testing and sealing of taximeters, passed by the Legislature last June, Daniel C. F. Palmer, State Commissioner of Weights and Measures, has made preparations for the inspection and test of the meters on motor cabs throughout Massachusetts. The law (Ch. 541 Acts of 1909) provides that the testing and sealing of such devices shall be performed by the commissioner of weights and measures of the commonwealth and not by the sealers of weights and measures in cities and towns. All such devices shall be tested as to the correctness of measures and values indicated by them, and the commissioner is empowered to make such rules as he may deem necessary.

To carry out the provisions of the law the State Commissioner has had laid out three measured courses of a mile each in Boston and will have similar courses laid out in the other cities where taximeter cabs are in operation. The Boston courses are on Beacon street, Massachusetts avenue and Columbus avenue.

They are marked permanently by metal plates in the curbing, these plates showing the beginning and end of the mile, the thirds, quarters and sixths. It is his plan to start a taxicab at the beginning of one of these courses and run it over the full mile, noting the tariff registered at the half mile, and at the quarters in what is known as the first tariff, and at the thirds and sixths in the second tariff. Under the first tariff the charge for the first half mile is thirty cents and for each succeeding quarter mile ten cents. Under the second tariff the charge for the first one-third mile is thirty cents, and an additional charge of ten cents is made for every succeeding sixth of a mile.

If the meter proves to be correct the commissioner will place upon it a lead seal in such a manner that the meter head cannot be removed or detached without breaking the seal.

It is believed that Massachusetts is the first State to undertake the testing and sealing of taximeters, although New York and some other cities have undertaken their supervision and testing

MILWAUKEE MAY TAX ALL VEHICLES FOR ROADS

MILWAUKEE, WIS., Dec. 6—Erich Cramer Stern, Milwaukee's youngest alderman, has issued an interesting defense of his proposed ordinance to tax all classes of vehicles. If the people of Milwaukee want better streets, more pavements and a better maintenance of existing pavements, he says, a vehicle tax is necessary, because the sources of revenue for this purpose now produce too little. The abutting property owner pays for the initial improvement of making a new street, but after that he should not be made to contribute or bear the entire cost of maintenance until a permanent pavement is laid. The property owner usually gets very little use for his contribution, says Alderman Stern, and it is fair that those who use streets should maintain them.

WISCONSIN UPHOLDS FINE FOR ROAD OBSTRUCTION

RACINE, WIS., Dec. 6—The circuit court at Racine has upheld the Racine municipal court in its action of fining a man for obstructing a roadway. Ernest Nowak, a Caledonia farmer, held the center of a narrow road for more than an hour when asked by Henry Plow, of the Mitchell Motor Car Company, for room to pass, keeping a pace of about four miles an hour. Plow brought suit for malicious obstruction of the highway, and Nowak was fined $10 and costs. This decision has been upheld.

LATHAM AGAIN BREAKS AEROPLANE HEIGHT RECORD

RHEIMS, FRANCE, Dec. 1—In a forty-mile gale Latham to-day piloted his Antoinette monoplane to a height of 500 meters, or over 1,600 feet. The record was officially observed by the Aero Club of France, which makes it a world's record. It equals, and probably surpasses, Orville Wright's unofficial record

Latham's Graceful, Birdlike Machine, in a High Flight

at Berlin on October 2. Paulhan is unofficially credited with having attained a height of 600 meters, nearly 2,000 feet, on November 20, but was not officially observed. Latham's Antoinette has been purchased by Hayden Sands, an American amateur, who has been taking lessons in flying for some time.

The rivalry between Latham and Paulhan is very keen, and some method of automatically determining the height attained will have to be invented. The present system, under which army officers observe the machine and take its altitude by triangulation, has many possibilities of error and is inaccurate at its best. It is thought that some form of self-recording barometer can be devised, to be carried on the aeroplane, and calibrated with reference to an official barometer on the ground.

Aviator Fernandez a Victim of His Imprudence

NICE, FRANCE, Dec. 6—Antonio Fernandez was instantly killed to-day by the collapse of a biplane of his own construction, in which he was making his first long flight. The accident appears to have been due to the inexperience and recklessness of the aviator, who, despite the objection of his mechanic, patched up a defective part of the machine with twine before attempting the flight. After going 200 meters, he took a turn too sharply and the machine tipped over, striking the ground with terrific force. The aviator was crushed beneath the motor.

The Fernandez machine had points of resemblance to the Wright and Curtiss biplanes. It was present at Rheims, and was later exhibited at the Paris Aeronautical Salon.

SANTOS-DUMONT TRIES BIGGER MOTOR

PARIS, Dec. 2—Since his record-breaking cross-country flights a few months ago not much has been heard of Santos-Dumont. He has not been idle in the meantime, but has been preparing his diminutive flyer for still more important performances. In place of the two-cylinder opposed engine that Darracq supplied and afterwards made the subject of a lawsuit, a four-cylinder Bayard-Clément of 45 horsepower has been fitted. In proportion to the supporting area it is the most powerful motor ever carried on an aeroplane, and should give remarkably high speeds. The first trial, though ending rather badly, tended to prove this. The aeroplane was taken out at Issy-les-Moulineaux, rose immediately and set off at such a speed that it had to be brought down quickly in view of the smallness of the ground. Being in danger of running into a fence, Santos-Dumont braked the wheels with his feet, causing the aeroplane to stop so quickly that it stood up on its nose, breaking the propeller and damaging the wings. Repairs will be made in a few days and flights continued at Saint-Cyr, where the aviator will have abundant room.

Paulhan Takes His New Farman Biplane Overhead

The Bayard-Clément engine is a four-cylinder in one casting, with valves on one side, and a one-piece copper jacket for all but the valve pockets, the jacketing of which is cast with the cylinders. The engine was never intended for such a small aeroplane as the Santos-Dumont, but as it has been found that this aeroplane is capable of lifting it, the fastest flying machine in existence has been secured. With the Darracq engine of 25 horsepower a very high speed was obtained, with the Bayard-Clément of 45 horsepower an increase of ten m.p.h. is counted on.

News of Aviators in Many Parts of France

Louis Blériot has fixed upon the Southwest of France, three miles from Bordeaux, as the best place on which to establish aeronautical headquarters. He opens school on December 1 with twenty pupils, who will be taught to fly the little monoplanes over a six-mile course. The district is a vast heather-covered plain with a mild climate and an atmosphere that is rarely disturbed by air currents and boisterous winds.

Sheds and rooms for the pupils have already been erected, but during the Winter a complete factory capable of accommodating 400 workpeople, will also be put on the edge of the plain. At present the Blériot machines are being built in the Blériot workshops in the suburbs of Paris, where the maximum output is one a day. As there are several hundred orders on hand, and the number is likely to increase, it is necessary to look for larger quarters. Blériot has already signed contracts for the erection of buildings for his aeronautical school to the value of $30,000.

Many Prospective Meets Next Summer

The plain, which can be cleared to make it suitable for aeronautical work, is open to other aviators, and will doubtless shortly become as important an aeronautical center as Mourmelon, in the Chalons district. Bordeaux has already decided on an aviation week over this plain next September, when there will be a Grand Prix of $20,000 and other prizes totaling altogether $100,000. In all probability Bordeaux and Rheims will be the two great aviation meetings of the year, the one held late in September, and the other early in August or late in July. Rheims has decided to repeat its program of last year, with an addition to its prize money which will carry the total to $80,000.

Method Used to Announce Parisian Week of Flying

French Army Officers Observing Height of Aeroplane

WASHINGTON INCLUDES AERO EXHIBITS

Washington, D. C., Dec. 6—A striking feature of the automobile show to be given by the local dealers at Convention Hall during the week beginning January 24, will be a comprehensive exhibit of aeroplanes. The matter was discussed at the last meeting of the dealers who are promoting the show and the suggestion to have such an exhibit met with instant favor. The Government has a number of aeroplanes in the Smithsonian Institution and a request will be made for their loan.

BALTIMORE'S GROWING AERO FUND

Baltimore, Dec. 6—The Finance Committee of the Baltimore Aero Club has raised $20,620 of the $50,000 guarantee fund for the next international aviation meet. This fund was given a boost by a subscription of $5,000 from the Baltimore and Ohio Railroad Company. The committee further announced that it has several large subscriptions in prospect. Many of the proposed subscribers have been out of the city for some time and this has caused a delay in the committee's work.

WANTED—AVIATORS, CHENANGO, N. Y.

Norwich, N. Y., Dec. 6—By voting to admit aviators on equal terms with automobilists, the Chenango County Motor Association believes it has put one over on other similar organizations in the State. This action was taken at the annual meeting. No aeroplanists have yet applied for membership.

ADVERTISING MANAGERS ORGANIZE

Fourteen representatives of the advertising departments of A. L. A. M. makers held an organization meeting at 7 East Forty-second street, Monday, with the result that a trio consisting of Arthur N. Jervis, Charles W. Mears, and K. P. Drysdale were designated as a committee to perfect permanent plans. It was made clear at the outset that nothing should be done to restrict the initiative or the freedom of action on the part of any of the members. It is the belief that much good can be accomplished by an interchange of ideas and period discussions of problems of mutual interest. R. H. Johnston was elected temporary chairman, and C. A. Stein was named as secretary. The roll call was as follows:

Arthur N. Jervis, American Locomotive Company; K. P. Drysdale, Cadillac Motor Car Company; H. W. Ford, Chalmers-Detroit Motor Company; Guy Hutchinson, Corbin Motor Vehicle Corporation; B. Rockwell, Maxwell-Briscoe Motor Company; H. L. Foote, Peerless Motor Car Company; George H. Davis, Pierce-Arrow Motor Car Company; H. A. Linehard, Pope Manufacturing Company; C. W. Wooster, F. B. Stearns Company; C. A. Stein, Stevens-Duryea Company; E. Leroy Pelletier, Studebaker Automobile Company; F. L. Faurote, E. R. Thomas Motor Company; R. H. Johnston, Waltham Manufacturing Company, and Charles W. Mears of the Winton Motor Carriage Company.

Colonel Frank Marston, of San Francisco, in His Locomobile

WISCONSIN WANTS COBE RACE

MILWAUKEE, WIS., Dec. 6—President M. C. Moore of the Wisconsin State Automobile Association has submitted to the racing board of the Chicago Automobile Club two proposed courses for the next Cobe trophy race. Both are in Walworth county, which touches the Illinois line at its southern boundary. Whitewater, the nearest city, is approximately 85 miles from the center of Chicago, and 45 miles from Milwaukee.

One course, as laid out by President Moore and H. L. Halverson, vice-president of the W. S. A. A., who resides at Whitewater, is practically square and four and one-half miles long, with an extra-wide and recently improved road-bed. The other course is six miles long, one leg of which touches the southeast limits of the city of Whitewater.

The road-beds are wider than the ordinary Wisconsin country road and are particularly free from gullies and deep ditches at the sides. Another good feature is that there are no villages or cities to interrupt the free use of the road, every part of the distance being in the country.

Janesville, Beloit, Elkhorn, Fort Atkinson, Delavan, Jefferson, Burlington, Racine, Kenosha and numerous other towns and cities of pretentious size are within easy striking distance.

The Wisconsin association is anxious to get the Cobe race and will do everything in its power to arrange the details, so the C. A. C. will have only to hold up its end. Even if the Cobe race should go elsewhere, the association plans to hang up a valuable cup for competition on one of these courses.

WHERE THE AUTO DEMONSTRATED

MORRISTOWN, N. J., Dec. 5—A fire that started in the general store of John M. Allen in Peapack, this morning, destroyed two other stores and two residences before it was checked. The Peapack Fire Department, unable to cope with the fire with its gasoline pump, asked aid of neighboring towns. The fire companies of Far Hills, Bernardsville and Mendham responded. Chief Engineer J. Fred Runyon, of the Morristown Department, was asked to aid. He took the automobile chemical engine to Peapack, covering the 13 miles to the fire in 21 minutes.

The Morristown men relieved the country firemen, who were almost exhausted, and took a stream into the residence of Philip Todd, and after a hard battle stopped the flames.

Western Canadian Life has one feature that rather surprises the newcomer, and that is the popularity of automobiles. In the Winnipeg district alone there are 800 cars on the register. Splendid new highways run for miles in every direction. Even the prairie trails make good running for a well-sprung car. Calgary has 350 cars to its 25,000 population, and Edmonton 270. At present cars of American makes predominate, mostly of four cylinders and between sixteen and twenty horsepower.

BLUE BOOK SALES THREE MILES LONG

An enthusiastic statistician in the office of the publishers of the Official Automobile Blue Book recently compiled some interesting figures to present on the sales of that well-known work for 1909, showing how great has become the popular demand for this exclusive and very complete, to say nothing of accurate, road guide, covering as it does the whole "navigable" part of the country.

He ascertained that it required the skins of 1,950 cows to supply the leather for the 25,000 books which have been sold. He also figured that if all of these books were placed one on top of the other it would make a column 2,833 feet high, or over four times the height of the Metropolitan Life Building, the highest building in the United States. Placed lengthwise, these books would make a path three miles long, running from Lincoln Square, Sixty-sixth street and Broadway, to Grant's Tomb.

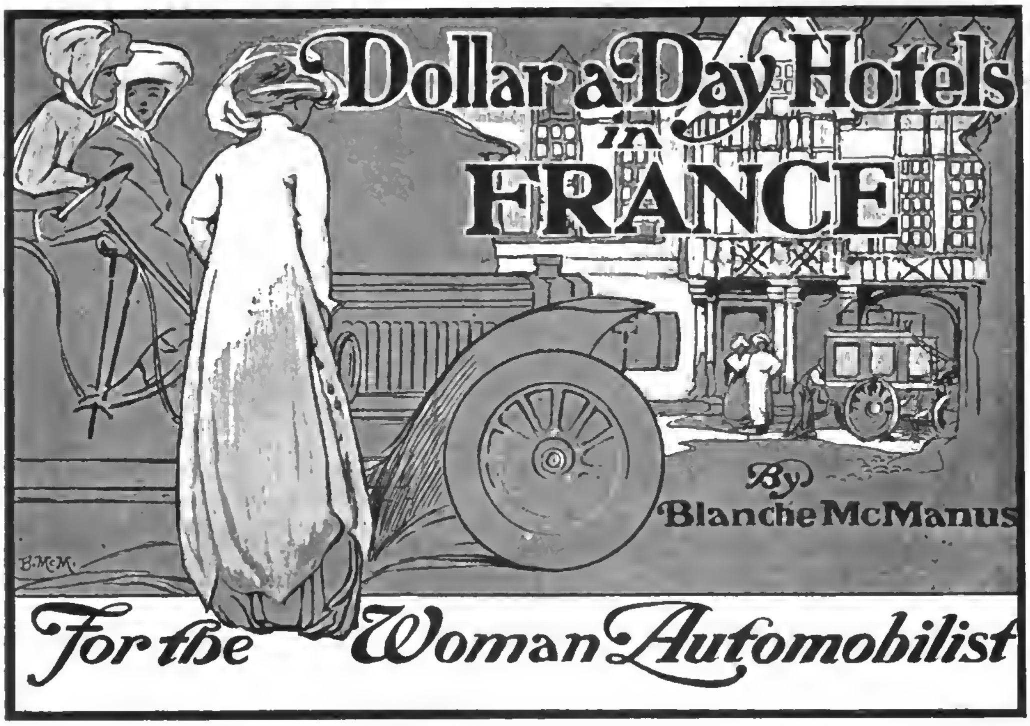
The Blue Book Company says:

"These figures show the interest which has been taken in touring in the past year, and it is estimated that they will be doubled during 1910. The amount of touring which will take place next year will be enormous. The cars being purchased have greater reliability than those of the past, and the increasing enthusiasm for country traveling will bring about, it is expected, a constant procession of cars on the country road next Summer. That the hotels and garages all over the country anticipate this is evidenced by the number of new enterprises of this character which are stretching out.

"Many of the hotels who cater to the wants of the motorist are making additions to their buildings, and many garages with up-to-date equipments are being built in nearly all the prominent cities."

The publishers of the Blue Book, in preparation for the big demand which the work will receive next year, intend to make the book the most complete road guide ever issued. A new system of indexing will be adopted, new maps will be prepared and many new routes which the Blue Book cars are now preparing will be worked up in a most interesting manner.

President Taft Boards a Stoddard-Dayton in Pueblo, Colorado



innkeeper more likeable than its patron, Thiriet. Tastes vary, of course, but all who have come to Hotel Bellevue, sooner or later come back again, as we find ourselves returning there year after year, declaring that in all France there is no place like it.

Hotel Bellevue is built on the vine-surrounded courtyard plan, as is so frequently the case with the country hotel in France. Several odd-sized buildings make up its mass, all of varying heights, with red tiled roofs, and enclosing in a casual sort of a way a little square of ground with a grand old lime tree, throwing out a grateful shade, in the center of the garden court. The cobble-paved Grande Rue of Petit Andelys runs before the door, and the Seine glides swiftly past the rear windows. Above towers a white chalk cliff crowned with the majestic ruins of Chateau Gaillard, built by the romantic yet energetic Richard Cœur de Lion more than a thousand years ago.

The hotel has aristocratic antecedents, too; the main portion was once the seigneurial manor house of a noble French family, the Beauforts, and Monsieur Charles, as we always familiarly think of the hotel's kind patron, points out with pride their arms still to be seen graven over the *porte cochère*. He shows one, too, with quite as much pride, that there is running water in the large front guest rooms with moulded ornamented ceilings, a most unusual thing to find in a country hotel in France, or, indeed, anywhere in Europe.

Hotel Bellevue is no common caravansary, dating only from the degenerate times of Louis Philippe. No, indeed, it has its own cachet and character, and so also has its owner.

M. Charles (though how we ever came to call him Charles, since his patronymic is Auguste, no one seems to remember) is representative of the best type of the French small hotelkeeper that one may expect to find in a lifetime of travel. Fair in his dealings, trustful with the stranger, content with a small turnover in business, and intensely conservative, Thiriet of the Bellevue has a personality one can but admire. He comes from Lorraine (that lost child of France), leaving his beloved *pays* as did so many others rather than remain longer in the shadow of the eagles on the German helmet.

M. Charles worships old traditions and old things, and scorns imitations with an *art nouveau* twist. Nothing gives him greater pleasure than to show his collection of "Old Masters." Are they "Old Masters"? That is the question many have often debated. Perhaps they are not; wiser men than the genial patron of the Bellevue have been deceived in such matters before now. Anyhow, it's a good guess that he has a Wouvermann and a Cuvo, unless signs fail. What matters it after all, so long as they give an air of dignity and antiquity which well becomes the long corridors of the hotel. All about the house there are pieces of old furniture and bits of rare china at which no critic can carp, and many an American with a long purse has tried to wheedle, unsuccessfully, M. Charles into parting with them for cash.

Last Spring, according to custom, we arrived

WHERE are they? What are they? How are they? we are invariably asked when we unconsciously descant on some case of the charming little artists' hotels we have known in France.

Well, they are not to be found everywhere, and not everyone who lodges beneath their spreading gables get the *prix de faveur* that is granted men and women of the palette and the brush. You must be properly presented to come within the fold, or at least show tangible credentials; the mere carrying of a paint box and a white umbrella will do this, even if you arrive in an automobile; otherwise you may pay seven or eight francs for the same fare. There are many, many of these unpretentious, but altogether lovely, haunts, but the following in Normandy, Brittany, and Provence are sufficiently wide apart and varied to suit the most catholic of tastes.

Hotel Bellevue, Les Andelys—We came first to Hotel Bellevue to stay a day; we remained three years. Those were the days when the author-chauffeur essayed to tour with a *tri-car,* that English automobile abomination, a sort of voiturette on three wheels, with one seat in front of the other, a species which fortunately never found its way to America. On the particular occasion when we fell upon Les Andelys we were proceeding by easy stages up the valley of the Seine via Caudebec and Rouen. Something was more than ordinarily wrong with this obstinate automobile in miniature, and we made our entrée into the lovely twin Andelys, pushing the wretched thing of a tricar before us.

Really we were bound for the Grand Cerf at Grand Andelys, starred by Baedeker, and two kilometers from the Seine, and only the mere accident by which Petit Andelys happened to be within a shorter pushing distance caused us to turn into the portal of the Hotel Bellevue, snuggled closely beneath the haunches of Richard Cœur de Lion's "Saucy Castle." This was the only good service that miserable "*tri-car*" ever did for us.

We have journeyed in a real automobile up and down and around France many times since then, and know intimately many pleasant resting places of all ranks within its borders, but none, in charm of situation and old-world simplicity, is the equal of Hotel Bellevue, nor have we ever come across an in Normandy from the South in apple-blossom time and turned our auto into the garden courtyard of the hotel as naturally as though we had left but yesterday. M. Charles met us all smiles, cracking the joints of his fingers, as he always did when pleased and excited. Besides M. Charles, equally beaming and gracious, was Louise, Louise who had come to the Bellevue five years ago, the very day we first entered its shadowy courtyard. Our rooms, "on the quai" overlooking the river, were always ready for us, no matter how much this desirable location might be wanted by any one else. For some days we were treated with greatest distinction, after which we fell into our old position as "one of the family" and suffered with the rest of the household when occasional attacks of "*mal à la tete*" or "*mal au dos*" ruffled our otherwise always good-natured patron.

The Hotel Bellevue of Petit Andelys is doubly delightful; besides being a very good hotel, its price is low, and lower still if you are an artist. What a cosmopolitan Summer colony we have often made there, and what discussions on art and literature and on automobiles have held forth around the long table set beneath the *tilleul* tree in the garden of a Summer's night.

Ever since we had been coming to the Bellevue we had been exercising our utmost ingenuity to induce M. Charles to add some needed modern improvements. It was not that we would in the slightest manner mitigate the hotel's charm, nor that of its genial patron, though true it is that there was sometimes a lack of proper service, and M. Charles himself would frequently let an automobilist who sought shelter late at night go away again because he would not go down and open up the *porte cochère*, and this even though there were vacant rooms on hand.

Besides land automobiles there come frequently parties of from three to a dozen or more by automobile boat down the Seine from Paris, often unannounced, and usually at an unseasonable hour. The automobile boat is seemingly a more capricious piece of mechanism than the land variety. M. Charles would stow away all as comfortably as possible, so long as they did not arrive in the middle of the night or some abominably early hour and everybody would be perfectly content.

The Hotel Bellevue's accommodations for automobiles had always been limited, and this year we succeeded in getting M. Charles to turn the stable into a garage. For years we had been agitating this question, while our own auto had suffered the indignity of being housed among the tubs in the wash room. M. Charles, in spite of the sign of the Automobile Club de France displayed on the front of the hotel, refused to put out the now sole occupant of the *remise*, the cart horse of the butcher opposite, and make room for the automobiles which, under existing conditions, had to stand on the flower beds or overflow into the narrow streets.

It was a matter of sentiment; he recalled the days when the green painted stable tucked under the courtyard gallery sheltered the relays of horses for the coach from Paris to Trouville, whose ribbons were handled by Gordon Bennett. It was as if he were purposely holding the stable in readiness for the hay motors which now came no more. This coaching craze was a wealthy man's caprice, but it was really he and no other who discovered Hotel Bellevue, perhaps twenty years ago, and thus gave its patron his start, and one has but to mention the name of the owner of one of America's greatest newspapers to open the floodgates of M. Charles' reminiscences.

It was only when Isabel and I painted a sign as beautifully as we knew how, a big red lettered "garage," a silhouetted automobile and a big red "danger spot" on a white ground, and presented it to M. Charles to hang out, that he bowed to the inevitable. It was a desperate measure, but it opened the *remise* of Hotel Bellevue to the modern usurper of the road, the automobilist.

The Hotel Bellevue has changed its aspect and its attitude mightily of late, but to those who are habitués it remains ever what it has been in the past, the most delightful and satisfactory dollar a day hotel in the Seine valley, if not in all North France. Of course you have to be one of the "elect" to fall in with M. Charles' good graces, but anyway two francs fifty for *déjeuner*, three francs for dinner and a franc and a half for a room is not dear.

Giverny: "Baudy's"—Twenty miles above Les Andelys, following the Seine towards Paris, is a little artist colony, mostly Americans, and mostly automobilists. Years ago "Baudy's" was but a little grocer's shop in the village which sold salt, matches and tobacco, all of them monopolies of the State, and some other things besides. Gaston, the younger Baudy, married a Parisian, but neither prosperity nor his wife have spoiled him. Gaston is always obliging and courteous, and has an amazing conception of the wants of his clientèle.

Giverny began its career as an art center by being a little painting place for artists who did not want landscape effects that were too exciting. Monet started it, when, to indulge his taste in gardening, as well as painting, he first made his home there years ago. But the real boom struck Giverny and Hotel Baudy with the American invasion.

How it came about no one can explain, least of all the invaders themselves, for so far as natural beauties go Giverny is one of

One Dines Much Outdoors—Hotel Bellevue's Vine-Surrounded Courtyard the tamest places in France; but this little collection of Norman farmhouses (one can hardly dignify it by the name of a village) has become one of the most Americanized spots in Europe.

The little colony is now something of a close corporation, with Hotel Baudy as a head center, for even the "residents" are more or less dependent upon Baudy's for coal for their stoves and gasoline for their automobiles. We never lived at Hotel Baudy at Giverny; it was too near Les Andelys to beguile us into leaving the Hotel Bellevue often; but we used to run over for *déjeuner* in the garden, and Giverny was just a pleasant afternoon's ride if we wanted to take a friend over to show them the house of Claude Monet, he who first made impressionist painting popular and the *vrai maître* of the art to-day.

Artists being much like sheep flock together, and now that Giverny has become a center and Baudy's has so greatly increased its accommodations the throng which descends upon the village during the Summer months is simply another inflowing wave of prosperity to the neighborhood, to "Baudy's," and to the original inhabitants and bids fair in the course of time to change the face of nature itself.

At Giverny itself the maiden from over seas who demands a whiff of the art atmosphere which surrounds the great, even if she gets no further, can look through the gateway into Monet's acres of garden, and can be sure of meeting the white-bearded painter himself driving about in his automobile, for he is an enthusiastic automobilist.

Frederic MacMonnies' house and studios are show places, too, and the slender painter-sculptor is one of the most constant figures on the tennis court. Rumor has it that Giverny is to lose this celebrity who, after a lengthy residence here, has finally decided to return forever to the land of his birth. At Giverny one can easily get five francs' worth in a day at "Baudy's," and it is still possible to get that price if you are properly credentialed, though the specially conducted travel parties for young ladies who are beginning to drop in once and again, and regard Giverny as a possible center for culture may not always know it.

Chez Julia at Pont Aven—We had slept many times beneath Julia's roof in the past and had come again to Pont Aven to see for ourselves just what had taken place in the "Ville des Moulins," as it is affectionately called by those who know it. Julia's, in times past, was the biggest nursery for art in France, and we wondered what it was like now.

It is a long pull by highroad and byroad across country from Les Andelys in Normandy to Pont Aven in Brittany, and "Julia's," as the "Hotel des Voyageurs" is always called, and we started from the Hotel Bellevue at an early hour one May morning and set out for Finistère, knowing full well that the itinerary, via Alençon—where the lace comes from—Mayenne, Vitré Ploermel, and Quimperlé, would be a delightful one.

After a singularly faultless three days we arrived at Pont Aven and entered the little town by an unprepossessing back street and drew up in the tiny place in front of what we had formerly known as "Julia's" modest establishment. We fully expected to find that "Julia's" had changed from the old days, but were hardly prepared for the overpowering many-storied edifice of brick and stone and steel beams which rose before us. The change was even more apparent when we entered and were taken up to our rooms, furnished on the department store plan, with brass bedsteads, rocking chairs, electric lights, electric bells, and bath tubs, too, on each floor. On the ground floor there was an imposing salon and a private dining room where dinners were served to order to real tourists. It is not easy to explain after all why these things should so completely spoil a place, but "Julia's" is certainly an example of how signs of progress can do harm, albeit it means profits to Mlle. Julia.

The original "Julia's" had its beginning years ago in the modest little Hotel des Voyageurs, which still stands in the shadow of the present imposing "*annexe.*" "Julia's" was then run, as it is now, by Mlle. Julia, a capable, strong, sound-headed, hard-working Breton peasant woman. Then all was simple and excellent and full of what is fondly called character. Now "Julia's" is still excellent when it comes to food and drink and a well-kept house, but simplicity has gone with the old clientèle.

In the old days there came to the little hotel a coterie of artists each year, Americans, Englishmen, and a scattering of Frenchmen, drawn there as much by the charm and comfort *and price* of the *pension*, as by the picturesque water-mills and quaintly coiffed peasant girls which offered such appealing subjects for the artist's brushes.

Julia, level-headed business woman, saw the possibilities ahead and succumbed to the pressure from without. How can she be blamed? Who of us has the courage to raise the umbrella which will ward off a golden shower? One dresses for dinner now at "Julia's." There are bridge parties in the salon, and automobiles are in each other's way in Pont Aven's small Place, and completely overrun the *remise* of the hotel at times.

Is Julia content? She has made and is making money, and making it fast. Julia is one of the self-made wealthy women of Brittany to-day, but she complains bitterly that the artists—the real artists—have left her. Prices have risen at "Julia's" to the height of the new hotel, but, it is said by those who know, that there is not one of the old crowd whom its *patronne* would not gladly welcome back at five francs a day, or less, if they would only come.

The Père Chabas—When Autumn leaves begin to turn in the North it has been our custom for many years to turn the prow of our automobile towards Martigues and the Hotel Chabas.

Martigues is one of those unspoiled places that certain people are always longing for and looking for, but never really like when they find them. In reality this class of travelers chiefly want big hotels in gay centers, and such will do well to give the Hotel Chabas at Martigues a wide berth. But for those who want to see the most beautiful corner of Old Provence, a *petit pays* with a character all its own, and would receive one of the "warmest welcomes at an inn" possible to conceive will do well to drop into Hotel Chabas, which sits at the entrance to the little village of Martigues, coming from Marseilles by road.

Provence is much more than an old name for a number of the *départements* of modern France which border the Mediterranean, but boundary lines are vague and shadowy to most travelers. It is recognized by the French as a region with its own traditions, its own language, its own customs; and with respect to these things, as with many others, one which bears little resemblance to the rest of France, while a Provençal is as unlike a Parisian as a New Yorker differs from a Terra del Fuegian.

Provençal hotels are different, too, from hotels in other parts of France, are more primitive, for instance, which adds to their interest, but not much to their comfort. And Hotel Chabas is a typical Provençal hotel, though if one will but put up with its obvious discomforts for the sake of its warm-hearted, kind Provençaux who run it, and many other things besides, they can pass some delightful weeks in Martigues, the "Provençal Venice," the painter's paradise.

Hotel Chabas may lack many things that most people want, or at least would appreciate, but it has for us a great attraction in the comfort and ampleness of our studio apartment. An American artist (one of the few who ever got to Martigues) came along one day and persuaded the Père Chabas to put in a skylight in a great room on an upper floor, and lo! the studio grew into being. It's the only forward step in the march of progress that the hotel has ever taken. In all other respects it is as it was a hundred years ago. It was built for a convent, and remained one until the Revolution forced on it a secular existence. Its long, dark corridors, off which open the small rooms, are reminiscent of conventual seclusion, and its lack of fireplaces suggests a régime of religious severity. This is one of the hotel's handicaps, for in spite of the fact that the sun shines more days in the year at Martigues than anywhere else in France, it can be cold enough in Winter by the very contrast.

One's automobile is stabled comfortably enough in the ancient chapel of the convent, now the *remise of* the hotel, which is still crowned by an empty bell-tower, and the small, wiry Provençal ponies now munch hay where the high altar once stood. What an interesting travel book an automobile could write if only it had the genius of Rudyard Kipling's machinery. "Garages I have known!" In France and elsewhere an automobile has some strange bed-fellows once and again.

Changes have come over Martigues, but it is not yet spoiled, and only automobilists with a spirit of adventure latent in their breasts, or a good bump of location, ever seek it out as they are bound from Paris to the Riviera. They keep chiefly to the great Route d'Italie and pass it by forty kilometers distant as they turn off at Aix-en-Provence leaving the road to Marseilles to the right at Orgon. These indications of the exact location of Martigues are all sufficient to the serious minded; let others who might not like it stick to the main route and make "la vitesse" to their heart's content.

The Grand Hotel Cendrillon—At the name "Riviera" one's thoughts leap at once to Nice, Monte Carlo, and the other luxurious resorts of that brilliant galaxy of Mediterranean playgrounds paralleling the coast from Marseilles to the frontier.

How many of the world of pleasure seekers who for the Winter months annually flock to the famous Cote d'Azur—as the Riviera is better known to the French—have an acquaintance with, or have ever heard of, Cassis?

Cassis is simply an obscure, tiny port, three kilometers from the railway, and as far removed from the glitter and gaiety of Cannes, Nice, and Monte Carlo as its small, enigmatic Hotel Cendrillon is unlike the palm-shaded, palace hotels of "la Cote."

Hotel Cendrillon owns to a dozen rooms, and is but an outgrowth of a *maison bourgeoise*, recently come into being as a hotel. It has, too, a strip of walled garden, planted with a couple of stunted palms and overhung with two towering pines. On top of the garden wall is a "terrace," or belvidere, overlooking the busy port, with the open sea beyond, and the unkempt Place or Square at its feet.

Cassis' nineteen hundred inhabitants divide their time between fishing and hauling crushed stone and cement from the mountains roundabout down to the port, there to be loaded on to the picturesque Mediterranean craft of all shapes and sizes which crowd the *darse*.

The only real excitement and hilarity for Cassis, its inhabitants in general, and those who live under the roof of the Hotel Cendrillon in particular, is on Sunday when an excursion steamer ties up to the quay, having brought out a crowd of Marseillais to eat *bouilla baisse* and play bowles. This, or an automobilist, strayed by accident from the great "Route National," are the only real dissipations of Cassis, so far as mingling with the outside world goes.

Hotel Cendrillon may be modest and retiring enough, but its proprietors are not. They think their hotel second to none on earth. The Ferauds are a typical Provençal couple, good-natured, warm-hearted, boisterous, and romancers, vivid and unblushing, all this overlaid with a childlike simplicity. Neither has ever been twenty miles away from their own *petit pays*. They had risen from being proprietors of a small wayside house of call, a halting place for the drivers of the heavily-laden *charettes* on their climb up out of Marseilles over the Estaque Mountains, to what they fondly imagined was a resort hotel. The transition has left them a bit dizzy and uncertain. At the time we happened on Hotel Cendrillon they had just prefixed the word "Grand" to their hotel sign, and had printed Cassis-Sur-Mer on their letter heads. These little things attended to, they sat down to wait for the golden stream of prosperity to roll their way. We broke rudely into this golden dream when we coasted down the mountainside into Cassis one Midsummer's day and drew up in front of Hotel Cendrillon.

The Ferauds had never come into contact with vagabond travelers who journeyed by automobile; they were expecting a gilt-edged clientèle only, and had arranged their prices to suit (as they fondly believed) this exclusive trade with which their hotel was to be inundated. Our modest automobile deceived them for the moment into thinking that the vanguard had arrived.

But our author-chauffeur and "business manager," without leaving his seat behind the wheel, firmly, but dispassionately, argued the matter out with the excited little couple who were dancing around us in a perfectly irresponsible manner. Five francs a day was our limit, and the price usually given to people of our proclivities for a stay throughout the country.

The mere fact that we arrived as automobilists through necessity, not wealth, and not as artists with white umbrellas was against us. Finally, upon convincing the couple that we knew our French well, and that there were many places even more attractive (with a contemptuous wave of the hand at the "Grand" Hotel Cendrillon) where, at this price we would be welcomed, literally, with open arms, the chauffeur prepared to move on.

How far the Ferauds believed all this is doubtful, but the prospect of a party of four driving away under their eyes (we were all still in the automobile) shook their nerve. They capitulated. And this is the true story of how the Grand Hotel Cendrillon fell from its high estate and became a dollar-a-day hotel. Those who come after us and pay more than that cannot possibly get more value. That is the difficulty with the resources of the hotel in the small French town. It is not possible to cater for you differently, whether the price you pay be the four or five a day charged a *pensionaire* or the ten or a dozen put on because you are an automobilist. With all its good points, and there are some, the Grand Hotel Cendrillon at Cassis-Sur-Mer is, frankly, not worth any more than five francs a day, whether you arive on foot or in an automobile.

We did not fare so badly at Hotel Cendrillon after all. But what virgin soil in which to plant new ideas! So we thought, and tried it, though we never got further than teaching the proprietor how to make toast—it was he who made our "little breakfast." This, and cleaning the knives (a job to which he could sit down) formed the bulk of his work. On Sunday, in his best clothes, he stood on the lookout for automobiles.

The mere sight of an automobile threw the Ferauds into a delirium. At the first sound of a horn way up the mountain Madame would rush from her kitchen to the window in the garden wall which commanded the little place, abandoning her cooking to any sort of charred fate that it might befall. Out of this window she hung, like a fat spider in its web, and with sweet smiles and words would try to entice the automobilist to enter, who, to speak truly, is usually as gullible as the traditional fly. Not all of us are, though, and no one really likes to be thought such, so these words of warning.

It was Madame who did the cooking. Also Madame was the intellectual head of the house. She was acquainted wtih Dumas' novels, and all the time we knew her she had in hand a "yellow-back," which she was always offering to lend us, entitled "Mignonette." It was one of those flimsy French things.

Madame Feraud was a poet, too. She could turn out a poem while you waited, written on a corner of the kitchen table in the Provençal patois. Meals were good enough, but problematic. There were days when we rolled in abundance, and there were days when we went out and bought things and cooked them ourselves. Those were the days when Madame conceived a new poem or "Mignonette" blocked the ordinary course of household affairs.

Still, both Monsieur and Madame felt much hurt when we left to take up our Winter quarters at Martigues, where we had a little *pied de terre* always awaiting us. Madame wept at parting, and Monsieur sped us on our way with a gift of half a dozen bottles of the famous white wine of Cassis.

Let us hope that nobody will be so cruel as to send the proprietors of the Hotel Cendrillon a translation of this, as has been done by officious persons with our written remarks on things French in times past, thereby causing coolnesses between us and some of our friends. We hope again to listen to another of Madame's poems, while slow-footed Felicie spreads the table in the shady garden of Hotel Cendrillon, before the Cassidiennes wake up to the knowledge that they are a part of the "real Riviera" and begin to plant palm trees on the quay.

One-Car Garage of Squared Field Stone, Which Appears Well and Is Very Well Arranged Inside

SO MUCH has been said about concrete and cement in the previous chapters of the story of the private garage that a note of warning must here be sounded. It is not necessary to use either in order to have a well-built, well-arranged garage; in fact, many of the very best garages are of stone, brick, or wood in combination with either of them. This is, of course, not said to deprecate cement, but simply to present the other side of the question, namely, the stone and brick side.

Even in the stone and brick house, there will be much cement used for floors, wash racks, foundations, and otherwise, but in the main, houses built chiefly of brick and stone, and having that external appearance, will be described.

Thus, the illustration at the head of this article shows a good example of squared field-stone construction. This is not laid up in courses, but as broken ashlar, the mortar or cement joining the individual stones being "pointed out" for the sake of appearances. In size, the whole building measures about 17 feet wide by 27 feet long. Of the total length, about one-third is given up to rooms for the chauffeur.

Adequate Provision for Driver Important—This matter of providing quarters for the driver is one that has a considerable influence upon the other matter of employment of chaffeurs. This latter, always a troublesome point, is greatly simplified and the chances of getting a first-class man and keeping him much improved, if proper provision is made for housing him and his family. The family need not always be counted upon, as in the present case, for instance, the quarters provided are large enough for but one. This, of course, presupposes an unmarried man as chaffeur.

The quarters provided in this case consist of but two rooms, if the bathroom be not counted. These are a bedroom and a small living-room. When the size given over to the rooms is considered, 8 feet x 16 feet inside, it is apparent that the rooms are small. However, this may be offset by the fact that a single man would be likely to use them very little. For the bedroom, as an example, only room for the bed would be necessary, namely, 7 feet by 5 feet.

Similarly, with other rooms, the need for space is small.

More liberal is the space allotted to the one car owned, this measuring 16 feet wide by 18 feet long, inside. These are the gross dimensions, as the door subtracts something at the front, while at the two sides are placed the workbench and cupboards. The latter are unusually complete and well-suited to the purpose, being built with doors for the upper part and drawers for the lower half. The doors open for access to a series of shelves, about five in number, and perhaps 3 feet long, two sets being located side by side.

These shelves begin about 3 feet 6 inches off of the ground and extend upward to about 8 feet. Below them the cabinet, if it might be called that, is widened out from 18 inches to about 2 feet in depth. In this wide part are located the drawers, three high, and two wide, as in the case of the shelves. This outfit provides more space than could possibly be used for the repair parts and tools of a single car, so that there is opportunity for "a place for everything and everything in its place," to paraphrase an old saying.

On the near side, the workbench provides plenty of room for ordinary repair work, being about 8 feet long by 2 feet wide. A pair of vises, one for large and one for small work, give ample provision for the driver to show his mechanical ability, while the several drawers below the bench provide space for the tools he would use. A skylight above of an area equal to fully one-fourth of the floor space, lights up the whole interior, assisted by the window shown and a duplicate on the other side, as well as the open front doors when the weather allows.

Another One-Car Garage of Glazed Face Brick

Heating System Very Important—Of great importance usually, when the chauffeur and his family or the chauffeur alone is housed in the same building, the heating system assumes a position of greatly increased importance. In fact it becomes *the* problem. In this case, a happy solution was effected. The garage is close to the rear of the house, unusually close. The rear in this case is the windy side of the place, and so, is cared for more than is usual. The heating means is steam. To heat the nearby garage was then a simple problem, a mere matter of connecting pipes.

It was effected as follows: The steam pipes for the rear of the dwelling were continued (underground) into the center of the side of the garage nearest to the house. Then a large radiator was placed in the center of that side and connected to the steam supply. Its position is such that it is against the wall of the driver's bedroom, thus furnishing plenty of heat for that. In actual location, however, it is in the automobile room, so that there is plenty of heat to prevent the water in the circulating system from freezing, no matter how low the temperature gets.

Aside from those described, this garage shows no other unusual features of interest. The oil and gasoline tanks are both outside of the building, buried under the ground. The top of a barrel of oil, waiting to be put into the underground tank, may be seen in the foreground, just above the stone wall.

Glazed-Face Bricks Give a Good Appearance—In the second garage shown on the first page, cement, studded with small round field stones, is used for the portal and foundations, or at least that portion of the foundation which is above ground. The rest of the house is constructed of brick with a glazed face. As the picture brings out, this gives the whole structure a very clean, neat appearance. Around the lower part of the outside is carried a water table of concrete slabs, which, dividing the pebbled surface from the smooth finish, gives the house an improved, not to say, finished appearance.

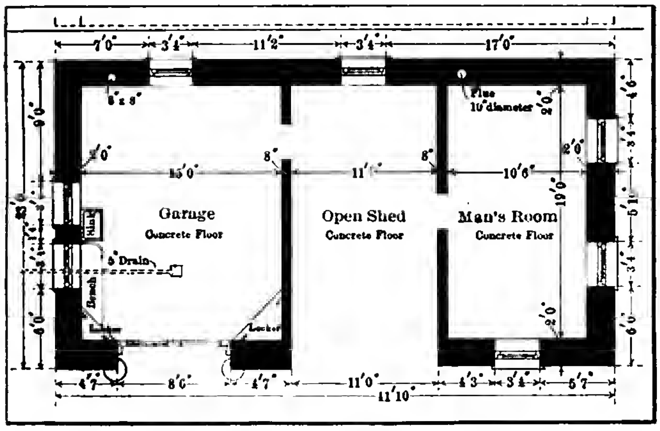
At the front, the portal which serves but for a door compartment adds very materially to the looks, as do also the overhanging wooden eaves. Speaking of the roof, the combination of three different shapes—the peaked, the square, and the mansard—adds very much to the *ensemble*.

This car space is nearly square, if anything, a little longer than wide. In the center, the washstand is placed, so that the car is driven right onto it, in coming in. In the picture the car is shown on the wash stand. The back door allows driving right through, although the interior is large enough so that the car may be turned to come out of the same door by which it entered.

At the right, nearly hidden behind the bush, is the door by which the owner may enter, this being near enough to the main or car doors to allow of entering by the small door and opening the car doors from the inside without much time wasted in either time or distance traveled.

Although none are shown on the side picture, the number of windows on the other sides is ample, and the interior lighting is very good. This garage, just recently completed by the owner, A. B. Harmon, is located at Frankfort, Mich. The upper part, above the automobile room, is finished off and furnishes plenty of room, either for storage of tops, robes, etc., or for chaffeur's quarters, should it be desirable to use it in that manner. The chimney, which may be seen very faintly to the left and above the roof, provides means for heating.

Field Stone Construction Popular—Elsewhere on this page is to be seen a slightly larger garage built of field stone. This form of construction is gaining favor every day, particularly



Plan of Unique One-Car Garage in Stone

This Garage, Large Enough for Six Cars, Houses but Two

for cases like this. The place is located in the country, so to speak, being about 20 miles above New York City, and really far from any other city. The house occupies the top of a high knoll, overlooking the Hudson River, of which a magnificent view is obtained. The knoll is of rock, and before any building can be done on the premises blasting must be resorted to in excavating for foundations. The result is that plenty of stone is handy, the railroad station is far away, so that it is no wonder that the stone is used for the walls instead of cement.

In form, the building is slightly deeper than wide, the depth being 30 feet against a width of but 22 feet. The picture is taken of the width, and gives scant idea of the much greater depth. Like all of the other buildings on the estate, this is of field stone laid up as broken ashlar, with shingle roof and concrete floor. Probably the most apparent feature shown in the picture is the front door arrangement.

This consists of a pair of doors, hinged in two places. This allows of folding up each door into a very narrow compact unit, one-third the width of the door when full open. But one of each pair of hinges opens toward the inside of the structure, so that latches to prevent it being pushed in at times when the owner is not around are necessary at but those two points. In the main, the door folds to the outside, and when closed normally rests against a metal strip which projects above the floor.

Within there is a large clear central portion, which the car occupies. At the sides of this are placed, respectively, the workbench on the left and the tools on the right. The latter consist of a hand drill press, mounted upon a post let into the wall, an anvil and fire, while the gasoline pump and washstand are located on this same side. The last named is a small affair intended for the owner's personal use, and should not be confused with the wash rack for the car, which is in the middle of the cement floor. It is located close to the door, so as to be convenient on leaving. Thus, having completed a dirty job on the car, everything is cleaned up, and just as the owner is about to leave, the last thing he wants to do is to wash up.

Some Slight Provision for Heating—Since the automobile should not be left without any heat in the winter, slight provision is made by the fireplace at the far end. This was built in at the time the building was constructed, and is connected to a very large, wide chimney, the top of which may just be seen in the picture. The latter would provide plenty of draft, but it would seem as if an open fire of this sort would be dangerous where much oil, gasoline and oily waste were unavoidably present.

Including the windows in the door, six in number, the light provision is ample, as there are ten other windows, three on each side and four at the far end. The size is such as to require considerable light; in fact, in spite of the numerous windows the interior appears very dark. Another feature of this garage worth speaking of is the maneuvering space left in front of the building. This has a tapering shape, from the very narrow neck, where the car must enter, to the very wide part just to the left where the car may be seen. Its shape and size are

Garage Which Was Stretched from One to Two Cars' Capacity

such that the longest car could make the full turn in one change of direction. The other cut on the previous page shows the plan of a stone garage of some merit. It is not large, but more space is provided than the one car would seem to call for. The first thing to be noticed is the open center portion, located midway between the automobile room and the driver's room. The latter is like the one previously described, somewhat small, and evidenty intended for a single man.

Inside it measures 10 feet 6 inches by 19 feet, slightly larger than the other one. The entrance in the middle of the side would give the impression that it, also, was divided into two parts, a living-room and a sleeping-room. The size and arrangement, too, would seem to carry out this idea, two being placed in the front living-room, where light was more desirable, and the single window in the bedroom, where light is not so needful.

In the automobile room little of novelty is found, the usual arrangement being followed. This gives the double doors, the drain for washing purposes close up to the doors, the workbench fairly close to the drain, so that work can be done on the car when being washed. Close to the workbench is the sink, where the driver could wash up, this also being close enough to the car position to be handy for filling the radiator.

Small Frame Building for Two Cars Unique—At first sight the unique features of the small frame garage for two cars, shown at the top of this page, are not apparent. In fact, it looks just as one would expect any well-designed frame garage of that capacity to look. The shape of the roof gives a slight clue to the peculiarity. This lies in the fact that this garage was originally built for but one car and was enlarged to accommodate two by cutting the building in two along the center line, widening out to two-car size by moving one-half over, and then filling in the missing portions. The two changes in direction of the slope of the roof indicate where the parting was made, the left-hand part being the older, or first-built, part, are also the right-hand wall and the first part of the right-hand roof.

The mansard part of the roof, the center portion, was added, the door at the left was duplicated, and the front and back walls sided up to match the other parts. One window at each side and one at the rear afforded scant light for the enlarged building, so when the changes were being made another window was added in the back and a skylight on each side of the roof. The garage is short and gives little room behind the car, or in front of it, for that matter. This determines the position of the car in the garage with some accuracy, and the skylights were located so as to afford overhead light on the engine of the car.

Another feature of this garage is, like the first, unique and also invisible in this picture. To understand it at its full worth the statement must be made that the whole building, first for one car, and later, as shown, for two cars, was built with the utmost economy. The floor is of wood, spruce being used except directly under the right-hand portion, where the Cadillac car shown is kept. There the floor is of concrete. This concrete floor is very small, exceeding the wheelbase of the car in length by but a few inches, and the tread in width by a similar amount. Like the various other parts of the building previously described, this was dictated by economy, the concrete floor being too expensive to use for the whole width and length, so all of its advantages were gained without its disadvantages.

Aside from the economy of space and money, the interior shows up with marked excellence; the light is good; the arrangement is even better, there is a place for everything, water, oil, and gasoline are provided in the proper places; tool equipment is complete and well selected, etc. The inside size is 20 feet wide by 18 feet deep. In this space the two cars, a four-cylinder Cadillac and a six-cylinder Ford, share equally, each having 10 feet in width. In depth, however, the workbenches, clothes closets, and other things congregated at the back reduce the available depth to about 14 feet. There is a source of water supply at each outer corner, so that each owner may use water at the same time without bothering the other. The gasoline tank is buried outside in a convenient place in front, and holds three barrels.

Three-Car Frame Garage—When it comes to a multiplicity of cars of high power, which usually spells long wheelbase, the garage requirements go up very fast; that is, the size must be unusual, particularly when the land provided is such as to call for a narrow building.

This is shown in the garage at the bottom of this page, which houses three big Thomas cars, two of them "sixes." The view was not taken to bring out the length, but, on the contrary, to reduce the apparent length as much as possible. The actual inside measurements were 24 feet wide by 60 feet long.

This great length was lighted by means of seven large windows on each side, as well as three equally large ones across the back, and whatever light entered at the front end from the one window there or the open door. The wash rack was at the front, just inside of the door, but in fair weather the cars were washed outside on the big cement platform provided as a runway. This measured 25 feet by 25 feet, so that it would be easily accommodate several cars at once.

Gasoline was furnished by a 500-gallon Bowser tank located at the left side of the building near the front road. The interior was heated by a large stove located just behind the stairs and toilet, in about the center of the length of the first floor. As the area to be heated was great, and as this one stove heated the living-rooms upstairs also, it was very large in size.

At the rear end extending clear across the building was a large workbench fitted up in the customary manner. The building, although frame, is made as nearly fireproof as possible by the inside sheeting, which is of ornamental sheet steel, as is also the ceiling of the lower floor. The floor is of concrete. The living-rooms above are unusually complete, comprising six large-sized and very conveniently arranged rooms for the chauffeur.

(To be continued.)

More Elaborate Garage of Frame Houses Three Big Cars

Automobile Vibration and its Physiologic Effects

By André Gonthier

CONSIDERED from the point of view of means of locomotion, the present age has been decisive. Important inventions have revolutionized that branch of human knowledge and have contributed powerfully toward the advancement of the world in the process of evolution that is being carried out. We live in the century of speed. In the present organization, a simple stoppage—a mere falling off in the means of communication—brings in its train great disruption. Present relations and exchanges between individuals and populations are so intense and so necessary that their continued maintenance is a matter of life or death.

Where are the peaceful trips of other days? The berlins of long ago, the diligences, and the good old times when no one was in a hurry? What a veritable revolution has been brought about in means of transport! And when their importance is considered, the character they have taken, the changes, transformations in habit which their use imposes, even to the extent of making necessary a new method of living to a constantly growing number of people, it will be evident that questions of hygiene are also involved. Swift steamers, railways, submarines, automobiles, dirigibles and aeroplanes are all means of locomotion imposing new conditions of existence, involving special accidents and bringing in their train a new pathology which is becoming more and more important. If automobile travel be considered, it will be seen that the organism of those devoted to it is subjected to multiple influences. The speed of the car, the blast of air striking the body, the cold, the dust, the prolonged immobility, the gas from the motor, and the concentration necessary are some of the factors capable of producing an entire gamut of physiological and psychological effects, which may even attain to morbidity.

The skin, certain organs of sense, the respiratory apparatus, the circulation, the oxidation of the blood, the nervous system and digestive organs are all more or less influenced. If these organs be normal and the causes in question act progressively, the individual will become inured, and, by the habit of resistance to exterior agencies, the organism will acquire a particular power of endurance in addition to that of the normal state. If certain organs be already diseased, they will also react, but in a manner aggravated or lessened by their defects.

Medicine and the Automobile—The relations which unite automobiling with medicine, while not established in a precise manner, exist none the less, since here is a means of locomotion becoming more popular from day to day, which bears upon important questions of hygiene, which may be the cause of pathologic affections, and also, it is true, be a therapeutic means —a valuable aid to the physician. It has already been noted that vibration is one of the factors by which the automobile acts on the system. Vibration, which in the automobile is regarded only as a disagreeable inconvenience to be remedied to the greatest extent possible, is also a therapeutic aid, resorted to in various cases, such as gynecology, nervous affections and the like. The patient is subjected to general or local vibration, applied either manually, or by means of special apparatus, mechanically operated.

Are the physiologic effects produced by the vibrations of the automobile comparable to those which it is sought to obtain therapeutically? What are the relations of the analogy, what resemblance can there be between the vibrations applied to the patient and those to which the chauffeur is subjected? What conclusions can be drawn therefrom? This is what we have attempted to study out.

In making a research of vibratory medicine, curious facts have been brought to light, demonstrating that for a long time past, medicine has occupied itself with a study of the effects of locomotion. If vibratory medicine be of rather recent origin in its scientific application, massage, of which it is a variation, has been known and employed since the most remote times. The medical literature of the Chinese and Hindoos show that these people had a thorough knowledge of massage. In the Graeco-Roman age, instruments had been perfected and mechanical vibration, which now interests us, was employed.

Astruc, the famous professor of the Faculty of Medicine of Montpelier, in an article appearing in *Le Mercure de France,* in April, 1735, enumerates the experiments made with this method of medication in the Greek and Latin epochs. According to him, Ovibase, Hippocrates, Coelius, Aurelian, and later, Bernard de Gordon, had all shown the benefits to be obtained from this practise. Since the beginning of the eighteenth century, works on mechano-therapeuty have become more numerous. In 1711, Hoffman, in Germany, prescribed gymnastics for hypochondria, phthisis and other ailments. In France, Chirac, the physician of Louis XV, recommended trips in a poste chaise for neurasthenia. He remarks that hypochondriacs are much benefited by riding over the block pavements of those days, of which, unfortunately, only too many evidences remain.

The success due to the somewhat special therapeutic treatment imposed by the romantic poste chaise of our ancestors inspired the Abbé de Sainte Pierre, the celebrated Utopian and author of the "Project for Universal Peace," to construct a sort of rocking chair of which the occupant was subjected to a shaking analagous to that experienced in the poste chaise, and from which, according to him, similar benefits were to be obtained. In *Le Mercure de France,* of 1734, appeared an announcement of the Abbé, unveiling his invention. The claims made are so interesting and naïve as to warrant a detailed citation.

"The Poste Rocking Chair"—"Machine for curing and removing maladies arising from an excess of nourishment, oversedentary life and lack of perspiration. M. Chirac and other skilled physicians have observed that the movement to which the body is subjected in a poste chaise, rolling rapidly over the pavement for several days, may be regarded as an excellent remedy for many of the evils attributed to melancholy, vapors, bile, etc."

He goes on to explaint in his own manner, in the physiological ideas of that day, which to us appear vague and ridiculous, how the shaking of the rocking chair would act in all classes of maladies—somewhat *a la patent* medicine panacea of our own time.

"The majority of these evils are caused by obstructions of the glands and other parts of the viscera, and these obstructions are found most frequently in those whose blood has become thickened or poverished by lack of air, which gives animation and increases the elasticity of the blood? Obstructions in the small canals of the glands are dissipated simply by the shaking and the rapid trembling of the entire body caused by the poste chaise, while, on the other hand, this sharp and continued shaking compeles stronger and more frequent respiration, thus passing more air through the blood. These effects of the obstructions happen most frequently to those who overeat and who

* Translation from the French of "Omnia," by Charles B. Hayward.

take less exercise than is necessary for the blood, of which there are a great many, particularly in the cities."

Have we not here the advice of hygienic exercise, which the modern practitioner does not disavow?

"But as the poste chaise remedy is costly and above all, embarrassing, I have invented a substitute in the shape of a rocking chair affixed to a frame which subjects it to strong and lively shaking."

Wealthy and sedentary people who are particularly subject to obstructions and lack of perspiration, may have such a machine, or trembler, at home, while others may be treated at apothecarics and by surgeons. So was launched *Le Tremoussoir*, and it raised a great furore in its time. Voltaire, writing from Champs, to the Comte D'Argental, September 14, 1744, says "I departed for Champs, instead of dining. Placed myself in the *tremoussoir* of the Abbé Sainte Pierre and here I am, a little better, etc." But in spite of its success and its illustrious clients, the novel rocking chair was soon lost in oblivion, like so many other inventions. The fact to be drawn from it was that the idea for that original device was taken from the poste chaise. It will also be seen that later, means of locomotion were responsible for the famous trembling chair of Charcot. The experiments of Zander and Nycander, both of whom invented special vibratory devices may be rapidly passed over, as well as many more of comparatively recent origin, a recital of which would form quite a lengthy chapter—more on medicine than automobiling. The prinicipal results of vibratory treatment are said to be an augmentation of the secretions, particularly of the intestinal tract, quieting of the nervous system, and the facilitation of digestion.

The Automobile Produces Similar Results—The use of the automobile and certain other forms of transportation, in which the vibration is violent and continually produces analagous results, and it seems that the physiological action of the vibrations affords an occasion to explain certain of the advantages and disadvantages of automobiling in this connection.

In a paper read before the Academy of Science, Mouneyrat has shown that in persons devoted to automobiling, there is an increase in the rate of formation of hemoglobin, as well as in the number of cells in the blood, which is explained by the action of the greater amount of air inhaled and its oxidation of the tissues. Is this not a close approach to the experiments of Colombo, who demonstrated the secretory effects of vibration? Dr. Legendre has also shown that the automobile, by reason of its vibration, affords a remedy for several forms of congestion affecting various organs. But it is hardly necessary to drag out further the catalogue of benefits or ills. It has been shown that medicine must contend with the new form of locomotion. On the railway, as on the automobile, the simple shaking, to which one is loth to attach any importance, may in certain cases, and according to the manner in which the subject reacts, mark the starting point of certain pathologic affections. On the contrary, it may also be a therapeutic aid, of which our forefathers long since took advantage.

FRANKLIN TRUCK UPKEEP REDUCED BY PNEUMATICS

SYRACUSE, N. Y., Dec. 6—An innovation in the construction of motor vehicles is the use of pneumatic tires on the tracks built by the H. H. Franklin Manufacturing Company of Syracuse. Though an innovation, this has been tested long enough so that the company is able to announce that their use results in a very low cost of up-keep. The company also states that to the fact that in their construction unnecessary weight is eliminated, is due the possibility of successful use of pneumatic tires on the wheels of the Franklin trucks.

In discussing the results secured and the use of pneumatic tires for trucks, the following statement is made by W. F. Kneip, engineer of the commercial car department at the Franklin automobile factory:

In the operation and manufacture of motor trucks the great question is the cost of maintenance and up-keep. This subject is of greater importance than reliability; indeed, reliability is actually involved in it. For example, it would be possible for us to conceive of operating a motor truck which was absolutely reliable but which, at the same time, cost an excessive amount to maintain. Of course, in spite of its reliability, its operation would have to be discontinued as it could not compete with others which could do the work more cheaply.

We will confine this discussion to trucks of 3,000 pounds' capacity and under. For such trucks or delivery wagons to show increased earnings over horse transportation their speed must be much greater. In delivery service such a truck must displace from two to three horse-drawn wagons.

In the past designers acted upon the assumption that reliability was the real key to success. With this in mind they pounced on our long-suffering and overworked friend, the pneumatic tire, and threw him out, bag and baggage. The idea was that a half hour lost now and then, due to a puncture, constituted an insurmountable barrier to the use of pneumatics. So far, we will all admit that, other things being equal, the puncture-proof tire is the best to use. But it was soon found that in order to make a satisfactory showing against horses the trucks would have to run at an excessively high speed when equipped with solid tires.

The result was that the trucks began to come apart quite rapidly, and spent considerable of their time in the repair shop. This interfered with reliability, and, in addition, greatly raised the sum of the items of repairs and tire cost. This was not all, as it was found that these high speeds had a tendency to loosen tires so that they would come off on the road. To apply one of these tires generally necessitated the removal of the wheel and the use of a huge, clumsy mechanism which took a man and a helper to operate. Thus when a tire came off on the road it was a case of either coming home slowly on the rim or waiting for a new wheel. These things interfered quite decidedly with reliability, besides costing money. The position of the operator of a single truck in a small town where there was no tire-applying machine was particularly unenviable.

To overcome this tires were finally developed that would stay on till worn off. This last kind was worse than the first, because the operator, in order to save money on tires, would let the tire wear down until it had practically no cushioning effect. His expense for repairs would be two-fold.

In the meantime, makers of pleasure cars were studying the pneumatic tire problem. It was found that there was a relation between size of tire used, weight carried and speed at which it was carried. Given a certain weight and a certain speed, larger tires would lower the tire cost per mile, at the same time assuring greater reliability from the tire point of view by eliminating the danger of blow-outs and minimizing the danger of puncture.

In a sense the problem is analogous to retail and wholesale buying, for when tires are bought it is simply a case of buying so many miles. When larger tires are bought larger packages of miles are purchased, and the rate is cheaper. The only objection to this arrangement is that it makes the first cost look high. That is one reason why so many so-called cheap cars are unsatisfactory to their purchasers. By the use of large tires, however, we have eliminated lost tires, the wasted time installing new tires and most of the lost time and money spent in repairing the mechanism. Therefore, the reliability is actually increased about one hundred per cent., while the sum of tire cost per mile, plus repairs to mechanism, is reduced.

At the same time, by increasing the safe available speed, the capacity of the truck per day has been increased about fifty per cent., and all this at the expense of an occasional puncture which can be easily remedied by the cheapest sort of help in a half hour, at most. We must not lose sight of the fact that cutting down the cost of repairs on mechanism also insures a far lower depreciation charge, so that, summing up the question of the use of pneumatics in place of solids, we find that with them:

1. Tire cost per mile is about the same or a little greater.
2. Earning capacity is increased about fifty per cent.
3. Depreciation is decreased about fifty per cent.
4. Repairs to mechanism decreased about fifty per cent.
5. Reliability, or total number of hours worked out of total number of chances, is increased wonderfully.

In fact, the use of pneumatics confines the troubles of the boss of the repair shop to minor adjustments and to the repair of punctured inner tubes.

ENGLISH DOUBLE-IGNITION SYSTEM OF UNQUESTIONED MERIT

NO longer is it necessary to apologize for the use of a double-ignition system, or to make excuses for the inclusion of a magneto, the necessity for the battery-coil-timer system having been granted some years ago. Far from it, in fact, the need for the magneto may be said to be more generally granted to-day than is the necessity for the other or alternate system.

With the growth of the magneto system, however, and the popular demand for it, has come about the almost universal fitting of both systems on the same car, the manufacturer being unwilling to take any chances, putting on both, and usually as two separate and distinct groups, each complete in itself and well able to ignite the engine satisfactorily for a prolonged period of running.

This, to look at it in a critical way, means not alone the parts of the two systems, but their placing and sufficient space to accommodate them in a workmanlike and accessible manner, to say nothing of the driving means. Since both must be driven positively, the latter requirement means a gear drive. In many engines the gear drive of two separate ignition mechanisms, coupled with the other requirement for a workmanlike and accessible manner of placing them, has resulted in an unsolved problem.

The meaning of this is that the problem, having been found too difficult for solution, has been dodged, and the result is a loss of some of the desirable quantities. Either one or both systems becomes inaccessible, or are located far apart, so that the engine is covered with wires.

New System Eliminates All Faults—With a new and decidedly different system, just brought out in England, all this is avoided. Not only is accessibility promoted, simplicity evolved, length and cost of wiring reduced materially, but by combining the two systems, or, at least, the parts of greatest importance, into one unit, while at the same time retaining the individuality of both, the desirability of having both is increased 100 per cent.

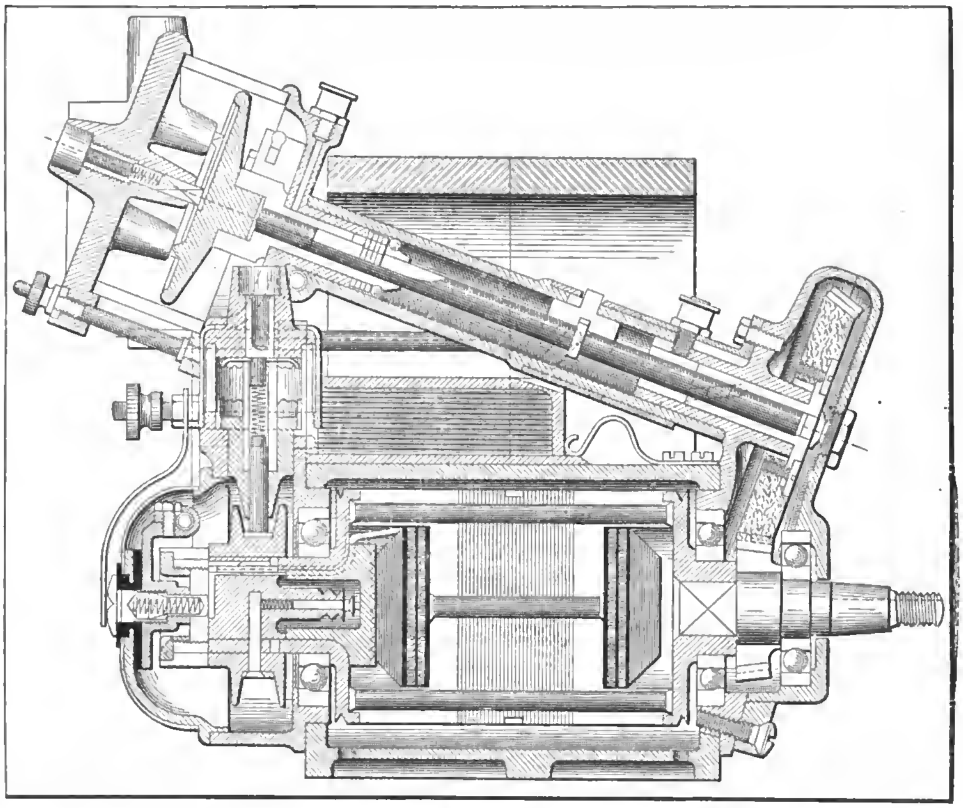
Hall-E. I. C. Double Ignition is the name given to it by the makers, the Electric Ignition Company, Ltd., Sampson road North, Sparkbrook, Birmingham, England. It consists of a magneto constructed with a distributor for the low-tension current as an integral part. Not only is this made in this manner, but it is made in two different ways, to allow an opportunity for choice on the part of the car designer. The two, both illustrated on this page and the next, differ in having the secondary distributor placed either inclined or vertical.

Inclined types lend themselves better to the placing of the magneto-timer at the rear end of the engine, close up to the dashboard, yet possessing a maximum of accessibility. The vertical type, on the other hand, while available for use anywhere, lends itself to the forward location in a better manner.

Two Contact Breakers, Two Distributors—As exemplifying the pains taken to have this system contain only those points which are good, and more—all that being good are necessary—may be noted the use of individual contact breakers and separate distributors for each system. That is to say, the high-tension magneto system has its own contact breaker, located at the front end of the driving shaft and readily removable by simply turning the spring aside. Strictly aside from this point of accessibility, absolutely without tools other than the hands, is that the magneto contact breaker works ahead of the coil which boosts the current, thus being strictly a low-tension current device.

Another distinct, yet exclusive, feature in relation to contact breakers is that the low-tension contact breaker for the battery-coil-timer system is exactly the same in all details, being interchangeable one for the other, either wholly or in part. The details of the one, then, will also be the details of the other, so it will suffice to describe either.

In appearance this is not entirely unlike the well-known La Coste timer, although there are some minor differences. The curved arm carrying the roller is used, but the spring to hold the roller in contact with the actuating cam differs. The latter is a flat spring instead of a coil, and is attached to a link which pivots on the lower end of the roller arm, rather than the arm itself.



Section Through Inclined Type Hall Magneto, Showing Ball Bearing Shaft and Distributor

The cam is regular in outline, a perfect circle, with four circular notches cut out of its periphery, equidistantly spaced. The roller rides on the inner surface of the notches normally, the rise to the outer surface making the break at the contact points. The latter are of platinum. A large adjustment is provided, with a locking screw to hold it. For the two differing uses, however, the makers recommend differing adjustments of the maximum distances apart as controlled by the adjustment. Thus, for the magneto 1-2 mm gives the best results, while for the battery system 1 mm is advisable. Expressed in English units, these distances are, respectively, .019 in. and .039 in., or a little more than 1-64 in. and 1-32 in.

Marked Difference in Unsupported Armature Length—As the two sectional drawings show, the construction follows standard practice in the main. Thus the armature is of the H slot type, the windings being concentrated in the interior of the slot. This rotates on ball bearings composed of 1-4-in. balls. The whole armature is very short and stubby, the distance between

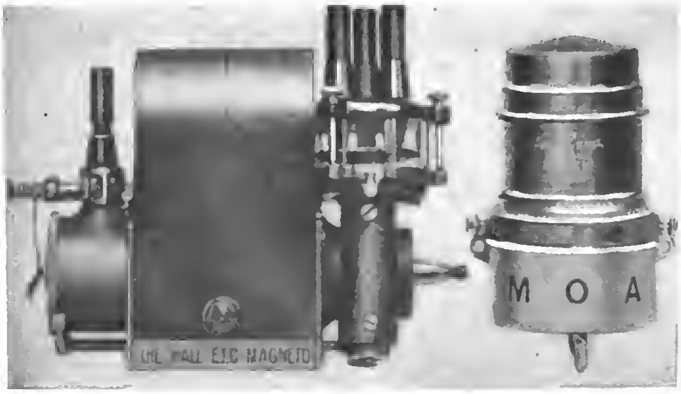


Illustration of Magneto and Special Combined Switch and Coil

the two bearings being much less than in the ordinary case. This is done by shortening the space given to the armature proper, although without any sacrifice of wires. Additional length is gained by the placing of the gear outside of the bearings, an extra bearing being provided beyond that, so that the gear driving strains are taken up by it. More than this, the high-tension collector ring—usually located close to the armature—is located just as close in actual distance from the end of the armature wiring, but actually beyond the bearing. This totals to a reduction of the usual center to center bearing distance of 6 1-2 in. down to an even 4 in. Not only is this a reduction of nearly 40 per cent., but in its bearing on the stiffness, resistance to springing and consequent rubbing against the pole pieces to cause wear, it is an improvement of more value even than that.

Accessibility is carried forward in the construction and placing of the condenser. This is made rectangular in shape, with the connection projecting on the left side as a small circular bar. With the contact breaker and safety spark gap off, the condenser may be lifted out bodily without touching anything else, not even disconnecting anything. With the two parts mentioned in place, however, it is necessary to turn the condenser up on edge, the space within the magneto being sufficient to allow this. It is then lifted out as before, without disconnecting anything.

Safety Spark Gap Useful at All Times—The high-tension collector ring is placed at the front end of the magneto, just in front of the ball bearing. Its location there is such as to allow of ready removal. This latter operation is brought about by holding the collector ring with the left hand and using the right to loosen the ring. This is done by means of a coin applied as a slot wrench to free the aforementioned ring. Then the contact breaker cam and high-tension collector ring may both be removed for inspection. Just above the ring, and bearing upon it, is the carbon collector brush. This leads the current up to the vulcanite terminal to the high-tension switch. Between the two is placed the safety spark gap. This serves the most important function of acting as a protector or safeguard against the armature burning out or breaking down. To facilitate its usefulness it is surrounded by a glass cover, through which the size and condition of the spark produced may be observed at any and all times. The gap is unusually substantial, being provided with a number of serrated spark points of steel. These act to make it long lived. The ability to see when the earth spark is working, thus locating or detecting faults, is of inestimable value to any one conversant with magneto ignition. More than this, the gap may be made useful in tuning up and otherwise. The proper space varies between 6 and 7 mm, or between 1-4 in. and 9-32 in.

To remove this, it is only necessary to turn it with the fingers, the connection being by means of fine threads. Like the other parts, the distributor, whether on the inclined or vertical type, may be removed by taking out three small screws. Then the top may be lifted off, the glass protector removed, the distributor disc lifted out, and, if desired, the contact breaker and low-tension cam, also.

Differential Spark Advance for Two Systems—A point which is often brought out against the dual ignition is that the advance for the two should be different. As this entails complications it is usually omitted, the same amount of advance being given for each. In the Hall magneto the correct amount of advance is given to each system, the coil having this movement in an advancing ratio to the magneto. This results in a greater amount of movement being given to the coil contact breaker than to the magneto contact breaker, thus compensating for the small amount of lag in the coil system. It operates on both advance and retard.

As brought out in the two drawings, the drive for the coil-timer-battery system is through the medium of either bevel gears for the inclined type or worm gearing for the vertical. These are constructed with a view of bringing out the noiseless feature, the worm being notable for this, while the bevels are of a material which reduces noise to a minimum. Both run in a bath of oil at all times. In the cut below, the whole construction is made apparent, this being a longitudinal section along the center line of the vertical type. The worm drive and provision for taking up its thrust may be seen clearly at the right.

In Vertical Type, Worm Driving Is Utilized, and Distributor Carried Up Above Magnets

GOOD ROADS: MODERN REQUIREMENTS—AN ENGINEER'S VIEW

By H. TIPPER

THE question of good roads is a vital one to the automobile owner and manufacturer, and it is also a subject of very deep interest to the general public. The automobile is responsible for the problem of revised construction of roads on account of the increased wearing effect which fast-moving traffic has upon a road constructed in the manner usually adopted for highways up to the last year or two. Consequently, the roads engineers are after a more lasting highway, as well as a cessation of the dust nuisance.

The general opinion of road engineers in the Eastern States, and in those parts of the country most largely subject to automobile traffic, is that the old method of constructing roads must be abandoned to a considerable extent, and that brick, cement, and other like materials involve considerations of cost and of doubtful efficiency in this regard, which practically eliminate them from consideration. The result of the investigations of engineers is that the proper surface for the future road will be produced with the incorporation of an elastic material with stone which will eliminate dust and, at the same time, resist the shearing effect produced by the fast-moving automobiles.

Further investigations are necessary to decide the most durable construction of this character, though it has been demonstrated that a most efficient material for this purpose is an asphalt produced in semi-solid form, which can be very economically applied to the road and which will, unquestionably, prevent the dust evil, and, if properly constructed, to a large extent eliminate the excessive deterioration caused by the high-speed traffic.

To Produce the Best Binder—Much difference of opinion exists at the present time as to the exact qualities which are necessary in the asphaltic material to produce the best binder, and a good many contradictory statements are made on this subject. A very general agreement, however, is shown among engineers as to the necessity for using some character of asphaltic material for the purpose of binding the road. This method of construction naturally involves an extra cost over and above the construction of the ordinary macadam road, and it is on the question of how far it will be possible to go in the expenditure of the extra sums of money on the highways that the decision will rest as to what method of construction will be finally adopted.

At the present time there are practically only two methods of construction which are used in this connection, and the relative value of these constructions as a permanent method of surfacing has yet to be decided upon from a point of view of cost and durability. There can be no question, however, that both these methods of construction are a considerable improvement over the ordinary macadam road, and are very much more adapted to the needs both of the automobilist and of the general public.

One of these methods is the pouring of the asphalt material while hot into the broken stone surface of the road, spreading the small screenings on the top and rolling the whole into the broken stone surface until it is all thoroughly bound together.

Another method is accomplished by mixing the broken stone and the asphalt together, laying on the road and then rolling in place with a very heavy roller.

The principal difficulty, and the one which engineers are busily engaged in attempting to solve, is the best character of asphaltic binder to adopt. There has been so much material of a doubtful character thrown on the market with the rapid extension of the problem and the enormous requirement developed, and so many absurd claims are made for materials which have yet to be proved of value, that there is considerable difficulty in deciding upon the best character of material to use.

Complaint in Regard to Oil—A great deal of complaint has been made regarding the use of oil, and much trouble has been experienced by automobilists with the application of this character of oil on the road. The trouble is that oil has been bought without any idea as to its suitability for the purpose and much material of a practically useless character has been dumped on the market merely because it was cheap. This application of cheap oil, to the detriment of the users of the road and those who live near it, will undoubtedly continue for some time until the authorities become much better educated as to the requirements imposed by the conditions of traffic.

It should be remembered, however, that an oil of the proper character, properly laid, is a very efficient dust layer, and when trouble is experienced in this direction it can very usually be traced to the poor character of the oil and, not infrequently, to the poor method of application.

Surfacing an Asphaltic Binder—The same criticism applies to the method of surfacing with an asphaltic binder, and the principal investigation to be carried on is in the direction of standardizing the material and the method of construction so that something of the same general result can be obtained.

As to the greater cost of roads built with the new method of construction, the additional cost for the method usually adopted in the Eastern States runs from $1,500 to $2,000 per mile on a 15-foot road. The maintenance charge, however, on ordinary macadam roads, where there is much automobile traffic, is so heavy—amounting to from $700 to $1,200 per mile per year, according to conditions—that the extra cost of the new method is frequently less than two, and usually less than three, years of the maintenance expense required for ordinary macadam roads, and, at the same time, the road is free from dust and suitable for the traffic.

Experimental Roads—There is a great cry frequently for the laying of strips of experimental road for the purpose of showing what material is best to use. The trouble with laying experimental roads lies in the fact that it is possible to build a road with almost anything, and it will show up fairly well for a month or two, or possibly a year. The real tests of a road lie, not in the way in which it stands up for a few months or a year, but the way in which it answers to the conditions for three or five years, or a longer period.

Experimental roads which have been built for the inspection of various conventions of good roads people and others are subject to the criticism that they have not been built and watched for a sufficient length of time before the inspection to warrant any definite conclusion being drawn for their appearance. The consequence is that the conclusions drawn on these occasions have been very frequently misleading, and roads built after construction of the kind prove to be of little value as a permanent proposition.

It is evident that if the heavy maintenance charge for roads is to be eliminated, the dust nuisance to be prevented, and the road to be kept in something like condition, increased expenditure is necessary for it. It is also evident that a considerable amount of investigation will have to be made to show the best method of construction and to give proper evidence as to the qualities required in a material to suit the new conditions. It is, therefore, desirable and wise to avoid the hasty condemnation or approval of any scheme which is still in the experimental stage, and the most that can be said at the present time is that the road engineers are fully alive to the proposition and are working upon it as quickly as is possible.

The indications are that the road of the future will be a stone road with a practically smooth surface, the surface course being built with an elastic binder, and that the dust evil will, within a few years, be a thing of the past.

BLUE AND BROWN PRINTS

Editor THE AUTOMOBILE.

[2,109]—Will you please answer the following questions through your valuable column of "Letters Interesting, Answered and Discussed": Some time ago I ordered prussiate of potassium for blue printing and received instead, potassium dichromate, with which citrate of iron fails to give the usual results, making a very poor light brown background and very dim brownish white lines. What can I get in the way of chemicals to make a dark brown or black print with clear white lines, like negative paper, for instance? Please give the proportions of the chemicals and method of mixing them.

W. B. CUNNINGHAM.

Lansing, Kansas.

Blue and brown prints differ very much, the chemicals, mixing of them, and the way in which they are used being widely different. Thus, for blue printing, nearly all receipts call for ammonia citrate of iron and red prussiate of potash. These may be made up as separate solutions, and mixed later on, or they may be mixed at first and the whole made up as one solution.

A formula using them together, is: Dissolve 1 oz. of citrate of iron and ammonia and 1 oz. of red prussiate of potash in 8 oz. of water. Dissolve for 10 mins. To use, shake thoroughly and apply to the paper with a sponge or camel's hair brush. This paper may be used as soon as dry, being developed and fixed, all in one operation, simple washing in water.

In the line of black or brown ground instead of blue, there are many processes as follows: Black lines on white (nigrographic process), white lines on black (Willis' platinotype), black lines on white (gallic acid or Shawcross' direct positive process), white lines on black or black lines on white (argentic nitrate process), brown or grayish lines on white (uranium salt process), brown lines on white (Poitevin's gelatine process), dark brown lines on white (Cros & Vergeraud's ammonic bichromate process).

Some of these are very complicated and the chemicals very difficult to obtain, to say nothing of the expense, so that a couple of the more simple ones, only, will be discussed. Thus, the fourth or argentic nitrate, more commonly called silver nitrate, is similar to blue printing solutions and after operation, excepting only the addition of a toning process.

Dissolve 60 grains of silver nitrate in 1 oz. of distilled water, adding 10 drops of a previously made saturate solution of citric acid per oz. of the argentic nitrate solution. Coat the paper with this, dry, and expose in the ordinary manner. Then, after washing several times in clear water, tone for 15 minutes in the following solution: 1 grain auric chloride, 30 grains sodic acetate, 10 oz. water. Wash again not less than three or four times, then fix by soaking for 15 minutes in this solution: 4 oz. sodic hyposulphite 1 pint of water. Finally wash several times to clear off traces of hypo.

Brown or gray lines on white, the uranium nitrate process is easy to use. Sensitize the paper by floating for about 8 mins. in a solution of: 617.2 grains (40 grams) of unanic nitrate, 4.4 pints (250 cc) of distilled water. Expose this paper slightly longer than the ordinary paper, then for a brown copy, float it for 4 mins. in a solution of: 15.43 grains (1 gram) potassic ferricyanide, 2 drops hydric nitrate, 4.4 pints (250 cc) water, after that wash it in slightly acidulated water. For a gray copy, develop by floating in a solution of: 30.86 grains (2 grams), argentic nitrate, 3 or 4 drops acetic acid, .54 pint (40 cc) water. Finally, wash in running water.

Should you ever desire to make prints with blue lines on a white background, coat your paper with a solution of: 3 parts sodic chloride, 8 parts ferric chloride, 4 parts hydrogen tartrate, and 100 parts water. This is thickened by adding 25 parts of powdered gum arabic. After printing, wash in a saturate solution of potassic ferrocyanide, but do not immerse the paper in it, so as to wet both sides, simply float it in the liquid. Wash in water and fix in: 8 parts hydric chloride, 3 parts hydric sulphate, and 100 parts water. Finally wash in water and dry in the usual manner.

In this connection, you will find some interesting reading in the following works, which either touch on this subject in a thorough manner or else give exclusive receipts: Heliography or the Actinic Copying of Engineering Drawings, by B. H. Thwaite, page 312 and following, Proceedings Institute of Civil Engineers (English), Vol. 86; Blue Printing, Etc., Trautwine's Engineers Pocket Book, page 979 and following; Modern Heliographic Processes, Ernst Leitze; Modern Reproductive Graphic Processes, Lieut. J. S. Pettit.

NOISY GEARS DISAGREEABLE

Editor THE AUTOMOBILE:

[2,110]—If possible, will you answer the following questions in your paper, under the heading "Letters Interesting, Answered and Discussed." I have a———— Model F car, 1909 make, which develops a grating, grinding noise when running between 12 and 15 miles per hour. The car runs smoothly up to 12 miles an hour, and makes practically no noise. Beyond that, the gears will grind until 15 miles per hour is reached. Increasing the speed beyond 15 miles results in the noise disappearing again. I have adjusted the differential gears, all kinds of ways, but still the noise remains, and I can not tell where it comes from. The noise which is made is very disagreeable, particularly as I take pride in the quiet running of the car.

W. C. BALL.

Kalamazoo, Mich.

There is a compound made of boxwood sawdust and heavy grease as well as the sawdust in graphite, which will deaden the sound of the gear teeth running together as much as anything you can obtain. The particular noise which you describe, occurring between 12 and 15 miles per hour and at no other time, is, frankly, beyond us.

LIKES $500 CAR IDEA

Editor THE AUTOMOBILE.

[2,111]—The ideas of Mr. Laurie as expressed in his article on "The Possibilities of the Light Runabout" seem to me to be absolutely correct. Not because I have long had the same idea myself in regard to a factory making a good, small, low-priced car to be sold directly to the buyers, but largely because the plan would be so thoroughly cooperative that it must succeed.

Mr. Laurie puts the price of such a runabout at $500. I think that is about the best approximation now possible. To illustrate, there are now at least two fairly good 4-cylinder runabouts selling at $750. This is about $600 to the factory. If the makers can now put out a small number at that figure, certainly a factory making three or four times as many could sell them at $500. And the sales would likely be ten to fifty times the size of either factory now making the cars to sell at $750 list.

I agree decidedly with Mr. Laurie that the runabout should have no rumble seat. And I would likely not advocate the seat as far back as he. I think the rear of a runabout should have a large enclosed carrying space. There is no doubt but what the rapid growth of the automobile industry has stimulated and had parasitic competition, and that this competition has in many instances taken the form of factories making cars to sell to agents, or to users under the title of agents. Many people have bought obscure cars because they could get the agent's discount, whereas, even with the discount off, they were paying more than if they had bought a standard make of automobile at list price. A factory making a good low-priced runabout to sell at $500 and including fully as much real value as any $750 or $800 car on the market to-day, would get all this custom which has so far been a prey for the maker of the flimsy picture automobile.

It would be quite an item to a buyer on the Pacific coast if he could save more than the $100 to $150 freight charges on his automobile by buying from a maker whose prices, by an elimination of the usual expense of selling, were that much below the regular lines of agencied cars.

S. ROSS PARKER.

Seattle, Wash.

MORE ABOUT TWO BEARINGS

Editor THE AUTOMOBILE:

[2,112]—I was recently told that the Chalmers-Detroit "30," 1910 model, only has two bearings on the crankshaft. If this is true, do you consider it an advantage or a disadvantage?

E. E. A. S.

Cambridge, Ohio.

This matter was discussed at some length in the issue of THE AUTOMOBILE for Dec. 2, in answer to a letter. The writer of that letter, however, was not as specific as you, and asked as a matter of general principle. To answer your question directly, the construction as used on the Chalmers-Detroit "30" for 1910 is a good one.

The block cylinder construction possesses many undeniable advantages, and to have the use of them, this is one thing that must be had. In the case you cite, the shaft is made very short and stiff by the omission of the usual center bearing, while the diameter has been increased about 50 per cent. over the size which this motor would necessitate. This double stiffening of the shaft makes it practically unbendable by any strains that may be set up.

You are referred, also, to the letter on this same subject, namely, letter (2,106).

ANSWERED AND DISCUSSED

$500 IDEA IN FLORIDA

Editor THE AUTOMOBILE.

[2,113]—The article by Rolland C. Laurie in your issue of Nov. 18th on "The Possibilities of the Light Runabout," has certainly struck a responsive chord. That there is a large demand for the type of runabout, such as he mentions, there can be no question, and this demand comes not alone from the man of moderate means, but also from the owner of the large car who wants a light, natty runabout which he can drive to and from business and which will save his larger car both in tire upkeep and general wear and tear. A good many manufacturers turn out what they are pleased to term "Runabouts," but they cannot get away from the rumble seat idea and design the car so as to place either a single or double rumble thereon. This immediately opens the door of temptation for the owner to overload his car, and we all know that this is generally done.

I do not know that I could suggest any change in Mr. Laurie's prospective design other than to underslung the springs, so as to bring the runabout closer to the ground and then give the wheels as large a diameter as the general design could accommodate.

I believe that a four-cylinder runabout, thoroughly well built along these lines, and selling for between $500 and $700, would tax the capacity of our largest plant to supply the demand.

ROLLAND M. BARBOUR.
Jacksonville, Fla.

Unconsciously or otherwise, your suggestion hits one of the very few things which the car at $500 cannot have, namely, large diameter wheels. This means large tires, and the cost of tires runs up much faster than the simple ratio of sizes. That is, a 36-in. tire costs more than a 30-in. tire in about the ratio of 50 to 30 rather than 36 to 30. That being the case, very large tires would be out of question, or to put it as you did, very large wheels would be impossible. Even with the present very high prices of rubber, which mean high prices for tires, the chances are that they will go up rather than down, since the supply is not equal to the demand.

GARAGE EQUIPMENT COST

Editor THE AUTOMOBILE:

[2,114]—Will "The Automobile," through "Letters Interesting, Answered and Discussed," give me some idea as to the equipment of a small garage and the cost of the same? I want to know about one equipped for all kinds of repairs, including a vulcanizing plant. Also, what are the usual storage prices?

J. A. C.
San Antonio, Tex.

If you take THE AUTOMOBILE, it would seem as if you have been either away from home or asleep, for the last six or seven weeks an article on this subject has been running in the columns of the paper. As to giving costs, your question is too indefinite to allow of that. Small garage, you know, means so many different sizes. For instance, the writer knows of a man who speaks of his "small" garage, this building being about 60 by 90, and housing six or more cars comfortably. Another speaks of a house 14 by 16 as a "small" garage. Between the two, there is an endless number which might be called small.

A vulcanizing outfit alone need not cost very much money; in fact, these are now made in small sizes for private owners, small enough to be used on the road, and carried along in the tool box at all times. Naturally, the cost of this size is very modest, being less than $10. For a public garage of large size, and equally large capacity, a vulcanizing outfit might run to 50 or 60 times this. Storage charges, also, vary greatly according to location, service and amount of business done or size of the garage. We have heard of dead storage as low as $7 per month. Again, we have heard of storage charges as high as $70.

SELF STARTER DETAILS

Editor THE AUTOMOBILE:

[2,115]—I have read your article on the Winton automatic self-starting device in the issue of "The Automobile" for July 22, but it does not explain fully enough how the device works, that is, how the air is forced into the reserve chamber, and in general, the article does not go into detail. For instance, is a pump used in pumping the air?

A. J. HAGUE, JR.
New York City.

The reason why the complete details of this device were not given in the article to which you refer is because the same thing was used last year and the year before, being described very fully in these columns at that time. We think, too, that you were a little hasty in condemning the article in question as incomplete, since a perusal of the same seems to give all that you ask for. To repeat what was said at that time, "the arrangement is as follows: Tubes running from the first and sixth cylinders carry part of the combustion pressure to a storage tank under the body. Here it is stored until required for starting purposes. The driver then opens a push valve on the dash, and the compressed air rushes through a rotary distributor valve to the two cylinders just over dead center. This pressure pushes down these pistons and, on the occurrence of a spark, the motor starts. The entire mechanism has only one moving part —the distributor valve. An attachment permits tires to be inflated without pump.

Assembled on the dash are: (1) the gage, which shows the amount of pressure stored in the tank; (2) the push button, which allows a pressure to flow from the tank to the cylinders, and (3) a shut-off valve.

From this you will see that no pump is used, the first and sixth cylinders acting as pumps on the explosion strokes. As the compression pressure is about 75 pounds, and the explosion is roughly four times this, a pressure of 300 pounds is thus available, more than the average pump of small size would yield.

USE OF H-T DISTRIBUTOR

Editor THE AUTOMOBILE:

[2,116]—Is there in use, in automobile construction, an ignition system utilizing a single spark coil for two or more cylinders? What is a synchronized coil?

G. E. WARD.
Fort Atkinson, Wis.

Such systems are used very frequently; in fact, every magneto makes use of them. The idea may be briefly explained as follows: The high-tension current, of sufficient strength to jump between the points of a spark-plug, is generated in the outer winding of the coil by rapid pulsations of low-tension current, coming from the batteries or magneto, in the inner winding. When the low-tension current is turned into the coil, the pulsations are caused by the action of the vibrator. In the ordinary system, one coil for each cylinder, the timer turns the low-tension current into the coils in proper order, and the high-tension current from these coils passes directly to their respective spark-plugs.

In the single-coil system, the timer turns the current into the coil whenever a spark is wanted, no matter in which cylinder, and the high-tension current which results is sent to the spark-plugs in turn by a second timing device, usually known as a distributor. Such distributors are regularly on the market. That they are not in more general use for battery ignition is due to the difficulties encountered in properly insulating them.

Practically all magnetos use the single-coil system. If they are what is known as the 'true-high-tension" type, the coil is contained somewhere in the body of the magneto, often being incorporated in the armature. In others the coil is separate. On both types the timer and distributor are carried on the magneto and driven from its shaft. The only exception we know of is the Ford Model T magneto in the flywheel, which uses a standard timer and four separate coils.

By a "synchronized coil" is often meant one of this type, acting for all the cylinders through a distributor. The word "synchronized" has a Greek derivation, meaning literally "at the same time." Its applicability in this sense comes from the fact that with such a coil the spark must take place in each cylinder at relatively the same time on the piston stroke. It is almost impossible to adjust several coils and vibrators to deliver a spark in exactly the same length of time; hence with a multiple-coil system some cylinders are often firing ahead of or behind the others. With a single coil this is impossible.

The term synchronized is also often applied to a multiple-coil system using a common or "master" vibrator, which provides but one adjustment and gives each coil the same amount of current, so that it delivers its spark in the same length of time. This results in sparks regularly timed, just as would be the case with a single coil.

The advantages of the synchronous coil are well recognized, and it would be more used were it not replaced by the magneto.

Appearance of the Forty-Two Horsepower Six-Cylinder Touring Car Is Typical of the 1910 Franklin Line of Cars

CATERING to every need with a wide range of powers, values and bodies, the Franklin line for 1910 is unusually complete, comprising no less than 16 body forms on three separate and distinct chassis. With this universal line of cars, the makers, H. H. Franklin Mfg. Co., Syracuse, N. Y., expect to tax the capacity of the present immense factory to its utmost. To prepare for this widespread demand, the commercial cars have been segrated, and a separate factory obtained for their construction.

As has been the case in the season of 1909, the touring car is made in three models, the largest being a seven-passenger car of 42-horsepower, known as Model H, and the smallest a four-passenger car of 18-horsepower, designated as Model G. Intermediate in size and power is a five-passenger car of 28-horsepower, which is known as Model D. Model H has a six-cylinder and the other models a four-cylinder engine.

A change in construction is noted in the introduction of the car with the close-coupled body, or miniature tonneau, in the 42 and 28-horsepower classes. These close-coupled cars take the place to a considerable extent of last year's runabouts of the same size and power built with a double-rumble seat. The runabout type with a double-rumble seat, however, is retained in both of these models, and in the lowest powered class there is a retention of the runabout in three forms to the exclusion of the more popular close-coupled car, as in the higher powered models.

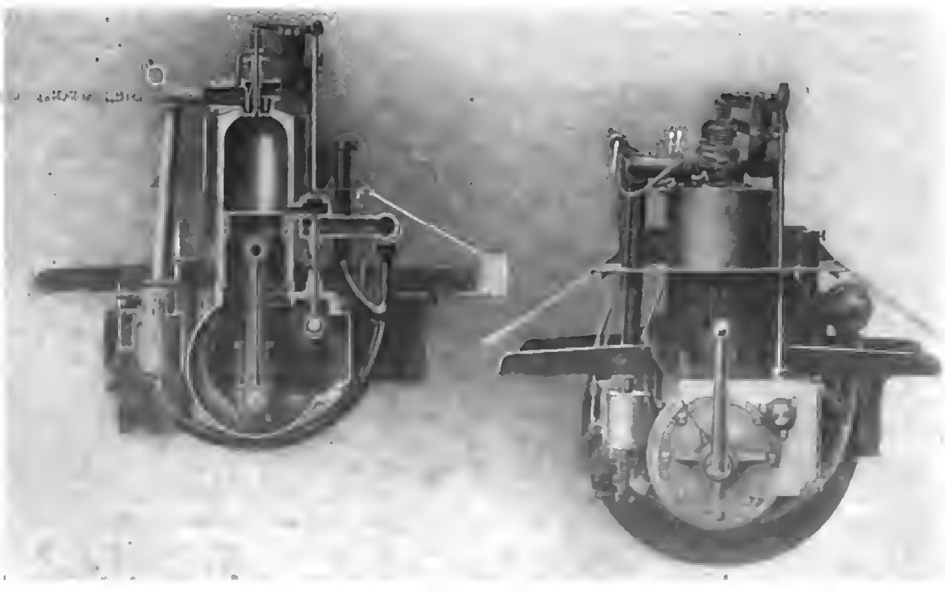
Closed cars appear in six forms, in the largest class being a seven-passenger limousine of 42-horsepower. In the intermediate class are another limousine, having 28-horsepower and carrying six passengers, and a six-passenger landaulet of like power.

Three closed cars are classed by themselves and not among the regular H, D and G models. They are all known as Model K, and each is driven by an 18-horsepower engine. They are a limousine, town car and taxicab, the two former providing respectively for six people and the latter for five. Both town car and taxicab have auxiliary folding seats. The driver's seat in the taxicab is single and the space beside it is large enough to be used for carrying baggage.

Most Noticeable Changes Made in Cooling Method—The changes most noticeable shown in the 1910 models are in the engine, but they are changes that are greater in appearance than in fact. Air-cooled like all its Franklin predecessors, the engine shows a new method of applying to the cylinders the cooling air current. Heretofore each of the cylinders has been encircled by a series of horizontal metal flanges of phosphor bronze shrunk onto the exterior wall. The same idea is carried out in the 1910 motor, but with this difference, that the flanges are vertical instead of horizontal, steel instead of bronze, and are cast into the cylinder instead of being shrunk on.

This makes possible the improvement in the way the current of cooling air is made to envelop the cylinders. In the previous engine the current of air taken from the front of the hood was sent back upon the cylinders by a gear-driven fan. This fan is eliminated now.

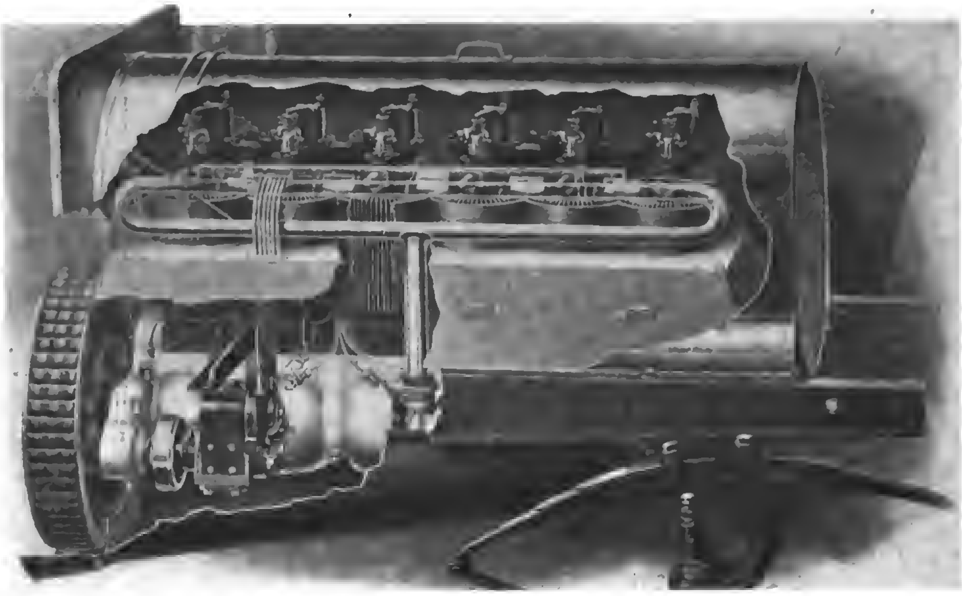
In the 1910 engine each cylinder, with its vertical flanges, is encased in a cylindrical sleeve of sheet metal, and through the tunnel-like opening thus formed, there is drawn from top to bottom a strong current of air by a suction flywheel at the rear of the engine. In order that the necessary suction may be effected, the entire engine base is given a housing of sheet metal. The top of this forms a



Section and End View of Engine Showing New Cooling Scheme

deck extending from the cylinders to the side members of the frame. This with the pan below the engine forms a chamber in which the air pressure is kept less than atmospheric by the flywheel, and thus is produced the partial vacuum necessary to the induction of the air current from above, and down the cylinders.

Powerful New Fan Creates Small Vacuum—This suction fan with its contributary devices creates a current of air far more powerful than that applied in previous engines. Increasing the amount of cooling air about the cylinders and doing it with less power, it increases both the cooling efficiency and the motor efficiency. Each cylinder, regardless of its distance from the opening in the front of the hood, is provided with an equal current of air, of equal temperature, and is equally cooled.



More Complete View of Six-Cylinder Engine Showing Cooling Details

Fan capacity is many times the capacity of the total area around the cylinders, assuring an equal distribution of the air. The air currents are fully controlled and accurately directed to those parts of the engine where they are most needed. Entering at the top, the air, while it is coolest, immediately strikes the valves and the hottest parts giving them a maximum of cooling effect.

Cylinders are cast separately, and each is equipped with the same number of flanges or fins. With the previous method of construction the number of fins was increased as the distance of the cylinder from the source of cooling air increased, this giving greater heat-radiating surface to those cylinders which felt least the effect of the cooling fan.

Rate of conduction is proportional to the area of the section through which conduction takes place, and the 1910 method of casting in the flanges increases this section and thereby aids in producing greater radiation of heat.

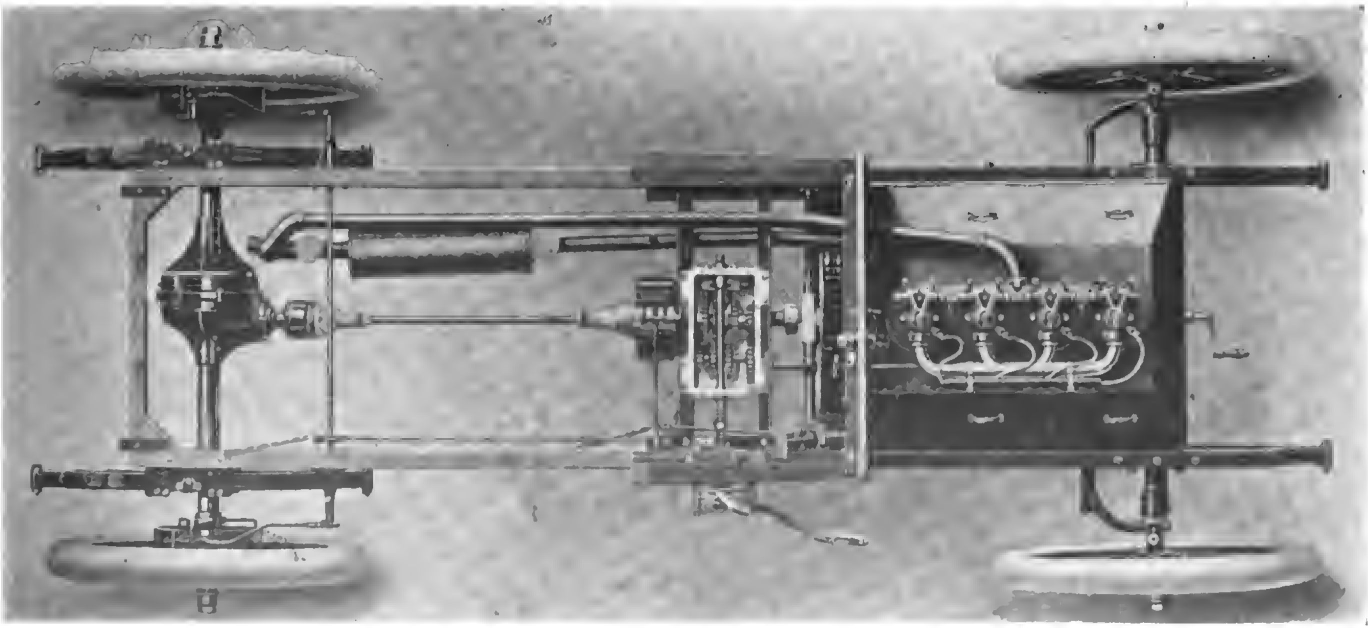
By the new directed or local cooling of the motor the cooling air is kept close to the cylinder wall from the time it enters until it leaves. The number of parts is lessened, the fan by means of which the air current is induced being made an integral part of the surface or rim of the usual flywheel.

In appearance the greatest difference of the new engine from the old is caused by enclosing in sheet metal all of the engine except the cylinder heads in order to produce the cooling suction.

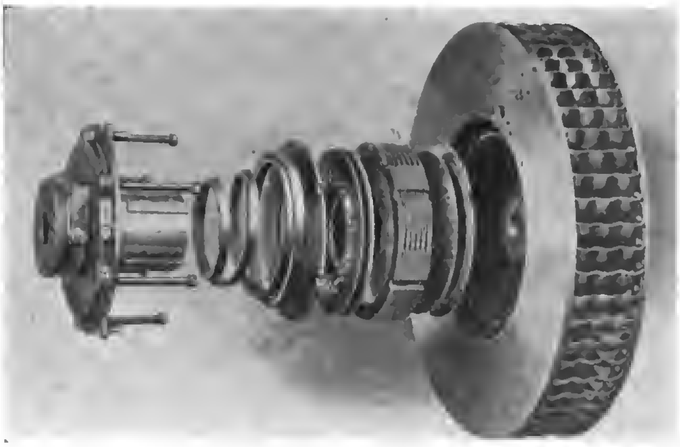
Three constructional features of the engine, which are retained from the models of previous years, are to be seen in an auxiliary exhaust, concentric intake and exhaust valves, and a dome-headed cylinder. Each of these is a considerable factor in the Franklin system of air cooling.

Of these three the auxiliary exhaust contributes most to efficiency in cooling. It opens at the base of the cylinder chamber immediately at the completion of the power stroke. The extent of the work done by it is shown by the fact that through it 71 per cent. of the hot, dead gas is immediately discharged and only 29 per cent. left to be carried out through the main exhaust in the cylinder head and there liberated.

Concentric exhaust and intake valves permit the use of larger valve diameters, which make possible a larger charge. The dome form of the cylinder head is largely made possible by the concentricity of the valves at the summit of the head. The dome form of the interior is a close approach to a spherical interior. The latter is a constructional aim of automobile engineers as it is productive of a minimum of interior or heat absorbing surface without lessening the heat-radiating exterior.



Chassis from above Displays Extreme Simplicity, Compactness, and Small Number of Parts of Franklin Car



Sirocco Flywheel Fan. Multiple Disc Clutch

Multiple Disc Clutch Retained Unchanged—The clutch shows a retention of the multiple disc type, phosphor bronze and steel alternating as the material of the discs. The clutch is within the fan flywheel. When it is engaged the discs are held firmly together by means of a spiral spring.

Carbureter is of the automatic, float-feed type. An improvement in its arrangement is shown in the removal of the primer connection from the dashboard and terminating it in a button at a lower corner of the hood front, where it is most convenient if occasion for its use arises when cranking the engine.

Another improvement in connection with the carbureter is a tributary pipe by which cool air instead of warm may be admitted. For cold weather driving, the air is taken by means of a pipe running from the auxiliary exhaust. In warm weather, this can be closed by a butterfly valve and air of the coolness of the outside atmosphere be taken through the tributary pipe which comes through the top of the engine jacket and which in cold weather is closed by a cap.

One Ignition System and No Spark Advance Lever—A single ignition system, that of the Bosch high tension magneto, is retained for a second year after a season's trial, which has shown it to be the most successful method of ignition. Spark control lever is abandoned on all models. The 18-horsepower cars were last season built with a fixed spark and are again so built for 1910. In the 28 and 42-horsepower classes, with the spark control lever now gone, the magneto is provided with a governor, which controls the ignition up to a speed of twelve miles an hour on the high gear, retarding it automatically at that point to take care of the motor's needs.

Simplicity has always been an aim in Franklin construction, and nothing before has gone farther in the direction of the elimination of complication than the 1910 control. The driver has nothing to handle but the throttle, unless he changes speed.

Throughout the rest of the mechanical part of the motor car the refinement is along lines already well established. There are some changes which serve to strengthen the construction and improve the performance of the car, but none of these is radical. Indicative of this sort of improvement is an increase in the size of the tubular front axle, together with new steering knuckles and arms, the latter being fastened to the knuckles with a taper key, nut, and cotter pins, thus eliminating brazing. Nearly every joint about this front axle is mechanical. The steering yokes on all these models are increased in size.

Progressive Transmission Finally Abandoned—A tendency toward uniformity of construction in the several models is evidenced not only in the ignition but in a number of other particulars. An instance is afforded by the transmission, all models for 1910 being equipped with a selective sliding transmission, whereas last year on the smallest model was used a transmission of the progressive sliding type.

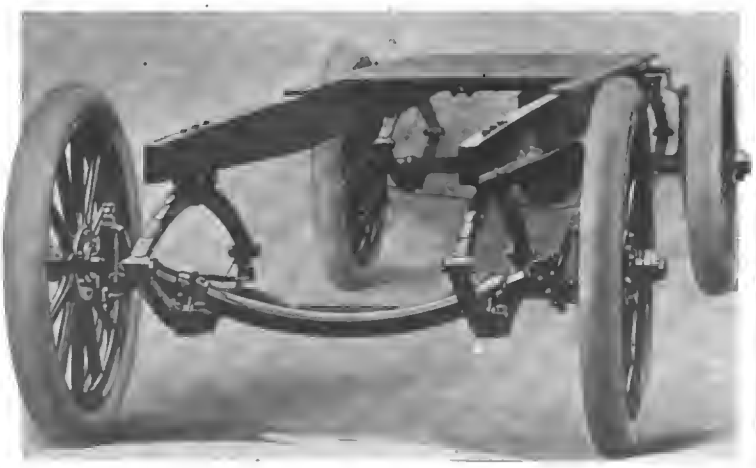
All of the 1910 models have a worm steering gear, which eliminates loss of motion and facilitates handling of the car. In addition the steering device shows a slight change, the steering arm being made to fit the larger steering yoke, and the diagonal steering tube being increased in diameter from seven-eighths of an inch to one inch. The steering wheel of the smallest model is increased in size, so that all are now 17 inches in diameter.

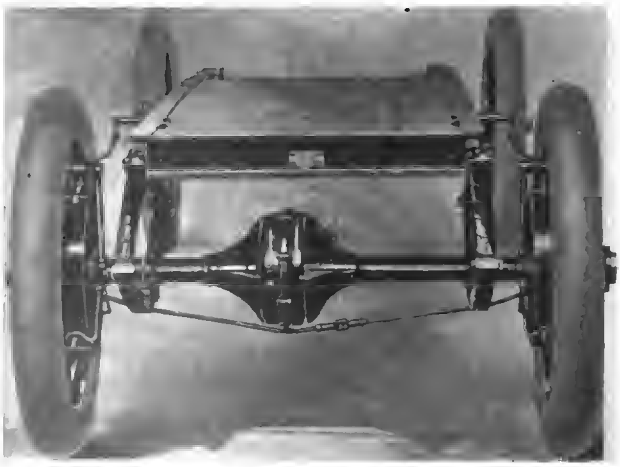
A new feature is an auxiliary oil pump on the dashboard for use in the event of extra oil being required in long stretches of hard going. In the general improvement of lubrication, small grease cups have wherever possible been substituted for oil cups, as at the base of the clutch lever and change-gear lever.

Larger Tires Have Undeniable Advantages—Larger tires are provided in accordance with the construction tendency of the past few years. The larger size serves both to prolong the life of the tire and to increase the riding comfort of the cars. In the securing of easy riding the effect of the large tires is greatly augmented by the laminated-wood chassis frame of all Franklin cars. This frame construction, of layers of selected, second-growth white ash, screwed and glued together, is shown by test to have a strength greater than that of steel.

Tires represent the owner's greatest item of expense of maintenance. The extent to which the makers of the Franklin have gone to eliminate this expense and prolong the life of the tires is seen in extra expense on their part in the providing of the first tires. These are without exception larger than are specified by the tire makers for the weight of car they have to support. The 28-horsepower, for example, weighs in the touring car type 2,200 pounds, but its tire equipment is that commonly specified for 3,300. Thus, this car is a third lighter than the makers would be justified in putting onto its tires.

Light shapely bodies are produced by the use of sheet aluminum. All the touring cars are finished in royal blue, with black running gear and hood and blue wheels. The close-coupled cars and runabouts are finished in red and black.





Front and Rear Axle Construction, Displaying Also Spring Suspension and Laminated Wood Frame

One of the Rainier Novelties for 1910 Is an Excellent Example of the Touring Body with a Torpedo Effect

FOUR touring car models and two enclosed bodies, all on the same chassis constitute the vital points; the meat, as it were, of the announcement of Rainier cars for 1910, as given out by the Rainier Motor Company, with factory at Saginaw, Mich., and offices in New York City. Chassis for all the models, except the baby tonneau, is identical, while the power equipment in all these models is the same—consisting of 45-50-horsepower engine of the four-cylinder, four-cycle type.

Of the models, one is a distinct innovation. This is the enclosed touring car. The plans call for the enclosure of the front seat as well as of the tonneau, with a door opening on the left side beside the owner's seat and a solid panel on the right side beside the driver. The panel is somewhat lower than the door line in order to permit the easy handling of the levers, but the extra door on the left-hand side is the same height as the tonneau door, making a very pleasing continuous straight line from the dashboard to the tonneau.

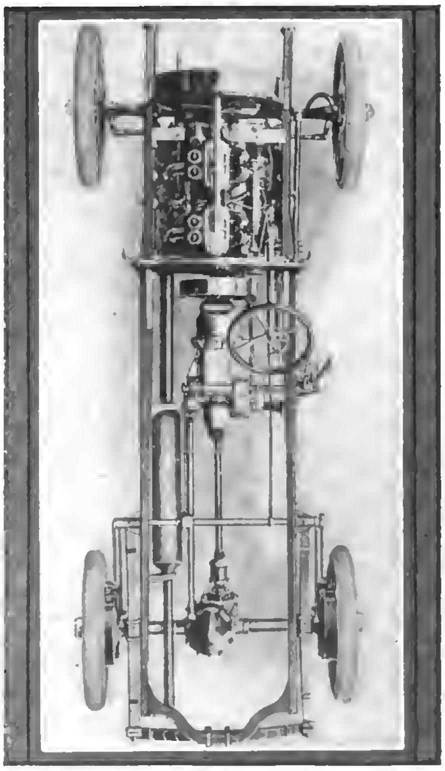
Advantages of the enclosure are obvious. It protects the occupants of the front seat from wind and weather, and makes the riding there as comfortable as within the tonneau. The regular touring model is also furnished, as well as baby tonneau and close coupled car.

Letters from owners, not only in the United States, but in Canada, South America and Europe, attest that the cars were singularly free from mechanical trouble. They were capable of high speeds, of great endurance, were wonderfully regular and reliable and have plenty of power on hills.

Recently in public contests the car has demonstated its reliability and endurance. Notably in the 24-hour race at Brighton Beach this year and in the New York-to-Atlanta run. In the last 24-hour race it covered 57 miles in an hour, breaking the one-hour record, and running a total of 1,115 miles, which broke the record for continuous 24-hour running.

Unusually Successful in Races the Past Season—In the race at Atlanta for the Atlanta Trophy, which was the most coveted trophy of the week, it ran 200 miles in 173 minutes, at the rate of nearly 70 miles an hour, and finished the race without a stop, with scarcely any evidence of wear on the tires and with no mechanical difficulty. In fact, the speed of the car for successive laps varied less than five seconds, while the second hundred miles was made 43 seconds faster than the first hundred, while all records in its class—over 150 miles—were broken. In fact, this speed has never been excelled in races of this distance except by high-power racing cars.

As a basis for this success was the correct design, careful workmanship and best materials. It is built in three units: the power unit, the clutch, transmission and universal joint in the second, and the cardan shaft and rear axle in the third.



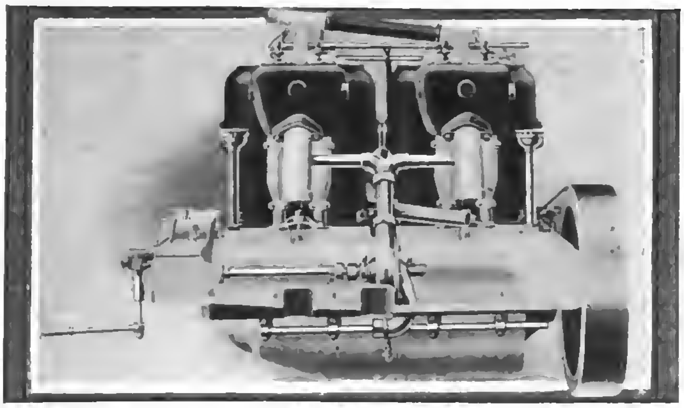
Chassis from Above Shows All Features

Very Few Changes Needed for 1910—Among the units the engine is unchanged, other than the lubricating system, which has been simplified, thus securing improved economy and more effective lubrication. The notable point about this unit is accessibility, as the chassis photograph shows.

A change has been made in the transmission unit to secure greater accessibility and slightly better distribution of weight, whereby the transmission and clutch are housed in a single case with a partition to prevent oil passing from one part to the other. The addition of the helix or screw thread to the clutch effects a notable improvement.

Changed also is the rear axle design in order to obtain greater accessibility, while the brake application has been altered to secure larger braking surface and greater rigidity. The front axle design has been modified so that the steering cross-rods are brought behind the front axle and protected by it from striking obstacles in the road.

Large-sized Engine Affords Much Power—The motor is of the four-cylinder type, 5-inch bore and 5 1-2-inch stroke. Cylinders are cast in pairs with liberal water jackets. The valves are of



Engine Has Distinctive Look, Due to Enclosed Valve Springs

large diameter, located on opposite sides, and interchangable.

Cams are integral with the camshaft. The camshafts run on special bronze bearings. The crankshaft is cut from a solid bar of nickel steel.

Main engine bearings and connecting rod bearings are bronze with babbitt interlining of the inserted type, the most durable bearings known. The oil reservoir is at the bottom of the crankcase, with a groove under each connecting-rod bearing. An oil pump secures circulation, while the system of lubrication practically eliminates all external pipes.

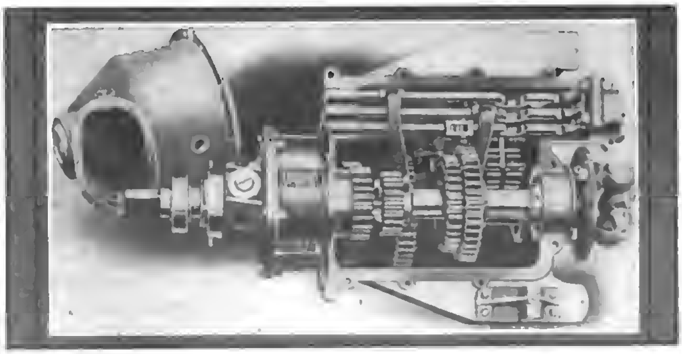
Water circulation is effected by a gear pump of the bucket type, while a fan assists in cooling. Make-and-break system of ignition, simplified, which has been so successful in the Rainier car for the past three years, is continued. This ignition system is believed to increase the efficiency of the engine at least 10 per cent. The spark is more positive and avoids the trouble with timing. It has been so reliable as to attract widespread attention.

Clutch is a multiple disc with alternate steel and bronze discs, operated through a helix which causes it to engage softly and increase its power as the load on the engine increases, so that the danger of slipping is impossible. A handhole at the top of the housing permits easy adjustment or examination.

Four-Speed Selective Gear Box—The transmission works of the selective plan, four speeds being provided with direct on third speed. The shafts and gears are of nickel steel, the latter being bolted up to integral flanges on the former. Shafts run on annular ball bearings, while removable covers permit ready examination or lubrication. The entire case is hung from three points.

Cardan shaft transmits the power practically in a straight line to the rear axle. Differential is the bevel gear and pinion type. Full floating rear axle is used. A live axle is carried within a tubular axle, on which the double ball wheel bearings are mounted, the tubular axle carrying the weight of the car. A double "V"-shaped torsion rod parallels the propelling shaft. Double ball bearings are used in the wheels and single ball bearings in the differential and propeller shaft.

The rear spring suspension is the platform type, with three springs supporting the weight of the body. The front spring is

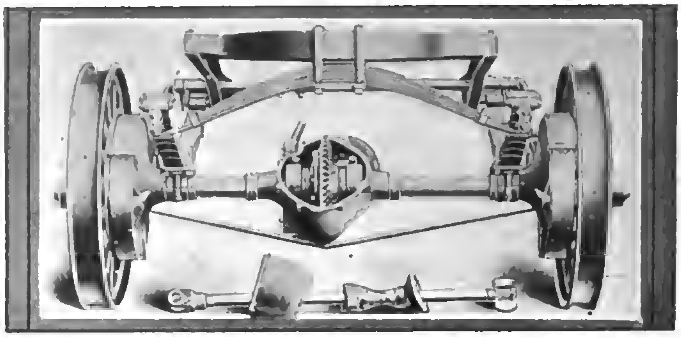


How the Four-Speed Selective Transmission Appears

the semi-elliptic type. This spring suspension coupled with the admirable weight distribution of the car produces very easy riding qualities.

Front axle is a solid drop-forging of I-beam section. The front wheels are mounted on double ball bearings. The brakes are very large; one external contracting and one internal expanding, both operated on drums bolted to the spokes of the rear wheel.

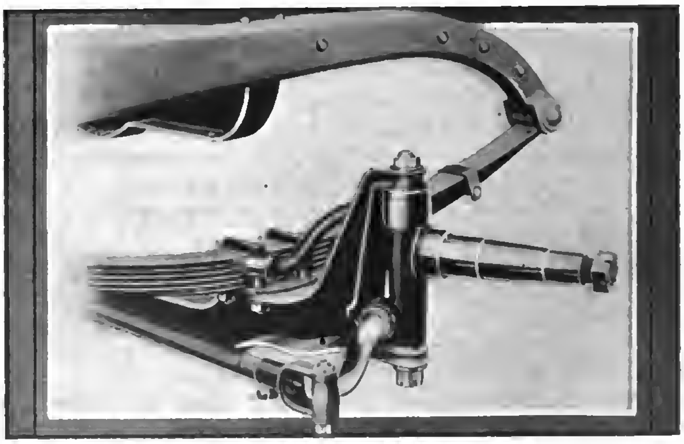
Steering mechanism is of the worm-and-nut type, with reach rods and knuckles of nickel steel. Wheels are 36 inches front



Rear End of Chassis, Showing Rear Spring Suspension

and rear, carrying 4-inch tires front and 4 1-2-inch tires in the rear. The frame is pressed nickel-steel and drops 2 1-2 inches forward of the rear axle. Has four cross-members. The weight of the car is 3,000 pounds, which is exceedingly light in view of its strength, and reduces wear and tear and tire cost to a minimum, giving also very low cost of operation and maintenance.

In the picture of the front axle below, will be noted the specially dropped front cross member of the frame, this acting as the support for the radiator, as well as stiffening the front



Front Axle and Steering Pivot Look Husky Enough

end of the frame. It is of pressed steel, channel section, with the open side turned to the front, and riveted to the main frame by hot riveting. Even should the rivets part, the shape and fitting of the member are such that it could not drop out of place or be deranged in any manner, but would continue in the same position, although the strength as a stiffener would, of course, be impaired.

Similar remarks apply to the rear cross member, which may be seen in the view of the rear part of the chassis above. This is of the same channel section, turned in, and is fitted into the open inside of the side members. This fitting is carefully done, so that the member really is a driving fit there.

Attention is called to the enclosing of the valve springs, as visible in the engine picture. This is in line with the modern demand for the ultra-silent machine, deadening as it does the noise of the valve motion.

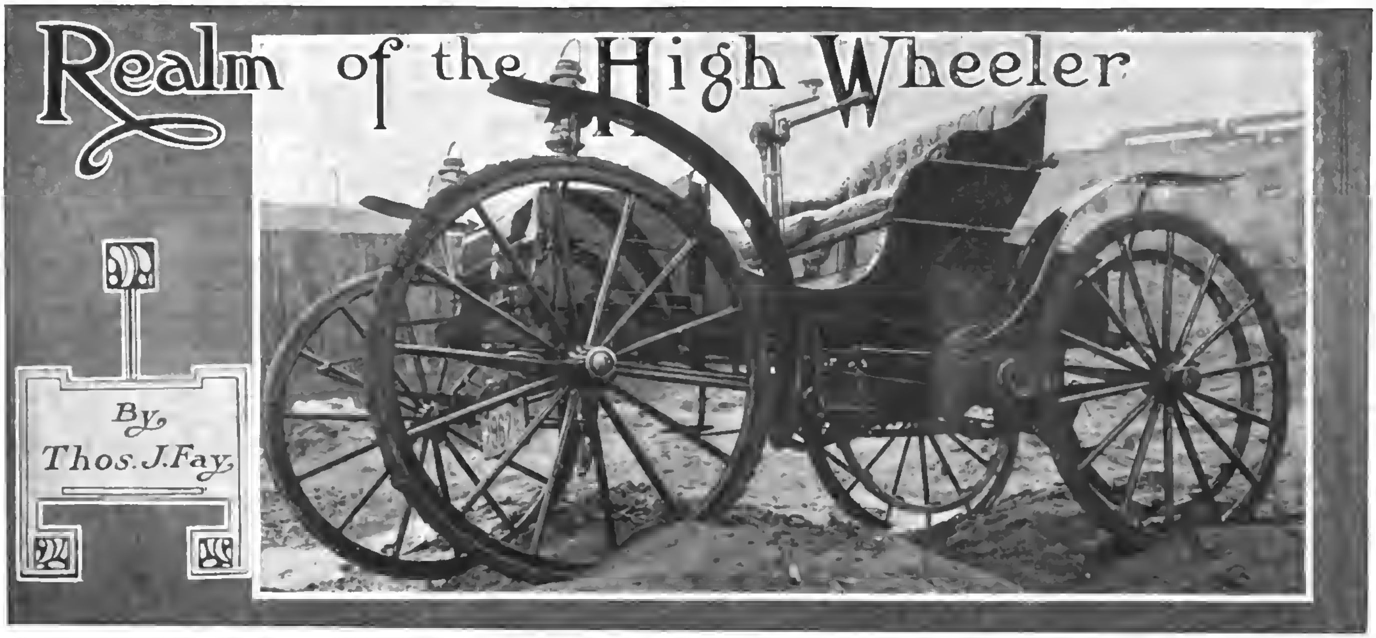


Fig. 1—Holsman high wheel car after doing stunts in a vacant lot which is being filled, making the going difficult

PRIOR to the introduction of pneumatic and solid rubber tires, during the long period of years when the cost of steel tires was but slightly different for the respective sizes of wheels, carriage and wagon makers resorted to the use of what is now dubbed "high wheels." Reasoning backwards, and it is plain to be seen that wheels, for carriages, in the absence of rubber tires, were made in the larger diameters simply because the service rendered by them was more in keeping with the requirements.

When pneumatic tires came into vogue it was found that they increased in cost enormously with diameter and the real question was: How small could they be and still do good work? At first they were made much smaller than after-experience indicated that they should be, and in late years the trend has been in the direction of greater diameter and a more liberal section for good and sufficient reasons, as follows:

Life of a Tire Properly Considered

(A) Is proportional to $2\pi R$;
(B) Considering S^2;
(C) Involving the sine of the angle of impact;
(D) Weight of car and its distribution;
(E) Square of the velocity of the car;
(F) Resistance offered by the impact medium;
(G) Quality of material used in tire;
(H) Manner of use of the material.

The conditions D, E, F, G, and H are not under the control of the maker of tires, but the designer of the car will be in a position to influence the situation by a proper display of skill. If the weight of the car is held within proper bounds, this circumstance will be nearly as important as the proper distribution of that weight; if the motor is of great power, the effect of speed, being a "square" value, it is at once apparent that life of the tires will be much more affected by power of the motor than it will be by properly distributed weight on the road wheels.

The condition F is neither under the control of the designer of the car nor the maker of the tires; this is a matter of road building pure and simple. The quality of material used in the tires may be controlled by the maker thereof, but this phase of the problem is not a matter that can be construed as an argument in favor of any type of vehicle; it is a tire maker's undertaking pure and simple. The condition H is partly up to the maker of the tires, and largely in the hands of the designer of the car, although the user is responsible for the ills of indifferent up-keep.

In view of what has been said it is self-evident that the conditions A, B and C (within limits) will dictate as to the best diameters of road wheels, but there must be a limit to diameter for reasons entirely beside the question of the life of the tires. In any case, since R is taken to represent the radius of the wheel, the angle of impact of the tread of the tire with a road obstruction is far from unfavorable after the wheels are brought up to a certain diameter, because the road obstructions, even under severe conditions, are limited as to height and abruptness.

The Wisdom of Selection Involves Diameter—Experience has shown that pneumatic tires will do the same service that may be expected from high wheels and solid tires, even when the pneumatics are considerably less in diameter, but they have to be of far greater section S in order that the value of S^2 will make up for the deficiency in the direction of $2\pi R$. If, however, the height of the road obstruction is excessive, increasing the section S, even to extremes, will not compensate for the deficit, due to the sine law involved; under such conditions, because of the wide angle of impact, high wheels are bound to do better work, and the higher the speed of the car the more marked will be the gain, although it must be remembered that flywheel effect may become a factor.

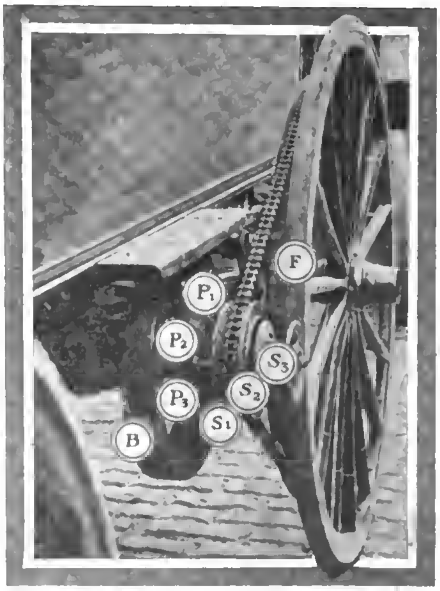


Fig. 2—Side chain drive, attached to a delivery wagon, showing chain of special construction running in shieves

Flywheel effect is just the same for one diameter of wheel as another, provided the peripheral velocity is constant, as it will be, for a given speed of the car in miles per hour; the possible difference in flywheel effect then will come in on account of difference in materials used in the respective tires—pneumatic vs. solids.

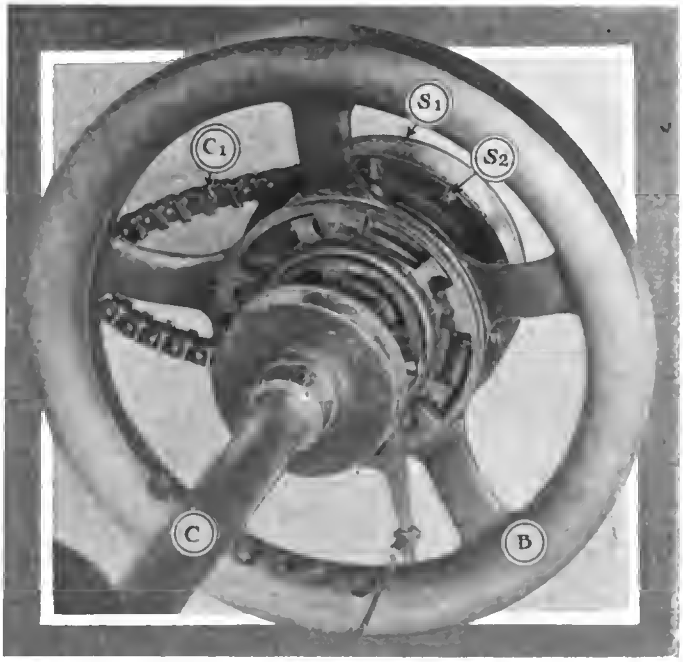


Fig. 3—View of side chain drive form back of flywheel showing how the control cable is attached to lever system

Stock Arguments Dictated by the Dollar Sign—From what has been said it would seem as if the cost of tires, since it increases enormously with diameter, is the prime reason for limiting the same, not forgetting that there are compensating factors:

(A) Pneumatic tires, because of the elastic properties of air, will render greater service per cubic inch of tire volume than will be possible when less elastic material, as when rubber compound, is used in the absence of an air cushion.

(B) With wheels of relatively great diameter, it is a detriment more than a gain, to employ tires of great section.

From the point of view of cost, then, pneumatic tires lend facility, since they will do good work even with a reduced diameter, and solid tires work better when the section is very limited, so that the increased diameter, which is a foundation for the better service, demands the use of a reduced section, which is, of course, followed by a reduction in cost.

Present Practice Seems to Be on High Ground—Disregarding, for the time, such attempts as involve trying to convert a horse-drawn rig into an automobile, it will be possible to review the situation and ascertain to what extent good mechanics adorn this branch of the industry. The process will, of necessity, require a concrete illustration, and the Holsman Automobile Company, Chicago, Ill., has consented to such an examination of the plant as will afford the desired amount of light.

Holsman products includes not only the type of car as shown in Fig. 1, but enclosed body work, as a coupé type and a line of delivery wagons and other commercial rigs as well. Fig. 2 is of a delivery wagon, showing the transmission, by means of a Holsman chain, and it is in this chain that much of the success of the system lies. An ordinary sprocket chain would not serve the purpose, for in Holsman cars the chain engages the sides of friction discs at an angle of about 15 degrees on high speed, and the chain must be so shaped as to afford contact, under proper conditions, with the faces (in juxtaposition) and referring again to Fig. 2, the shieve-plates *S1* and *S2* are so related to each other that they may be spread apart or brought into closer axle-wise relation, and in this arrangement is the facility for alter-

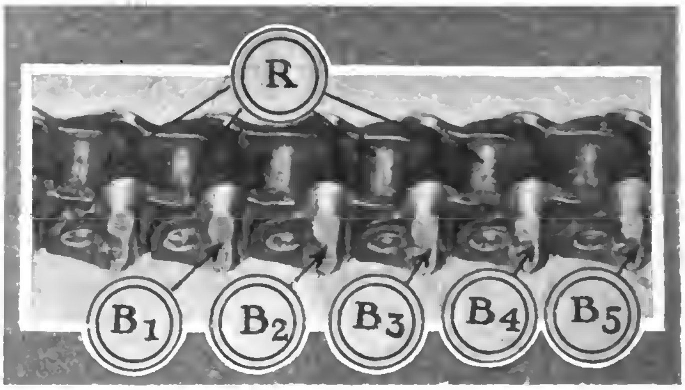


Fig. 4—Section of chain showing how links are bulged and so finished as to run in grooves of shieves

ing the lever advantage for the purpose of changing speeds when the car is moving in the forward direction. If the plates *S1* and *S2* are closed in, the chain will be crowded out toward the periphery and the speed of the car, for a given angular velocity of the motor, will be increased; likewise, spreading the discs will have the reverse effect.

This method of changing speeds is limited, and if low gear, so called, is to be let in, this is done by letting the chain down on a

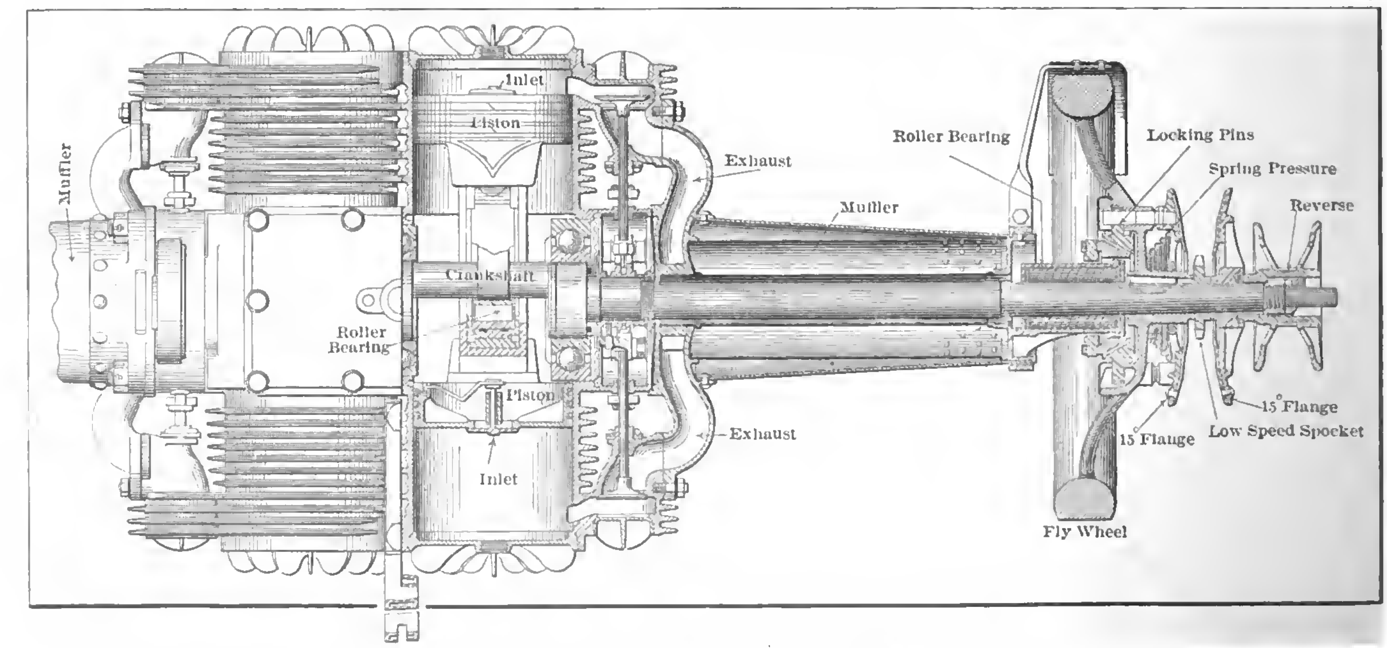


Fig. 5—Holsman type of motor in part section with one end broken off, but presenting evidences of use of ball or roller bearings at every point and other novel features

sprocket pinion, which lies under the chain, and is keyed to the shaft. The mere spreading of the discs *S1* and *S2* will allow the chain to settle down on the sprocket pinion, and the same motion of the lever system, under the control of the driver, pushes the motor forward on its ways, so that the chain will tighten up properly.

In going into reverse all that is necessary is to slide the motor in the direction of the rear wheels, when a set of forks (one of which is partly shown at *F*) will support the chain, while the shieve *S3* will engage the tire of the road wheel.

Both sides (for the side-chain drive) are symmetrical, and the motor is provided with two flywheels, one of which is designated as *B* in the figure. When the engagement is for high gear, so called, locking pins *P1*, *P2*, *P3*, etc., around the motor shieve, are thrown into engagement, and since they register with holes in a fixed member, the work comes on them and the shieve is positively locked. The reverse side of the motor shieve, including one of the flywheels, is pictured in Fig. 3, in which *C* is the extension of the crankshaft, *B* the balance wheel (on one end, there being two), *C1* is the chain, and *S1* and *S2* are the two members of the shieve plates, as referred to in Fig. 2.

How the Chain Differs from Other Sprocket Chains—Referring to Fig. 4, of a section of the chain, it will be observed that the side bars or links of the chain instead of being flat as they would be in regular sprocket chains, are bulged out at *B1*, *B2*, *B3*, *B4*, *B5*, etc., for each link, and the links on both sides of the chain are identical. These faces, produced by bulging the links out, in the manner as shown, are accurately finished and conform to the 15-degree angle of the faces of the shieves for the purpose of engaging, and the drive is made in this way. In all other respects the chain is identical with the more common forms of sprocket chains, excepting that the material is selected for strength and great hardness. The rivets are shouldered in the customary manner and the rollers *R* are of the right size to drop into the small sprocket pinion which is placed to afford a positive low-speed drive.

Unique Plan of the Power Plant—In any further consideration of the Holsman system it will be necessary to note the entire absence of a transmission gear, differential or other means of transmitting the power of the motor. Fig. 5 is of the motor, which is of the four-cylinder, horizontal, air-cooled type, which, in the chassis, is swung across beneath, and the distance from center to center of the shieves on the extensions of the crankshaft registers with the distance from center to center of the driven shieves on the rear road wheels of the car.

Ball or Roller Bearings Used Throughout—As Fig. 6 shows, in substantiation of Fig. 5, there are no plain bearings used, and one of the novel features lies in the use of an annular type of crankpin ball bearing, as, Fig. 6, placed to take the pressure of the crankpin. This bearing is placed on the crankshaft over the pin and presses against rocking shoes nested in the connecting member between the two pistons. The rocker is provided with teeth, engaging teeth on the connecting member, so that the rocker cannot displace, and the whole system, in view of the hard quality of the material used for the pressure faces, as well as accuracy of workmanship, works with a precision and so noiselessly that it is to be commended.

The exhaust, as will be observed in Fig. 5, makes its exit from each pair of cylinders to two mufflers, at the two ends, with the mufflers placed in concentric relation to the crankshaft extensions; this adds to the compactness of the power plant and lends facility to the system by which the motor is shifted back and forth on its cradle for the purpose of maintaining the right tension of the driving chains.

High Aims in the Process of Manufacture—It being the idea in this article to discuss the manufacturing problem rather than the details of rigs, many interesting features of the rigs will be omitted. Many autoists labor under the impression that the high-wheel industry is more or less impregnated with makeshift methods, and some of them claim that the industry is devoted to the adaptation of motors to horse-drawn vehicles.

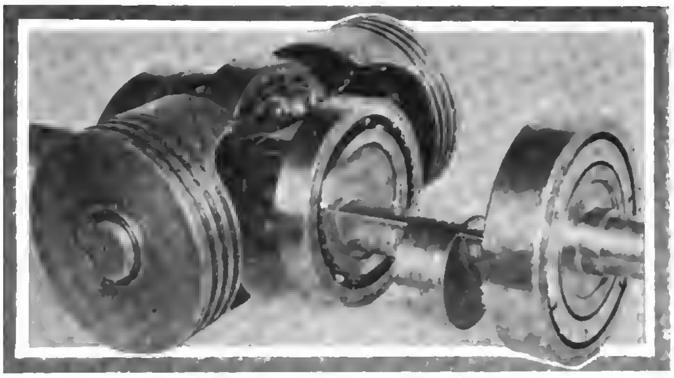


Fig. 6—Crankshaft, pistons and connections between, as used in four-cylinder type of motor

This method of reasoning, as we shall presently see, is contrary to fact, and what the real situation shows is a system of manufacture that carries with it every scientific device known to manufacture that can, by any reasonable chance, improve the product and assure interchangeability of parts. These methods also possess the advantage of reducing cost, and the designer, holding to the contention that high-wheeled rigs have a wide use, has kept uppermost in mind the class of men who prefer rigs of this character, and simplicity is the keynote.

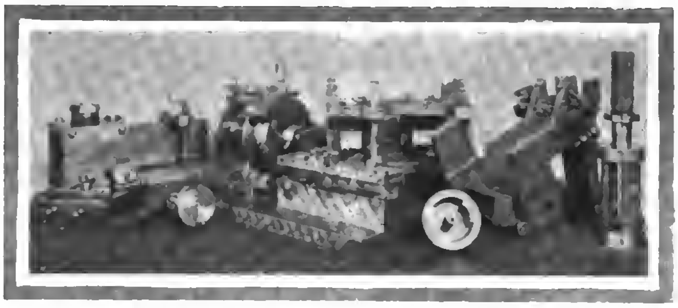


Fig. 7—Some jigs, picked out at random, from tool room, in which a jig will be found for every important operation

Special Grades of Steel Are Used—There would be no object in incurring the cost of a heat-treatment equipment were it not the aim to employ special grades of steel in the cars. Fig. 8 was reproduced from a photograph taken of a corner of the heat-treatment room, and the Brown and Sharp furnaces, as shown, are run under the guidance of a pyrometer which was taken out of its case and shows in the open to the right of the illustration.

Fig. 8—Brown and Sharp furnaces used in heat treating and a pyrometer to tell the tale of temperature

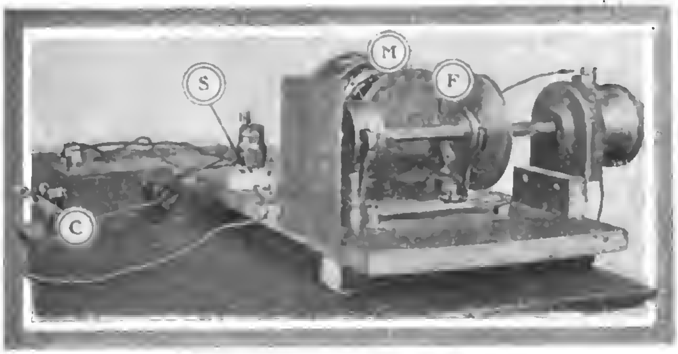


Fig. 9—Instrument devised by Holsman for determining the lag of spark coils

The equipment includes every facility for heating, quenching, annealing, tempering, and cementing the parts of great responsibility, as used in the Holsman cars, and it is only necessary to point out that the making of sprocket chains, roller bearings, and like parts can only be successfully undertaken in a well-equipped plant. In the laboratory, contrary to the usual expectation, means are at hand to examine into every detail of the work, and Fig. 9, of a testing equipment used to determine the "lag" in spark coils is a good indication of the extent to which testing is done in this plant. In this instrument means are afforded to test the lag of coils at speeds even above 3,000 revolutions per minute, and referring to the figure, *M* is an electric motor which furnishes the driving power and is capable of speeding up beyond the highest required range. Incidental speed changes are made through the disc transmission *F* by the simple expedient of sliding the driven friction disc across the face of the driving friction disc. The lamp socket *S* serves as a switch in the electrical system, and the coil *C* is undergoing test.

The lag of the spark is accurately measured, and Fig. 10 is a curve plotted from the coil, reaching the high point of 3,030 revolutions per minute. As the curve shows, the lag reached to a maximum of 49 degrees, as shown by the ordinates, when the speed was 3,030 revolutions per minute, after which the coil failed to work and the spark occurred at the timer instead. Up to 2,600 revolutions per minute the lag was almost in direct proportion to speed, as shown by the nearly tangent relation of the spark points on the chart.

Grinding Assures Accuracy of Finish Dimensions—It is not necessary to picture the whole shop and all the machine tools to indicate the nature of the process and the standard to which the artisans are keyed up to; Fig. 11, of a grinder, with divers crankshafts to the right, is ample indication of the process in vogue. Every part, if it has a concentric relation and can be set up in centers in the grinders, is rough machined and then ground; this grinding process affords a fine finish appearance, but it does more, it enables the workman to come down to a fraction of a thousandth of an inch with the same facility that a good man on a lathe can come within a sixty-fourth of an inch of the finished diameter.

The plan, then, in view of grinding as the final method of finishing, is to use rigid machine tools for roughing out, and they are intended to rip off metal at the highest possible speed, using alloy-steel cutters in rigid tool-posts, and such other necessities as experience dictates.

Some of the Material Specifications—Nickel steel is used to quite some extent, and it must conform to the specifications as follows:

Open-hearth, cold-drawn steel, special analysis:
Nickel, 3.50.
Manganese, .50.
Carbon, 30 to 40, aim at 35.
Silicon, about .01.
Phosphorus, under 0.02.
Sulphur, under 0.02.

Must test to 175,000 pounds tensile strength per square inch after heat treatment.

In parts to be cemented every effort is made to select a grade of steel that can be relied upon to take on a hard shell, and while the core must be relatively soft and dynamic in character, even so, it is considered necessary to afford a fairly rigid foundation for the shell. This material, while it is, in some instances, alloyed, is also in carbon steel, and the selections made are on a basis of well-regulated carbon in a definite and satisfactory field very low in metalloids.

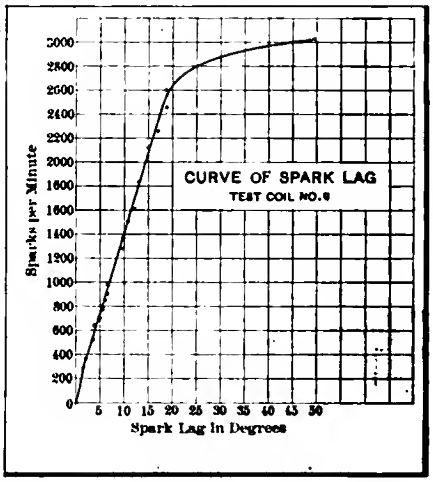


Fig. 10—Curve of lag of a coil that failed to come up to Holsman ideas of quality

All along the line, despite the ideas of those who have not looked closely into the question, the materials are carefully selected, and that it is necessary to do so is assured if the rigs are to perform in a proper and satisfactory manner. In view of the positive indications here included, it is not considered necessary to pursue this phase of the discussion further, on the ground that readers who take enough interest in the matter to appreciate the value of the processes exhibited will be satisfied

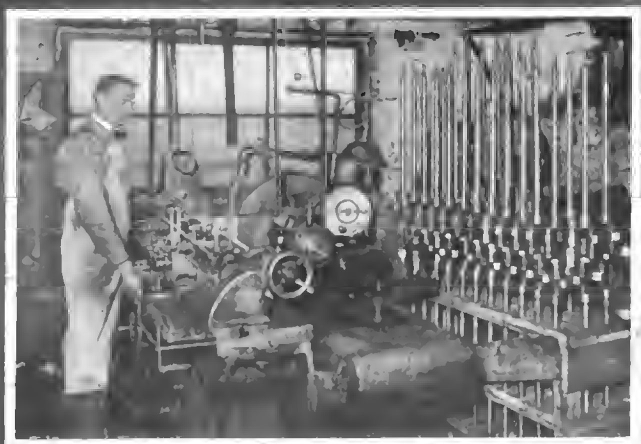


Fig. 11—Grinding crankshafts to within three ten-thousandths of dead accuracy

Fig. 12—Where motors are tuned up, showing two rows of test stands and fans to absorb power

that engineers who work along the lines indicated will hardly be likely to fall below the standard set when it comes to the minor particulars.

Every Motor Is Tested Before Entering the Chassis—Fig. 12 is of the interior of the motor test room, and with test stands in two rows, in each side of the room, with a capacity of 12 motors at one time, the work of testing is readily done and it is a relatively simple task to make a run under several conditions of load for each motor. The stands are cast from gray iron, and the load is put on the motors by means of fans *F, F, F,* etc., which are fashioned out of fairly heavy sheet steel, forming the vanes by the simple process of cutting around three sides and bending the metal over to a right angle from the plane of the discs of steel. These air propellers are riveted to hubs and keyed onto shafts to which the extension of the crankshaft of the motor to be tested is coupled in each individual case. The fans are so designed that they load the motors when the speed is that desired under normal running conditions, and by a system of calibration which has been devised, intermediate known loads are applied in order to be able to adjust the carbureters for the best average results, all of which is accomplished in the most simple and reliable way with evidences of stability.

WITH HIGH WHEELS THE WHEELBASE MAY BE SHORTER

By H. K. HOLSMAN, Engineer, The Holsman Automobile Company.

HIGH-WHEELED automobiles are often confused with that peculiar type of vehicle which belongs to neither the high-wheeled nor pneumatic-tired class, and is therefore lacking in the virtues of either, while possessing many salient faults belonging entirely to itself.

True high-wheeled automobiles must have wheels of sufficient diameter and resiliency to give the necessary riding qualities and to protect the machine from injury from road shock. It has been my experience that in order to gain these results it is necessary to use a wheel of at least 40 inches in diameter. The increase in diameter of a wheel not only furnishes a spoke of sufficient length to give the necessary resiliency, but also produces the effect of an increased wheel base, inasmuch as the vertical motion of the wheel in rolling over uneven surface will be found to be in about exact proportion to the diameter, so far as the motion affects the occupants of the vehicle, and therefore a car equipped with 48-inch wheels and having a wheel base of 60 inches would possess all of the riding qualities of 120-inch wheel base mounted on wheels of one-half that diameter. Of course, the machine itself is also relieved from the severe vibration which would be due to the greater vertical movement, and a little road experience is enough to establish the fact.

It is a well-known fact that it requires less power to drive a high wheel than a low wheel over the same road, the difference being inversely as the diameter. It is also true that the high wheel is much more easily steered, and that on account of its yielding qualities the side vibration is taken up.

Contrary to the general belief, rubber tires of small section are employed on this type of car, not because of their lesser cost but because tires of greater section are an actual disadvantage—first, on account of the disagreeable bounce of the wheel fitted with the large tire, and, second, because of the fact that small tires can be driven where it would be impossible to drive a larger one.

Present high-wheeled automobiles were originally designed for localities where the roads were so poor that the pneumatic-tired machine could not be used. It is the equal, if not the superior, of the low-wheeled type on well-paved streets, and, while the low-wheeled car is limited to highways in more or less good condition, the high-wheeled car may be operated over exceedingly rough roads, deep mud or snow, with little or no inconvenience. There is a perceptible lessening of prejudice in favor of the low-wheeled car owing to the gradual awakening of the public to its limitations, and the increasing recognition of the possibilities of its high-wheeled brother.

THE AUTOMOBILE CALENDAR

Dec. 25-Jan. 1....Columbus, O., Automobile Show, Columbus Automobile Club.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Jan. 17-22........Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows' Building.

Jan. 17-22........Kansas City, Mo., Annual Automobile Show of the Motor Car Trade Association of Kansas City. P. S. Sutermeister, Secretary, Midland Building.

Jan. 24-29........Detroit, Wayne Hotel Gardens, Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Jan. 24-31........Washington, D. C., Automobile and Aeronautical Show, Washington Automobile Dealers' Ass'n.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19........Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dai H. Lewis, Manager, 760 Main Street.

Feb. 19-26........Newark, N. J., Essex Troop Armory, Automobile Show, New Jersey Exhibition Company.

Feb. 19-26........Salt Lake City Auditorium, Automobile Show, Utah Automobile Dealers' Association. W. D. Rishel, Manager, 1-5 East First South Street.

Feb. 21-26........Cincinnati, Music Hall, Automobile Show, Automobile Club of Cincinnati. Jesse Lippencott, Chairman Exhibits Committee, Gibson House.

Feb. 22-27........Milwaukee, Wis., Auditorium, Second Annual Automobile Show, Milwaukee Automobile Club.

Feb. 24-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 24-Mar. 3....Toronto, St. Lawrence Arena, Canadian Automobile Show, Ontario Motor League. E. M. Wilcox, Secretary.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

March 12-19......Syracuse, N. Y., State Armory, Automobile Show, Syracuse Automobile Dealers' Association.

March 21-30......Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show, Buffalo, Launch Club. D. H. Lewis, Manager, 760 Main Street.

Races, Hill Climbs, Etc.

Dec. 12...........Los Angeles, Cal., Six-hour Race, Los Angeles Motor Racing Association, Los Angeles, Cal.

Dec. 14-18........Dallas Endurance Run, The Implement & Vehicle Journal, Dallas, Tex.

Dec. 17-18........Indianapolis Motor Speedway, Race Meet. Ernest A. Moross, Director of Contests, the Motor Speedway, Indianapolis.

Dec 22-29.........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

Feb. 4-6..........New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.

Spaciousness Shown in General View of the Plant of the Mora Motor Car Company, at Newark, New York

MODERN FACTORIES, AS EXEMPLIFIED BY THE MORA PLANT

NEWARK, N. Y., the location of the factory of the Mora Motor Car Company, lies within a convenient distance of Rochester, affording all the facilities of a large distributing center, and at the same time the freedom and spaciousness of a small town. The factory site comprises seven acres, conveniently located on the Northern Central R. R. At present there stand on it four buildings, of various sizes; but these have been so planned that more buildings can be added when desired without serious disturbance of the existing layout.

The main building is of brick, mill construction, 406 by 60 feet, and two stories in height. Its architecture has considerable distinction, given by the prominent buttresses between each of the large windows. In the center is a tower, projecting and carried to a slightly greater height than the body of the building. The lower floor of the building is devoted entirely to machine work, and each department has a separate motor for supplying the required power. The upper floor contains first the reception room and offices, reached from a private entrance at the front end of the building. Back of these are the designing and drafting rooms. The remainder of the floor is occupied by the final assembly room and the painting and upholstering shops. The upper floor has a full skylight roof, giving an abundance of light.

Convenient Arrangement of Small Buildings—At the left of the main building is a long, low frame structure for the accommodation of cars undergoing the road test. It will house nine cars, as may be seen from the nine wide doors on its front. The cars may be driven directly in and out, without maneuvering. Five of the stalls have pits, over which the cars may be run for making adjustments. A large room, equipped with a complete lavatory, is set apart for the testing crew.

The heating plant, an isolated building of concrete block, is set near the far end of the main building. Its location, near the railroad, allows coal to be dumped direct from the railroad cars into the capacious fuel storage bins.

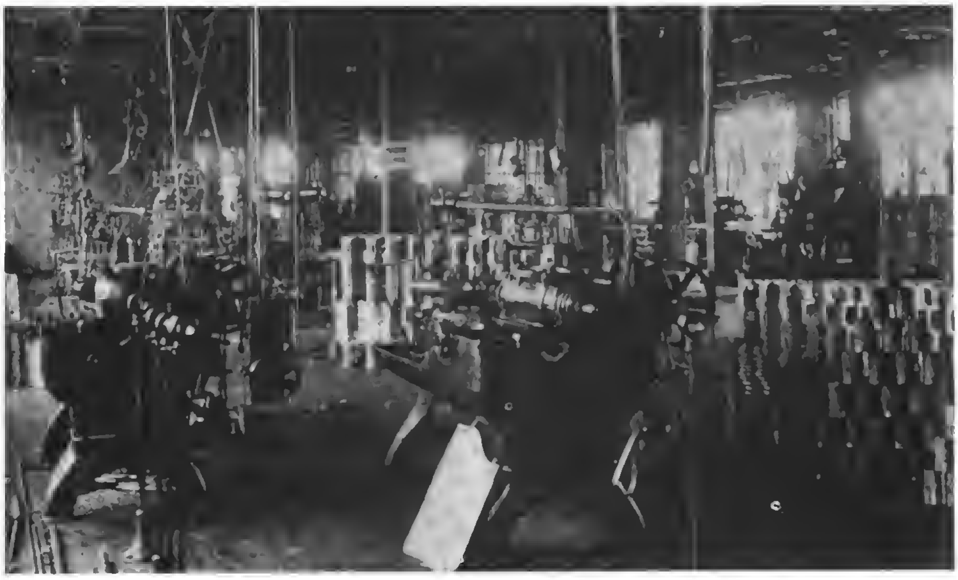
Just beyond this is located the blacksmith shop. All work of this kind is thus done at a sufficient distance from the main building, relieving the shops of the noise and dirt inseparable from blacksmithing. Such precautions, reacting in the contentment of the employees, are becoming a feature of factory design.

Paint Shop, with Bodies in Various Stages of Finish

Up-to-Date Tools in Machine Shop—The machinery equipment is the best obtainable, all new within the past three years. The photograph showing a part of the machine shop reveals many interesting details of practice. In the foreground may be seen two automatics, one working on pistons and the other on gearshafts. No better example could be asked of the wide range of uses to which these handy machines can be put. Although similar in all important features, one is operating on iron castings 4 1-2 inches in diameter, varied in shape, and the other on 1 1-2 inch round steel bars.

At the right of the photograph is a stack of twenty or more unfinished pistons, waiting their turn on the automatic machine; in the corner stands a smaller pile of the finished product. Near at hand is a row of sixteen or eighteen cylinder castings. In the middle distance a number of the combined crankcases and gearboxes which distinguish the Mora design are standing on end, awaiting their turn to be bored. This operation, being performed simultaneously on the bearings of the crankshaft and the gearshafts, insures their cor-

Testing Garage, Where the Cars Undergoing the Road Test Are Sheltered rect and permanent alignment. The background will reveal upon study several drill-presses and a stack of crankcase upper halves. This view, of course, shows but one end of the machine shop; it should suffice, however, to give still further evidence of the quality of the tools. In this department, above all, up-to-date equipment amply repays its expense.



One Corner of the Busy Machine Shop—Automatic Lathes in Foreground

The comfort of the employees is assured by an abundance of light and ample room around the individual machines. The central tower, besides stairways and elevators, contains the lavatories for the shop hands.

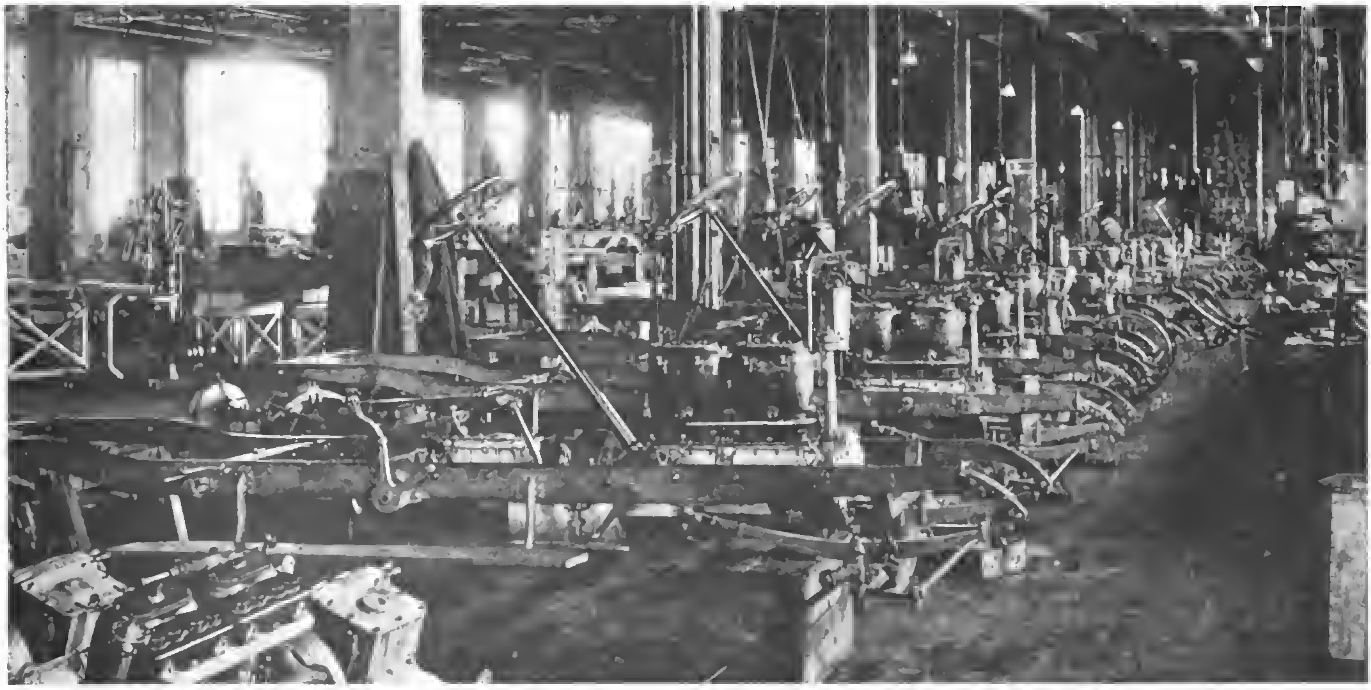
Attention Is Given to Testing—The country immediately surrounding the factory is one of steep hills and roads often rough. Altogether it is hardly a paradise for private touring, but offers just the conditions desired for a thorough testing of the Mora chassis. Before each car is turned over to the finishing department it must have shown a satisfactory performance on 250 miles of road work. The building in which the cars are housed during the testing process has already been described. It may be added, however, that automatic ventilators are provided to furnish fresh air and carry off the dangerous gases from the inspection pits.

After the testing the cars are cleaned by a steam blast, which is much more satisfactory than washing the metal parts. The blast also removes all oil and grease, giving a clean surface for the finishing coats of paint on the running gear. The paint shop, with a number of bodies, is shown in one of the photographs. These bodies are brought to the factory in the white; all painting and upholstering is done in the Mora shops. At the rear of the paint shop is the varnish room; one body may be seen on a truck in transit from one department to the other.

When the cars have been assembled, tested, fitted with bodies, and given their final inspection, they are ready to be shipped. For this purpose a sidetrack at the factory is imperative, as the cars must be loaded with care to avoid injury to their finish, and must be securely blocked and braced to prevent their breaking loose en route. The Mora factory, as mentioned above, is located on the Northern Central Railroad, connecting with the New York Central system at Rochester. The factory sidetrack accommodates fifteen box cars, and is graded down to bring the floors of the cars on a level with the lower floor of the building.

There is opportunity for some writer of proverbs in the relation between the factory and its product. It is nearly always the case that the company which insists on abundance of light and room in its factory will embody similar features in the car, which will then be generously designed, with a logical arrangement of parts and the utmost accessibility.

In conclusion, consideration will reveal that due attention has been given the three principles which govern factory design, namely, the proportioning of the individual buildings to secure the best light and greatest efficiency of the floor space; the arrangement of the various departments to eliminate all unnecessary haulage, and, finally, a due regard for the requirements of the future, with its natural expectation of growth.



Lengthwise View of Light and Airy Assembling Floor Reveals a Number of Chassis Nearing Completion

AUTO FIRE SERVICE WAGONS MEETING WITH MUCH FAVOR

WHEN the importance of fighting fires quickly is granted, as is done by everyone familiar with the situation, the necessity for the motor-driven, or as it is usually called, automobile fire wagon is conceded in the same breath. The reason for this is the inability of any animal to serve with the unerring precision of a machine. So, too, disease, illness, and other things enter to make the horse singularly unfitted to this use. Statistics show that the fire loss is $200,000,000 per year.

Combination Chemical and Hose Wagon for Bristol, Conn., Fire Department

How much of this is due to the use of inefficient horse-drawn apparatus no one can fully estimate, but it must be a very large percentage. To save this money, a number of prominent firms are turning to the construction of self-propelled fire apparatus. Among those who have been connected with this business for some time, and have, consequently, acquired a good working knowledge of the conditions to be met therein, is the Pope Manufacturing Company, Hartford, Conn.

The piece of apparatus shown on this page is a sample of the work done, being a wagon supplied to the town of Bristol, Conn. Many of the New England towns have gone in strongly for this type of wagon, Taunton, Worcester, Lowell, and Fall River each possessing one like that shown, while the latter city has a chief's wagon of the same make in addition.

It is called a combination chemical and hose wagon, being equipped with a 40-gallon tank, with full equipment, including 250 feet of 3-4-inch hose for the same. Then the central part of the body has space for 1,000 feet of 2 1-2-inch hose. Two 15-foot extension ladders, two hand extinguishers, and numerous axes, picks, lanterns, and door jimmies complete the fire-fighting means. The running board will accommodate from five to fifteen men according to the body design and the length of wheelbase.

On the car shown the wheelbase was 130 inches, standard tread, 30-horsepower engine, three-speed transmission, shaft drive, efficient brakes, gearing for 40 miles per hour, and other parts of the regular Pope-Hartford chassis.

EVIDENCE OF TRUCK PROGRESS IN 10-TON MACHINE'S WORK

IN the table below is given the daily record of a ten-ton Hewitt truck, hauling coal in New York City, for two weeks in the month of October, just passed. This work was done in the service of Burns Brothers, a very large coal handling firm, whose work is evidently divided so that the truck made large hauls only to substations, about ten in number, from which places it was rehandled by smaller capacity wagons.

Prominent in this tabular study of the regular daily work of the largest truck in America is the unusually high ton-mileage. Specially fitted touring cars competed in many contests, but very few of them—they may be counted on the fingers of one hand—ever exceeded the figures attained by this coal-hauling monster. The average daily mileage of 35.4, taken together with the average daily tonnage of 84.03, and weight of the truck itself, give the astounding figure of 34.43 ton-miles per gallon of gasoline.

From the table the following very interesting figures have been compiled, these being figures which relate to the work done and the efficiency of the machine in doing it only:

Average miles per day	35.4
" gallons gasolene per day	11.9
" miles per gallon	2.97
Total tons in 13 days	1,092.39
Cost per day (maximum)	$16.00
" " ton	$ .19
Average miles from base	2.13
Weight of car, empty	13,000 lbs.
Average weight of load	20,250 "
Total weight	33,250 "
Average ton miles per gallon of gasolene	34.43

Date	No. of loads	Gas Gals.	Address	Total Distance	Day's Mileage
Oct. 13	1	12	81 st. & Columbus ave.	5.5	....
"	2	..	80 st. & West End ave.	10.0	....
"	1	..	23 st. & 6th ave.	3.5	....
"	4	..	18 st. & 6th ave.	18.0	37.0
Oct. 14	1	8	81 st. & West End ave.	5.5	....
"	7	..	10 st. & 6th ave.	31.5	37.0
Oct. 15	1	10	81 st. & West End ave.	5.5	....
"	1	..	81 st. & Columbus ave.	5.5	....
"	6	..	18 st. & 6th ave.	27.0	38.0
Oct. 16	5	12	18 st. & 6th ave.	22.5	....
"	1	..	81 st. & Columbus ave.	5.5	....
"	1	..	44 st. & 6th ave.	3.0	....
"	1	..	44 st. & 6th ave.	3.0	34.0
Oct. 18	1	12	81 st. & West End ave.	5.5	....
"	1	..	73 st. & West End ave.	4.0	....
"	6	..	18 st. & 6th ave.	27.0	36.5
Oct. 19	2	15	56 st. & 7th ave.	7.0	....
"	3	..	18 st. & 6th ave.	13.5	....
"	4	..	22 st. & 6th ave.	16.0	36.5
Oct. 20	1	11	81 st. & West End ave.	5.5	....
"	3	..	57 st. & 7th ave.	10.5	....
"	1	..	22 st. & 6th ave.	4.0	....
"	3	..	18 st. & 6th ave.	13.5	33.5
Oct. 21	8	10	57 st. & 6th ave.	32.0	....
"	1	..	43 st. & 6th ave.	2.6	34.6
Oct. 22	9	12	57 st. & 6th ave.	40.0	40.0
Oct. 23	8	17	57 st. & 7th ave.	28.0	....
"	1	..	81 st. & West End ave.	5.5	33.5
Oct. 25	1	10	81 st. & West End ave.	5.5	....
"	7	..	18 st. & 6th ave.	31.5	37.0
Oct. 26	3	14	18 st. & 6th ave.	13.5	....
"	3	..	71 st. & Central Park W.	13.8	....
"	1	..	81 st. & Columbus ave.	5.5	....
"	1	..	79 st. & Amsterdam ave.	5.0	37.8
Oct. 27	1	12	79 st. & Amsterdam ave.	5.0	....
"	1	..	43 st. & 8th ave.	2.0	....
"	3	..	71 st. & 8th ave.	13.8	....
"	3	..	18 st. & 6th ave.	13.5	34.3

BOSTON TRADE PREPARATIONS FOR A BUSY NEW YEAR

BOSTON, Dec. 6—The establishment of new agencies and changes in location of old ones have been quite numerous of late in Boston, and others seem likely to occur in the not distant future. The expansion of the automobile trade in the vicinity of Massachusetts avenue will be aided by the completion of the new garage at the corner of Massachusetts avenue and Newbury street. The property was purchased by F. J. Tyler, of the Maxwell-Briscoe Boston Company, some months ago, and has been completely remodeled, the upper floors being equipped for garage and repair shop purposes and the street floor being used for salesrooms. The store at the corner of the avenue and Newbury street already is occupied by the Maxwell-Briscoe Boston Company as a salesroom, and one of the other stores has been taken by the Austin Company, the new agency for the Austin car. Other automobile agencies are considering renting the other stores.

A new arrival on Massachusetts avenue is the Henderson-Lowe Company, of which the veteran "Pop" Lowe is manager, and which has opened an agency for the Midland car at 117 Massachusetts avenue, the salesroom once occupied by the Dragon branch and later by the Grout agency.

Along Boylston street there are a number of changes, the most prominent being the erection of the new Goodrich tire building that will be ready for occupancy in a few weeks. The Goodrich branch is now on Columbus avenue. The Selden agency has taken a new salesroom at the corner of Boylston street and Fairfield street, and just around the corner on Fairfield street there was opened a few days ago the new Palmer-Singer agency. Copley Square, one of the finest squares in the city, has been invaded by the motor car trade.

For a long time the Locomobile branch was alone in Copley square, but this fall the American Motor Car Company, agent for the American, opened a salesroom there and this week the Rainier Company of New England, of which Raymond S. Joo is manager, has moved to a store alongside the Locomobile branch, from its former quarters in the Motor Mart. H. C. & C. D. Castle, of Boylston street, agents for the Lozier, have added the Haynes to their line. On Huntington avenue a new agency is W. L. Russell & Co., handling the Apperson car.

While there is a tendency to move away from Columbus avenue toward Boylston street, there are a number of new agencies in the older section. The Croxton-Keeton Motor Car Company, of which L. F. Witherell is manager, has opened a salesroom in the Motor Mart for the Croxton-Keeton car and the Hub Automobile and Renting Company has taken the agencies for the Pullman, formerly held by the Crown Motor Car Company of the Motor Mart, and for the Black Crow. The Overland agency, managed by Charles Andrews, formerly of the J. M. Linscott Co., has its headquarters at 24 Columbus avenue, and the Thomas branch is located in upper Columbus avenue, until better quarters are obtained.

The Corlew-Coughlin Co., agents for the Velie, has just rebuilt the large building at 21 Hawkins street and opened it as a down-town garage, while the S. M. Supplies Co., has added the Empire car to its list. The first aeroplane agency in Boston has been opened by J. H. MacAlman on Boylston street.

DETROIT'S SHOW WILL BE NOTABLE

DETROIT, Dec. 6—When it came to allotting space for exhibitors at the Detroit Auto Dealers' Association show, to be held at the Wayne Hotel Gardens January 24-29 next, the committee having the matter in charge found itself up against the serious problem of cutting demands down to meet the available space, a task not easy when more than 36,000 square feet was asked for with a trifle over 31,000 available.

TWENTY-SIX WILL MAKE THEIR DEBUT

Detroit's show will have 191 models of 58 different makes. Twenty-six of the makes are to be exhibited locally this year for the first time and of this number fifteen are the product of companies which have come into existence since the last show, all being local. As several prospective exhibitors are still to be heard from, the committee reserved the right to alter allotments in the event of further entries.

MASSACHUSETTS SUPPLIES SOME REAL STATISTICS

BOSTON, Dec. 6—Figures of the automobile department of the Massachusetts Highway Commission for the fiscal year ending November 30 have just been compiled, and they show for the twelve months included in the calculation a tremendous increase in every department of motoring over the preceding year. Receipts from motorists for registration certificates, licenses, etc., increased about forty per cent. and the registration of cars increased approximately thirty per cent. The total receipts during the past year of the automobile department were $169,973.54 against $121,488.50 last year and $92,091.50 in 1907. The total number of cars registered during the year ending November 30 was 23,902, while in the preceding year the number was 18,052. The registration of motor-cycles numbered 2,392 against 1,917 the year before. The growth of the trade is indicated by a gain of considerably more than one hundred in the number of manufacturers and dealers registered. Last year there were 379 and this year 491.

The issuance of licenses to drive, both to operators and chauffeurs, however, is the most striking evidence of the growing popularity of motoring. Two years ago 4,721 licenses were issued, last year 5,865 were added, and the total was increased this year by 8,336. There are now in effect approximately 35,000 licenses issued to private operators, all of which become invalid the first of next month when the new automobile law goes into effect. There has also been a surprising growth in the number of chauffeurs, and nearly 10,000 persons hold licenses entitling them to operate motor vehicles for hire, the exact number being 9,915. Last year there were 7,305.

Statistics of accidents in which motor cars were concerned have also been tabulated by the Highway Commission, and these show an alarming increase in the number of fatalities. The commission began keeping track of accidents in July, 1908, and for the five months ending November 30, 1908, there were 13 fatal accidents, which would be at the rate of 31 for the year. During the year ending November 30, 1909, there were no less than 54 fatalities. In August alone there were 11, almost as many as in five months of the previous year, and last month there were 10. Injuries caused by automobile accidents did not increase this year over last. In the five months of 1908 for which there are records, 486 injuries were reported to the commission, which, if the injuries were distributed evenly throughout the year, would make a total of 1,166 for 1908. This year the total number of injuries in motor car accidents reported to the commission was 969.

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PRESERVING THE EQUILIBRIUM

Prosperity carries many a man off his feet; adversity compels him to move with deliberation. Business corporations are managed by human beings, and consequently they are subject to the same tests as are supplied to the individual. The automobile industry is plainly at flood-tide, and there is bound to be a considerable amount of flotsam and jetsam afloat. It has been an inevitable happening in every new industry, to reach a period of over-production; and an over-production in this industry, involving millions of dollars, would mean incalculable harm to all producers and sellers concerned in one way or another.

While there is no excuse whatever for timidity, there yet remain logical reasons why preparations for the future demand should receive a careful survey, especially by concerns recently launched or about to be introduced into a new and somewhat problematical field. Prosperity is evident, but the depth of it should be examined with due regard to a future which naturally will not offer as promising a prospect as the present heyday of active demand and a temporarily inadequate supply.

'Tis the wise man who looks farther ahead than a twelve-month; and the making of automobiles and accessories does not belong in the list of "get-rich-quick" undertakings. Methods which may seem applicable to one industry are a misfit in other channels; and there are a few misfits in the business of producing automobiles.

ADVANTAGES OF WORM DRIVE

American engineers might profitably give some thought to the tendency of English automobile design, as revealed by the Olympia show, toward worm drive. The worm and its gear, in this construction, replace the usual bevel gear and pinion on the rear axle. Although confined two years ago to a single maker, this drive is now employed by half a dozen English firms of the highest repute. Its adoption seems to have been solely on its merits, due to the advantages which it possesses over the bevel drive for certain classes of work.

The most common, and most erroneous, objection to the worm gear as a means of final drive is the superstition that it is irreversible; that is, that it would be impossible to push a worm-driven car by hand, say on the garage floor. This fallacy is derived from the use of worm gears in the steering gear. As a matter of cold fact, the reversibility or irreversibility of a worm gear depends on the angle of its thread. A "slow" worm, such as is used in steering gears, may be irreversible; but a "quick" worm, in which the threads may be at 45 or 60 degrees from the axis, reverses perfectly.

Of greater actual weight is the contention that the worm is inefficient as a power transmitter. The advocate of the worm can afford, however, to yield considerable ground on this point without endangering his case—as we will show later. However, the truth is that the only published tests of worm gears were made before the day of modern ball-bearings and gear-cutting machinery, and form a poor basis for argument.

The worm really only competes with the bevel in the case of low-powered runabouts and heavy trucks—both cases in which a considerable gear reduction is demanded between the motor and the wheels. In a bevel gear the reduction is the ratio of the diameters of the gear and the pinion; to secure a large reduction, either the gear must be big or the pinion little. Structural considerations interferes on one side, and lowered efficiency and shortened life on the other. The gear reduction of the worm, however, depends on the pitch as well as on the size; indeed, a considerable range of ratios may be had with the same-sized worm and gear.

The use of the worm drive on runabouts and commercial cars, therefore, allows the necessary reduction to be obtained in a simple and compact piece of mechanism. The efficiency, moreover, is at least as good as that of a bevel set with the exaggerated dimensions necessary for the same work, or of any form of double reduction by spur gears and bevels, or bevels and chains. The bevel gear, it must be remembered, is itself by no means remarkable for efficiency. In combination with another form of gearing, the efficiency of the set could not well exceed 90 per cent. That figure is easily attainable by a properly cut and lubricated worm with ball thrust bearings; in fact, tests made as long ago as 1898 showed an efficiency of 92 per cent.

Still another consideration. In a worm set, the axis of the driving shaft does not intersect the axis of the driven shaft, but is at a distance from it which, in automobile practice, might be from four to six inches. If the worm is above the gear, the engine can be set high to obtain a good clearance, and the drive shaft joints will normally work in a straight line. Thus one may kill with a single stone not only two, but even three, birds.

EXHIBITORS FOR GARDEN'S TENTH NATIONAL SHOW

THAT the Tenth National Automobile Show in Madison Square Garden, January 8-15, will eclipse any former similar exhibition ever held in the famous building is positively assured by the official list of exhibitors just issued by the Association of Licensed Automobile Manufacturers under whose auspices the show is held. The list shows a total of 323 different displays, of which there are 54 exhibits of complete cars, besides 246 exhibits of accessories and parts, and 23 motorcycle exhibits.

Even with an increase over last year of more than 7,000 feet of exhibition space, which the show managers by ingenious methods were able to squeeze out of the Garden interior, there is not one foot of space available for exhibition purposes to be had in any part of the building at present and there is a long waiting list.

The list of exhibitors, with the number of their spaces, follows:

MAIN FLOOR

1 Elmore Mfg. Co.
2 Everitt-Metzger-Flanders Co.
3 Studebaker Automobile Co.
4 F. B. Stearns Co.
5 Knox Automobile Co.
6 Columbia Motor Car Co.
7 Autocar Co.
8 Corbin Motor Vehicle Corp.
9 Matheson Motor Car Co.
10 The Pope Mfg. Co.
11 Lozier Motor Co.
12 Locomobile Co. of America.
13 American Locomotive Co.
14 Packard Motor Car Co.
15 Pierce-Arrow Motor Car Co.
16 Cadillac Motor Car Co.
17 Chalmers-Detroit Motor Co.
18 E. R. Thomas Motor Co.
19 H. H. Franklin Mfg. Co.
20 Winton Motor Carriage Co.
21 Stevens-Duryea Co.
22 Peerless Motor Car Co.
23 Buick Motor Co.

ELEVATED PLATFORM

24 Selden Motor Vehicle Co.
25 The Willys-Overland Co.
26 Hewitt Motor Co.
27 Royal Tourist Car Co.
28 Mercer Auto Co.
29 Olds Motor Works
30 Haynes Automobile Co.
31 Waltham Mfg. Co.
32 Hudson Motor Car Co.
33 Apperson Bros. Auto. Co.

EXHIBITION HALL, MADISON SQUARE FRONT

50 Woods Motor Vehicle Co.
51 S. R. Bailey & Co., Inc.
52 The Waverly Co.
53 Babcock Electric Carriage Co.
54 Columbia Motor Car Co.
55 The Baker Motor Vehicle Co.
56 The Anderson Carriage Co.
57 The Rauch & Lang Carriage Co.
58 Studebaker Automobile Co.

BASEMENT, COMMERCIAL VEHICLE DEPARTMENT

75 Knox Automobile Co.
76 E. R. Thomas Motor Co.
77 Studebaker Automobile Co.
78 Baker Motor Vehicle Co.
79 H. H. Franklin Mfg. Co.
80 American Locomotive Co.
81 The Autocar Company.
82 General Vehicle Co.
83 Packard Motor Car Co.
84 The Pope Mfg. Co.
85 Alden Sampson Mfg. Co.
86 Hewitt Motor Co.

ELEVATED PLATFORM, ACCESSORIES

100 The B. F. Goodrich Co.
101 The Diamond Rubber Co.
102 C. F. Splitdorf.
103 Goodyear Tire & Rubber Co.
104 Atwater Kent Mfg. Works
105 G. & J. Tire Co.
106 Gray & Davis
107 Pennsylvania Rubber Co.
108 R. E. Dietz Co.
109 Wm. Cramp & Sons Ship & Eng. Bldg. Co.
110 Baldwin Chain & Mfg. Co.
111 Phineas Jones & Co.
112 Light Mfg. & Foundry Co.
113 The Jones Speedometer
114 Conn. Telephone & Elec. Co.
115 C. A. Metzger
116 Weed Chain Tire Grip Co.
117 N. Y. & N. J. Lubricant Co.
118 Republic Rubber Co.
119 National Carbon Co.
120 Ajax-Grieb Rubber Co.
121 Hartford Suspension Co.
122 Empire Tire Co.
123 The R. E. Hardy Co.
124 Janney-Steinmetz & Co.
125 J. H. Sager Co.
126 American Ever Ready Co.
127 Auto Improvement Co.
128 Witherbee Igniter Co.
129 Globe Mach. & Stamp. Co.
130 Leather Tire Goods Co.
131 Coes Wrench Co.
132 Cook's Standard Tool Co.
133 The Hoffecker Co.
134 Edmunds & Jones Mfg. Co.
134A Fox Metallic Tire Belt Co.
135 C. Cowles & Co.
136 Continental Rubber Works
137
138 The Motz Clincher Tire & Rubber Co.
139 The Duff Mfg. Co.
140 A. W. Harris Oil Co.
141 Firestone Tire & Rubber Co.
142 Oliver Mfg. Co.
143 The Timken-Detroit Axle Co.
144 Timken Roller Bearing Co.
145 Warner Instrument Co.
146 Motsinger Device Mfg. Co.
147 The Randall-Faichney Co.
148 Byrne-Kingston & Co.
149 Spicer Universal Joint Co.
150 Pittsfield Spark Coil Co.
151 The Whitney Mfg. Co.
152 Brown-Lipe Gear Co.
153 Swinehart Clincher Tire & Rubber Co.
154 Warner Gear Co.
155 American Ball Bearing Co.
156 The Standard Welding Co.
157 Badger Brass Mfg. Co.
158 A. R. Mosler
159 Gabriel Horn Mfg. Co.
160 Joseph Dixon Crucible Co.
161 Heinze Electric Co.
162 C. T. Ham Mfg. Co.
163 Valentine & Co.
164 Adam Cook's Sons
165 Briscoe Mfg. Co.
166 The Gilbert Mfg. Co.
167 Vacuum Oil Co.
168 Atwood Castle Co.
169 Herz & Co.
170 S. F. Bowser & Co.
171 Springfield Metal Body Co.
172 Michelin Tire Co.
173 Remy Electric Co.
174 Consolidated Rubber Tire Co.
175 Stewart & Clark Mfg. Co.
176 Wheeler & Schebbler
177 Continental Caoutchouc Co.
178 The Fisk Rubber Co.
179 Veeder Mfg. Co.
180 Morgan & Wright
181 Diamond Chain & Mfg. Co.
182 The Hartford Rubber Works

CONCERT HALL

300 The Sprague Umbrella Co.
301 L. C. Chase Co.
302 Victor Auto Supply Mfg. Co.
303 Columbia Lubricant Co.
304 A. O. Smith Co.
305 Thermoid Rubber Co.
306 Standard Roller Bearing Co.
307 Stromberg Motor Devices Co.
308 U. S. Light & Heating Co.
309 The Pantasote Co.
310 Federal Rubber Co.
311 Hayes Mfg. Co.
312 Vesta Accumulator Co.
313 National Coil Co.
314 The Dayton Rubber Mfg. Co.
315 Hancock Mfg. Co.
316 The Seamless Rubber Co.
317 C. M. Hall Lamp Co.
318 Royal Equipment Co.
319 McCord Mfg. Co.
320 Lebanon Steel Casting Co.
321 Briggs & Stratton
322 Lovell-McConnell Mfg. Co.
323 Rands Mfg. Co.
324 Excelsior Motor & Mfg. Co.
325 Gemmer Mfg. Co.
326 The Hess-Bright Mfg. Co.

BALCONY

200 Elec. Storage Battery Co.
201 C. A. Shaler
202 Link-Belt Co.
203 High Wheel Auto Parts
204 The Noera Mfg. Co.
205 Havoline Oil Co.
206 Warner Mfg. Co.
207 The Batavia Rubber Co.
208 Driggs-Seabury Corp.
209 Charles E. Miller
210 The Sireno Co.
211 Champion Ignition Co.
212 Keystone Lubricating Co.
213 Perfection Wrench Co.
214 R. I. V. Co.
215 Jeffrey-Dewitt Co.
216 Thos. Prosser & Sons
217 Eastern Carbon Works
218 Simms Magneto Co.
219 Isaac C. Johnson & Co.
220 L. J. Mutty Co.
221 H. H. Franklin Mfg. Co.
222 High Frequency Ignition Co.
223 S. Hoffnung & Co., Ltd.
224 Peter A. Frasse & Co.
225 Lavalette & Co.
226 J. S. Bretz Co.
227 George A. Haws
228 K-W Ignition Co.
229 Morrison-Ricker Mfg. Co.
230 N. Y. Sporting Goods Co.
231 The Carpenter Steel Co.
232 Flerson Motor Supply Co.
233 Ernst Flentje
234 Allen Auto Specialty Co.
235 Geizler Stor. Battery Co.
236 Standard Leather Washer Mfg. Co.
237 Wm. P. Miller's Sons
238 McGraw Tire & Rubber Co.
239 H. W. Johns-Manville Co.

BALCONY EXTENSION, MADISON AVENUE

240 Emil Grossman Co.
241 The McCue Co.
242 Stein Cushion Tire Co.
243 Tray Plate Battery Co.
244 Ellte Mfg. Co.
245 Riley-Klotz Mfg. Co.
246 Hopewell Bros.
247 Motor Car Equipment Co.
248 The Novelty Mfg. Co.
249 Automatic Headlight Co.
250
251 Burn-Boston Bat'ry Mfg. Co.
252 Frank R. Cress
253 N. J. Car Spring & Rubber Co.
254 American Vanadium Co.

BALCONY EXTENSION, FOURTH AVENUE

255 Bosch Magneto Co.
257 Stackpole Battery Co
258 Metal Stamping Co.
259 Vanadium Metals Co.
260 Zeglen Bullet Proof Cloth Co.
261 Howard Demount. Rim Co.
262
263 Cox Brass Mfg. Co.
263A Philip C. Traver Mfg. Co.
264 Lavigne Mfg. Co.
265 Barrard Specialty Co.
266 Stevens & Co.
267 Livingston Radiator & Mfg. Co., Inc.
268 P. Reilly & Son
269 The Perfection Spring Co.
270 Detroit Motor Car Supply Co.
271 Wayne Oil Tank & Pump Co.

SECOND TIER

400 Newark Rivet Works
401 Wright Wrench Mfg. Co.
402 C. A. Willey Co.
403 Kamlee Company
404 Hilton Mfg. Co.
405 Dover Stamping & Mfg. Co.
406 Grimm-Plaut Construct'n Co.
407 Calmon Asbestos & Rubber Works of America
408 Shipman Instrument Co.
409 Woven Steel Hose & Rubber Co.
410 Union Battery Co.
411 The Waterhouse Co.
412 Motor Parts Co.
413 Harry A. Allers Co.
414 Columbia Nut & Bolt Co.
415 Recometre Co. of America

ROOM 7

416 Rothstein Mfg. Co.
417 B. M. Asch
418 William R. Winn
419 New York Coil Co.
420 Vorhees Rubber Mfg. Co.
421 Gasoline Motor Effic'ncy Co.
422 Favary Tire & Cushion Co.
423 The Chandler Co.
424 Rushmore Dynamo Works.
425 The English & Merseck Co.
426 E. M. Benford.

BASEMENT, ACCESSORIES

500 Merchant & Evans
501 James L. Gibney & Bro.
502 W. E. Pruden Hardware Co.
503 Como Electric Co.
504 H. & F. Mesinger Mfg. Co.
505 Class Journal Co. (Motor Age)
506 Class Journal Co. (Automobile)
507 The Horseless Age
508 Valvoline Oil Co.
509 Nathan Novelty Mfg. Co.
510 The A-Z Co.
511 Julius King Optical Co.
512 Motor
513 International Engineer'g Co.
514 Motor Print
515 Motor Vehicle Pub. Co.
516 Joseph Tracy
517 Burroughs Rem'able Rim Co.
518 Apple Electric Co.
519 Chilton Printing Co.
520 Nonpariel Horn Mfg. Co.
521 Erie Foundry Co.
522 Livingston Radiator Co.
523 Automobile Topics
524 The New Departure Mfg. Co.
525 The White & Bagley Co.
526 The Vanguard Mfg. Co.
527 Ajax Tr'nk & S'mple Case Co.
528 Kilgore Mfg. Co.
529 The Post & Lester Co.
530 Nightingale Whistle Mfg. Co.
531 Noonan Tool & Mach. Works
532 Willard Storage Battery Co.
533 Phila. Storage Battery Co.
534 National Auto Top Co.
535 Troy Carriage Sun Shade Co.

BASEMENT, MOTORCYCLE DEPARTMENT

600 Merkel Light Motor Co.
601 The Bicycling World
602 The Consolidated Mfg. Co.
603 N. S. U. Motor Co.
604 Motorcycle Publishing Co.
605 American Motor Co
606 Hendee Mfg. Co.
607 The Herring-Curtiss Co.
608 Harley-Davidson Motor Co.
609 Reading-Standard Co.
610 Aurora Auto. Mach. Co.
611 Greyhound Motor Works
612 The Pierce Cycle Co.
613 Excelsior Supply Co.
614 The New Era Gas Engine Co.
615 Eclipse Machine Co.
616 F. A. Baker & Co.
617 Royal Motor Works, Inc.
618 The Miami Cycle & Mfg. Co.
619 Emblem Mfg. Co.
620 Marvel Motorcycle Co.
621 Reliance Motorcycle Co.
622 S. D. Mfg. Co.

REEVES TO BE A.L.A.M. MANAGER?

Detroit, Dec. 6—It was learned here to-day that Alfred Reeves, of New York, has been tendered the position of general manager of the Association of Licensed Automobile Manufacturers which carries with it a salary of $15,000 a year. Rumors to this effect got into circulation here soon after the decision of the Selden patent suit, but now it can be stated definitely that the offer has been made.

Mr. Reeves for the past four years has been general manager of the American Motor Car Manufacturers' Association, which has opposed the licensed makers, but since the practical settlement of the patent controversy many of the independent makers have joined the A.L.A.M., or secured licenses, and others are expected to follow.

The annual Grand Central Palace show in New York is managed by Mr. Reeves, but following that affair it is believed he will assume his duties wtih the licensed association, provided he decides to accept the tender that has been made.

When seen in New York Tuesday Mr. Reeves asked to be excused from making any statement regarding the above report from Detroit. He would not deny that an offer had been made, but insisted that he would be manager of his present association for some time to come.

SOME GOSSIP FROM MOTORDOM'S HUB

Detroit, Dec. 6—This "Hub of Motordom" frequently sees many faces from "dear old Broadway." Pretty nearly every New York paper last week had its representative in the field looking for show business. The advertising managers of the factories loaned them cars to get around the vast district in as quick time as possible, presumably that the sooner they helped their New York visitors to get out of town, the sooner they would again be able to settle down to work.

E. LeRoy Pelletier, advertising manager of the Studebaker factories, was forced to undergo an operation for trouble with his nose, and spent the week in the hands of doctors.

When "Jack" Lasley was in town he saw Lee Counselman, sales manager of the Chalmers-Detroit Motor Company. Mr. Lasley, as agent of the Eclipse bicycles at Washington, gave Mr. Counselman his first living wage, $25 a week. Mr. Counselman became an amateur (?) star on the Eclipse team and gained renown in that field. Mr. Lasley owned a cash register business, and into that field the young bicycle rider grew naturally, graduating to the National Cash Register Company, where he became a right-hand man for Hugh Chalmers, who took him into the automobile field.

E. Ralph Estep, advertising manager of the Packard Motor Car Company, has a show place in his photograph gallery, of which he is very proud. This department is fitted up regardless of cost, the entire outfit being perhaps the best in the world for the exclusive use of one concern.

George Banker, looking fine as a fiddle and quite like the George Banker of the days of cycling when he ranked as a champion in America and Europe, was a Detroit visitor recently. George and his brother, Arthur, are making the Banker Brothers Wind Shield Company boom. "It is night and day work for us right along," said he.

M. & A. M. ADDS TO MEMBERSHIP

At the meeting of the board of directors of the Motor & Accessory Manufacturers, held in New York City, November 27, a number of companies well known in trade circles were elected to membership. The additions are the Auto Parts Manufacturing Company, the Batavia Rubber Company, the Driggs-Seabury Ordnance Corporation, the Excelsior Motor & Manufacturing Company, the Havoline Oil Company, the Royal Equipment Company, the Seamless Rubber Company, the Warner Manufacturing Company and the Thermoid Rubber Company.

THE HOTEL BRESLIN'S AUTO SHOW

There must be such a thing as luck, according to the belief of those who attended the annual show luncheon given to the trade by Manager W. E. Hildredth of the Hotel Breslin, held Monday noon in the grill room of that popular Broadway hostelry. H. C. Esselsteyn first drew for the R. M. Owen Company in connection with the Grand Central Palace show, the result being that the Premier secured the exhibition privilege of the Breslin lobby during the show period. Next, Mr. Esselsteyn drew for Carl H. Page Company, and again he secured the ticket marked "winner," which means that the Chalmers-Detroit will occupy the Breslin pedestal during the Madison Square Garden show. Henry M. Duncan was the graceful toastmaster of the occasion, and the other talkers included Host Hildredth, and M. L. Downs of the A. L. A. M. show and Alfred Reeves, general manager of the A. M. C. M. A. Besides the contingent at the star table, which included James C. Young, secretary of the Madison Square Garden Company, the list of those present included the following: John Plummer, Locomobile Company; J. M. Boyle, Midland Car Company; W. J. Donlan, Studebaker Car Company; William M. Haradon, Columbia Car; Keene Carruthers, Mitchell Car Company; C. A. Benton, Sultan Motor Company; P. F. Rockett, Isotta Import Company; Philip H. Lucas, Reo Car; H. C. Esselsteyn, Premier Car; W. McK. White; William L. Colt, Colt-Stratton Company; Julius Augustine, Franklin Car; J. S. Norton; O. Frost, Black Manufacturing Company; Capt. H. L. Stratton, Colt-Stratton Company; J. R. Flanagan, Pullman Car; Charles M. Brown, Winton Car; William E. Adams, H. J. Koehler Company; Frank Eveland, Stevens-Duryea; A. J. Stocker, of Frank Presbury & Co.; A. N. Jervis, of American Locomobile Company; A. G. Batchelder, N. Lazarnick, E. F. Korbel, R. B. Johnston and Ernest Crowhurst.

BUFFALO SHOW SITUATION SETTLED

Buffalo, Dec. 4—The Eighth Annual Automobile Show will be held in the Broadway Arsenal, February 14-19, under the direction of the Buffalo Automobile Trade Association. It will have the co-operation of the Automobile Club of Buffalo, but it is announced that the Trade Association will manage the show. This ends a struggle between the club and the association as to which should conduct that enterprise this year.

The Trade Association announced last year that the show of 1909 would be the last to be run by the club, and that thereafter the association would manage those affairs. Various propositions to smooth over the difficulties between the two bodies were brought forward from time to time, but the Trade Association rejected them and declared that if the club held a show in the Broadway Arsenal, the association would hold another in Convention Hall. Finally, the club agreed to take $2,500 as its share of the enterprise and in return for its co-operation, leaving the association to run the show.

G. L. Poppenberg and Charles F. Monroe, and Laurens Enos and Harry T. Vars, two from each organization, will constitute the advisory committee in charge of the show; but the Trade Association will run the enterprise through committees in charge of every detail.

AMERICAN PRODUCT OPENS GERMAN EYES

Henry Hess, president of the Hess-Bright Manufacturing Company, Philadelphia, is making the rounds of the automobile industry, accompanying Director General Kosegarten and Chief Engineer Gohlke of the D. W. F. Ball Bearing Company, of Germany. When the representative of The Automobile interviewed the party at Indianapolis, Buffalo, Cleveland, and Detroit, the foreign visitors admitted that they had been impressed with the vastness of the industry. In many places the rate at which automobiles were being turned out proved to be perfectly astounding, although Director General Kosegarten, of the D. W. F., himself is the head of a concern of no mean proportions.

N. H. Stewart Drives Franklin Six, Winner in Kalamazoo, Mich., Parade

On the occasion of the floral parade commemorating Kalamazoo's silver anniversary, Mr. Stewart's 42-horsepower Franklin took first prize. The car was a mass of purple flowers with a white background. The occupants, beside Mr. Stewart, are Mrs. E. R. Burdict, Mrs. Donald Stewart, and Misses Irene Taylor, Lillie Speyer, Eleanor Austin and Elsa Speyer

Grossman Prizes for Dealers—On Thanksgiving Day the Emil Grossman Company announced a number of cash prizes for dealers who handle its line of accessories. Eighteen prizes will go to the houses whose catalogues embrace the best representations of "Red Head" spark plugs, "Red Rib" cable, Peugeot chains and the Grossman line of wind shields, bumpers, etc. Twelve prizes will be given for newspaper and theater program advertisements, six for window displays during the holiday season and twelve for show window and store displays between January 1 and July 1, 1910. An editor of a leading automobile publication and two general advertising men will be the judges of all contests. Cartons for show window displays, hangers, card and electrotypes will be furnished gratis to all who desire to participate.

Open Season for Tire Advice—If amateur drivers who lay up their cars for the winter find the tires in bad shape next spring, it will not be for lack of good advice. The Firestone Company is the latest, as follows: "If an owner is bound to store his car without removing the tires, it is best to jack the wheels up off the floor and let out some of the air, as well as seeing that the tires are clean and free from oil. The best way, however, is to remove the tires from the wheels. The tubes should be taken out, cleaned, painted with graphite, wrapped up and put away in a dark place where the temperature is always about 30 deg."

Favors a Contest of Tires—Howard E. Coffin, chairman of the contest board of the Manufacturers' Association, endorses the suggestion of the B. F. Goodrich Company that future endurance runs should include competitions for tires, and will attempt to have rules for this purpose formulated by the board. It is probable that carbureters, magnetos and other accessories will receive similar attention. Makers of accessories who interest themselves in touring contests for these honors will be made parties to an agreement to advertise only the real facts.

New Car From Badger State—The Wisconsin Carriage Company, of Janesville, Wis., has started work on a series of 100 touring cars for the 1910 market. Specifications include a four-cylinder 4 3-8 by 4 3-4 motor; Schebler carbureter; Bosch magneto and battery; cone clutch; three-speed selective ball-bearing gear; full-floating rear axle with enclosed drive shaft, also ball-bearing; 115-inch wheelbase and 34-inch wheels, selling at $1,750, with either touring or baby tonneau body. T. E. Warnock is designer and Oliver Gleason shop superintendent.

Minnesotan Company Reorganized—The reorganization bug has penetrated far from its usual haunts, even unto peaceful Minneapolis, Minn. There the H. E. Wilcox Motor Company has increased its capital to $1,000,000, and proposes to make 300 touring cars and 150 trucks. H. E. Wilcox is president and manager, John F. Wilcox vice-president, G. W. Lewis treasurer, P. W. Strong, sales manager, and Claude E. Cox chief engineer. C. L. Wood will be chief engineer of the truck department.

Dynamometer for Moon Company—In order that each car which leaves the factory may be tested for full rated horsepower, the Moon Motor Car Company, of St. Louis, has decided to install a specially made dynamometer. Some device of this sort is recognized as necessary in a modern plant, if horsepower is to be determined in other than theoretical ways. The dynamometer was constructed under the direction of C. M. Garland, professor of engineering at the University of Illinois, and will be installed this week.

Boston Men to Make Trucks—A. L. Waugh, a dealer in commercial vehicles in Boston, is organizing with Frederick Wells and J. G. McDonald, a concern to be known as the United Vehicle Company, to manufacture a complete line of commercial cars from 1-2 to 5 tons capacity. The company plans to erect a concrete building with 80,000 square feet of floor space near the present Waugh salesroom and make 150 cars first year..

Concentrates on Wholesale End—The Motor Car Equipment Company has sold its uptown New York branch to the Lowe Motor Supplies Company and has permanently retired from the retail field. The company now occupies a six-story 25x100-foot building at 55 Warren street. Three floors are devoted to stock and one to packing exclusively. Fifty orders can be filled simultaneously.

Another Lecture on Electrics—An illustrated lecture on the care and operation of electric vehicle batteries was delivered in Washington Hall, Detroit, on December 6, by Bruce Ford, engineer of the Electric Storage Battery Company, of Philadelphia. The lecture was given under the auspices of the Edison Illuminating Company.

New Detroit Magneto-Maker—T. G. Baillie, M. Fletcher, E. M. Tyler, John A. Lotz and A. A. Fletcher have incorporated a new accessory manufacturing concern in Detroit under the name of the Detroit Magneto Company, with a capital of $100,000.

IN AND ABOUT THE AGENCIES

Baker, Cleveland—The Baker Motor Vehicle Company has acquired the corner of East Seventy-first street and Euclid avenue and will erect a new building with showrooms on the avenue side and a garage on Seventy-first street. One of the showrooms is to be occupied by the Standard Automobile Company, agent for the Packard.

Royal, Rochester and Syracuse, N. Y.—Hobart M. Adams, sales manager of the Royal Tourist Car Company, announces that the Schoeffel Auto and Livery Company has been appointed Royal agent in Rochester, N. Y., and that a sales company is being formed in Syracuse, N. Y.

Chalmers-Detroit and Thomas, San Francisco—The Pioneer Automobile Company, which handles the Chalmers-Detroit, Hudson, Thomas and Randolph, will remove shortly to temporary quarters on Golden Gate avenue, near Gough street, during the erection of its new building.

Rambler and Crawford, Philadelphia—The Hoopes Motor Company, Broad and Fairmount avenues, has succeeded the Crawford Automobile Company, of Philadelphia, and in addition to the Crawford the new concern has acquired the Philadelphia agency for the Rambler.

National, Atlanta, Ga.—J. J. and J. L. McLendon, under the name of the National Motor Sales Company, have been appointed Georgia agents for the National. On December 1 they moved into the former Maxwell salesrooms at 38 Auburn avenue.

Kline Kar, Baltimore—The Palace Motor Car Company, J. S. Ditch, president, and Edward T. Boswell, secretary and treasurer, has the Kline Kar agency for Maryland, and has opened a salesroom at Mount Royal and North ave.

Stearns, Baltimore—The McMullen-George Automobile Company will have the Maryland agency for the Stearns. It has the former Ford salesroom in the Academy of Music building, with garage and repair shop at 542 Tyson street.

Everitt, Philadelphia—The Wayne-Davis Automobile Company has been awarded the Philadelphia agency for the Everitt. The territory will include Eastern Pennsylvania, Del., Md. and Va.

Velie and Empire, Macon, Ga.—E. J. Willingham, Jr., and J. C. Wheeler have opened a large garage at Cotton avenue and Cherry street, Macon, and have the State agency for the Velie and Empire.

Velie, Mason and Fuller, Salina, Kan.—F. W. Reed and P. D. Miller will occupy the 50 by 100-foot building at 131 North Fifth street by February 1, and will handle the Velie, Mason and Fuller cars.

Marmon, Louisville, Ky.—The Atlas Machine Company, agent for the Empire in Louisville, has added to its line the Marmon and expects to open a new garage within the next few weeks.

Haynes, San Francisco—The Haynes Auto Sales Company, which was recently appointed local agent for the Haynes, has opened a salesroom on Golden Gate avenue, near Van Ness.

Studebaker, Durant, Okla.—The Durant Motor Company, of Durant, Okla., has been appointed agent for the Studebaker lines, and will control four adjacent counties.

Apperson, Boston—W. L. Russell & Company, who are the agents in Boston and vicinity for the Apperson, have opened at 169 Huntington avenue.

Midland, Kansas City, Mo.—The Midland Motor Car Company branch in this city has removed to new quarters at 1523 Grand ave., where it has a fine place.

Moon, Houston, Tex.—The Auto and Motor Boat Company has been appointed local agent for the Moon car, made by the Moon Motor Car Co., of St. Louis.

Schebler Carbureters, Detroit—Wheeler & Schebler, of Indianapolis, have opened a Detroit office at 876 Woodward avenue, in charge of L. M. Railsback.

Paterson, Philadelphia—The Penn Automobile Company, 4212-18 Chestnut street, has taken the Philadelphia agency for the Paterson, made in Detroit.

PERSONAL TRADE MENTION

Charles B. Shanks, formerly sales manager of the Winton Motor Carriage Company and later occupying the same position with the F. B. Stearns Company, Cleveland, was in New York City last week and visited old friends along "Automobile Row" in upper Broadway. Mr. Shanks is now connected with the Jacobs-Stine Company, the largest real estate operators on the Pacific coast, with headquarters at Portland, Ore. Before finally starting westward, Mr. Shanks paid a visit to the Croxton-Keeton factory at Massillon, Ohio, and ordered one of the 1910 models for his personal use. The former hustling sales manager admitted that he was meeting with as much success in selling real estate as he did in the past in disposing of motor-driven vehicles.

Chas. B. Shanks

W. E. Metzger, of Detroit, Mich., wears a rather expansive smile these days, occasioned by the definite knowledge that he is once more firmly and securely in the A. L. A. M. fold. Though the official announcement is delayed for a well-understood reason, it is nevertheless a fact that the new company of which Mr. Metzger is the head has secured a transfer of the license of the Hewitt Motor Company of New York City. This means that Metzger cars will soon be forthcoming with the A. L. A. M. stamp of approval.

Wm. E. Metzger

George W. Hipple, formerly of the Levy-Hipple Motor Company, of Chicago, is managing the Chalmers Motor Company, Philadelphia agents for the Chalmers-Detroit. Frank Fanning, head of the Chalmers-Fanning Company, former representatives of the car in the Quaker City, is now Philadelphia agent for the Mercer.

W. R. Darrah, long and favorably known in the old bicycle days as the Barnes "White Flyer" agent in the Quaker City, has joined the sales force of the Studebaker branch in Philadelphia.

C. J. Welch, formerly with the E. R. Thomas Motor Company, Buffalo, N. Y., has been appointed sales manager of the Inter-State Automobile Co., Muncie, Ind.

Louis C. Block, manager of the Philadelphia Ford branch, is in Cincinnati launching a similar institution. He also opened the Buffalo branch.

O. P. Bernhart, vice-president of the Croxton-Keeton Motor Company, is on a trip through the West in the interests of the company.

Another German Tire Represented Here—In the opening of an office and salesroom at 1693 Broadway by the Calmon Asbestos and Rubber Works of America, Inc., last week, there was established an American selling agency for the well-known Calmon tires, made in Hamburg, Germany.

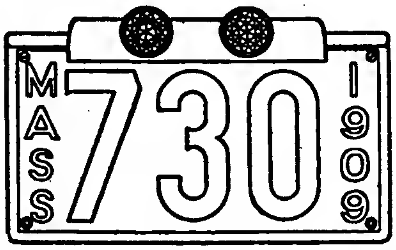
While Calmon tires are a more expensive product than most any tire sold in this country, this fact will amount to but little if the half of what the enthusiastic American sales agents claim for them is true. For instance, they have any number of letters and affidavits showing that abroad Calmon tires have frequently been in constant use for over 17,000 miles. One affidavit from a big electrical company shows that four tires used on their motor cabs had been used for 9,413, 10,985, 10,007 and 11,240 miles of continuous service.

Calmon Tire, a German Newcomer

The tires are splendid examples of rubber manufacture, somewhat heavier as to thickness of the stock than some of the American tires.

Information for Auto Users

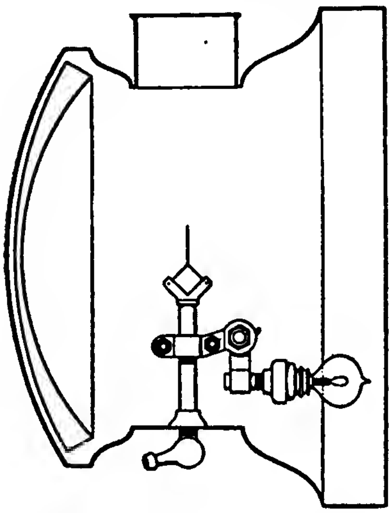
Gray & Davis Electric Attachments—The growing popularity of electricity as a means of lighting the car is evidenced by the action of Gray & Davis, of Ames-



G. & D. ELECTRIC TAIL-LIGHT AND NUMBER

bury, Mass., one of the best-known makers of gas and oil lamps, in bringing out a line of electric accessories. One of these is a tail-light, combined with a rear number plate, much like others that have recently been described in these columns. This lamp has two bulbs, so that if one gives out unexpectedly the rear of the car will not be left completely in the dark. These bulbs are six-volt and so may be used with the ordinary ignition battery. Means are provided for protecting the reflector by a glass door, and also for securing the bulbs so that they cannot be stolen. Patent on this device has been applied for.

Another device which opens up interesting possibilities is an electric attachment for acetylene headlights, so de-

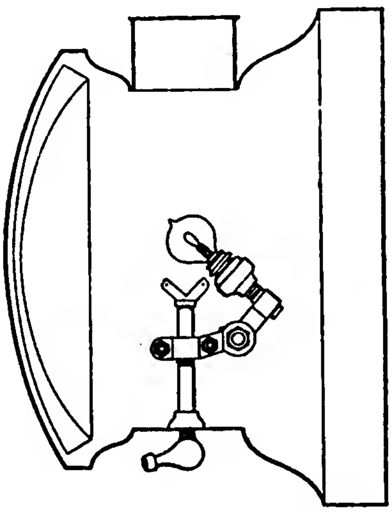


COMBINATION SEARCHLIGHT—GAS POSITION

signed that either gas or electricity can be used at will, with a minimum of exertion in making the change. The primary object of this device, as stated by the maker, is for use in cities where the full-powered gas light is undesirable. As is made plain by the drawings, the electric bulbs can be swung into or out of focus with a touch of the hand, after opening the door of the lamp.

Calmon Brake Lining—E. H. Garcin, of the Calmon Asbestos & Rubber Works, 1693 Broadway, New York, says of this material:

"Calmon Ajax brake lining is made of asbestos cloth specially woven for this



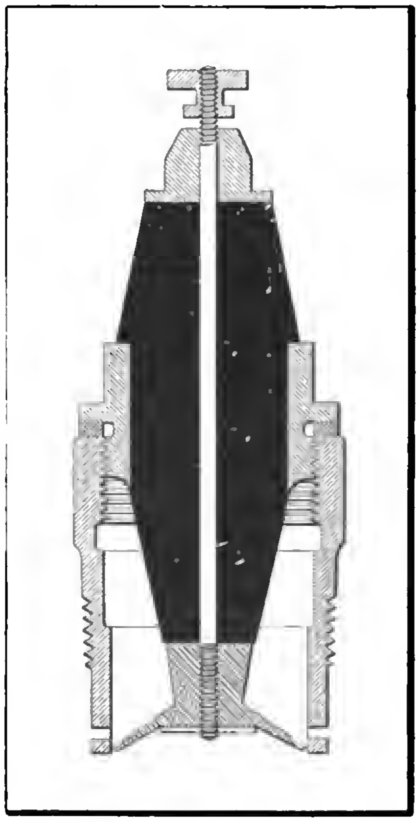
COMBINATION LIGHT—ELECTRIC POSITION

purpose. Each thread is spun around a wire center and the asbestos used is guaranteed to be 95 per cent. pure asbestos. The rubber compound coating used to thoroughly impregnate the material is cured under hydraulic pressure of more than 2,000 pounds to the square inch. This mode of preparation produces a lining that is water, oil, dust and grease proof that will not get hard, but which will grip instantly when it is needed.

"The care used in the spinning of the threads assures an absolute uniformity of their size so that the wear (or rather lack of wear) is equal in every portion of the lining."

New Multiple Point Spark Plug—In response to the demand for a spark plug the E. M. Benford Co., of Mt. Vernon, N. Y., has just placed upon the market a new magneto plug which is the result of several years' experimenting to produce one that will give better satisfaction, working with a magneto, than anything now on the market, and the results seem to justify their claim of a perfect or nearly perfect spark plug.

The construction is very unique. First an imported metal stamping with all the good qualities of platinum is set over a solid turned electrode. To hold this in place a cap of steel is placed upon same about ½ inch long. Then the mica tube is put upon the bolt after same has passed through an electrical heating furnace to burn out any vegetable matter that may be in the mica and to also thoroughly dry the mica. Carefully selected washers that have been passed through an electrical magnetic machine to test for iron are then placed over the tube, which is twice the thickness of the ordinary mica insulation. Over same is placed a brass bushing, which takes up any expansion in the metal part. Over the bushing more selected washers are placed and the entire plug is put under a pressure of 3,000 pounds in order to compress the mica into one homogeneous mass. After assembling, the plug is again placed in the electrical furnace in order to test whether any expansion will take place, and if so, it is again tightened up on the compressing machines. The plug is then turned in automatic lathes and assembled under the most experienced eyes. The particular features are the cone-shaped star, which prevents the oil from shooting into the chamber, and any carbon that should get by the cone-shaped star will find its way to the steel bushing, not to the mica, as in other plugs of this type.



NEW BENFORD SPARK-PLUG FOR MAGNETOS

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VOL. XXI NEW YORK—THURSDAY, DECEMBER 16, 1909—CHICAGO No. 25

THE AUTOMOBILE

INDIANAPOLIS SPEEDWAY IS READY

BY THOS. J. FAY

INDIANAPOLIS, IND., Dec. 14—With every brick laid except one, the Indianapolis Motor Speedway awaits its official reopening on Friday and Saturday of this week. This missing brick is a gold-plated one weighing 52 pounds and valued at $500. Of course it will be watched until the conclusion of the meet, after which its future resting place will be decided upon. Drivers of international repute will participate in the competition and time trials, and it is anticipated that many new records will be established during the two-day meet, provided the winter weather conditions are not unnecessarily severe. All who are connected with the enterprise are most enthusiastic and good records are promised.

The earlier speeding attempts on the Indianapolis track proved that after a certain velocity is attained, cars, unless they are almost unbreakable, will give way under work they are required to do, even when the road is better than the standard set for ordinary road building. On account of the unfortunate accidents that befell some of the racing automobiles during the opening meeting held at the speedway, which opened August 19 last, it was decided that nothing but the best possible pavement could be accepted, and the work of brick-paving has been under way ever since, culminating in the most perfect track possible to design and build, the dimensions being as in Fig. 1.

15-Ton Roller up 36 Degree Embankment

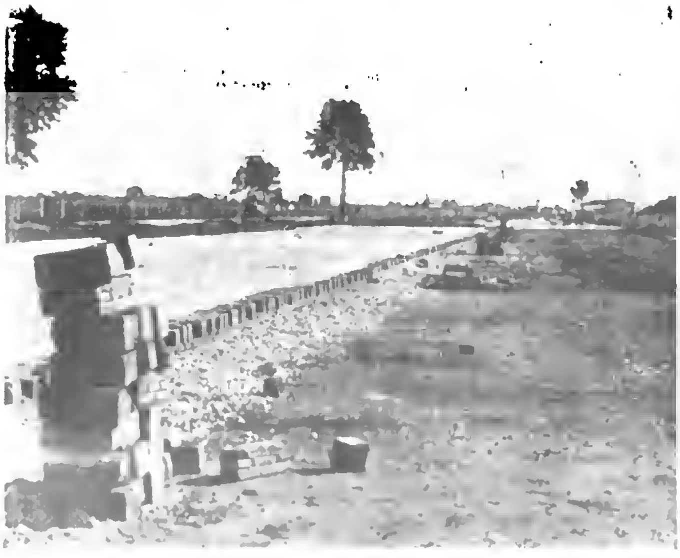
Belt Conveyor in Process of Laying Pavers.

Brick Pavement Finally Decided Upon—That the original track, so well constructed as it proved to be, will serve as a most capable "base fill" is conceded by all the road engineers who were consulted before the work of brick-paving was undertaken. The resurfacing, which was necessary, was well executed, as indicated in the statement here afforded as prepared by Park Taliaferro Andrews, holding the official position of chief engineer of the speedway. The engineer's resumé was gotten out by Mr. Andrews especially for THE AUTOMOBILE, and the author, having gone carefully over the whole work, is able to accept the engineer's resumé in the light of a most guarded statement of actual fact, to which nothing of value can be added.

The life of this brick-paved track, however, is as yet to be determined, and this phase of the problem, while it may be regarded as well looked into, must be to some extent considered within speculative confines and entitled to a little discussion at this time. That there is nothing new about brick may be readily shown; they were used in the Tower of Babel; about this time, so it is recorded, they were also made by the children of Israel, in Egypt, under the Pharaoh. To indicate, however, the uncertain history of this industry, it is only necessary to point out that pottery, which is akin to brick, was a product of cave-dwellers of the drift period from the Neolithic.

Crushed Surface Rock Ready to Spread on Old Track

Rolling Crushed Stone on Top of Old Track Surface



First Sample of Brick Surface Laid at Motor Speedway

Modern brick were first used, according to the most authentic sources of information, at Suffolk, in England, in the year 1260. In a hundred years from this time they were of fairly good manufacture, and in 1660 were in quite common use in London.

First Brick Kiln in America—At Salem, Mass., in 1629, the first brick kiln was probably established, although for many years nearly all brick used in this country came from Holland or England. Paving brick, which are of recent origin, were first used in this country in 1870, as nearly as present sources of information can be relied upon.

Process of Manufacture Defined—In the manufacture of paving brick there are many points to consider that do not have to be taken into account in connection with the manufacture of brick for building. From a suitable deposit of clay or shale the material is selected with the greatest care, crushed in dry pans or milled in solid rolls, they being about 48 inches in diameter and one foot wide. The rolls revolve within a revolving pan as much as 108 inches in diameter, the same being provided with a grated bottom. For a large-sized brick machine, two such pans are required, and the amount of shale crushed per hour lies between five and ten cubic yards; about two cubic yards of material is required per thousand of brick.

The crushed material is screened in a process involving fixed and shaking riddles, and knockers are employed to prevent the wet clay from sticking. From the screening process with its attending difficulties, which will not be discussed here, the clay goes to the "pugging" process, where the screened material is rendered plastic in form by suitable additions of water during the process of working in a properly contrived pug-mill. Pugging must be thoroughly done to remove air-enclosures, secure homogeneosity and reduce laminations to a minimum.

When the clay is well crushed, tempered and worked, which for the best results is frequently done by the wet-pan process, moulding follows. In moulding there is the "stiff-mould" process, which seems to be the more promising, despite frequent attempts to apply the dry-press system. A continuous working auger in the stiff-mud process forces the mud through forming dies, when the bar is sanded to prevent the brick from sticking together in the kilne. The bars, as they emerge from the forming dies, are cut to the required length, and a machine, under well-working conditions, is good for 100,000 bricks per day.

The repressing process, when it is applied, consists in putting freshly made stiff-mud brick into a die-box and subjecting it to a heavy vertical pressure, applied, as a rule, to the flat side. This process has the virtue of filling out the angles and edges, making the brick much more dense and uniform.

Drying is done by placing the brick on cars in a checkerwork fashion as high as possible within the sustaining ability of the stiff-mud condition of the brick to be dried, and the cars, so loaded, are run into drying chambers.

Burning, disregarding for the time the quality of material, is the most important process, for no matter how good the work may be done up to this process, No. 1 paving brick can only be the result of proper burning, and it is just here that the skill of the expert counts for everything. Burning usually takes place in from seven to ten days, and as to temperature, a shale brick requires from 1,500 to 2,000 degrees Fahrenheit, while brick made of fire clay demands from 1,800 to 2,300 degrees Fahrenheit.

Annealing follows, after the vitrifying temperature has been maintained for a sufficiently long time to heat the brick through to the center, which annealing is done by closing the kilns and allowing the brick to cool very slowly. For No. 1 brick, annealing should take from seven to ten days. Sorting follows after annealing, and in a properly processed batch of brick it is possible to realize fully 90 per cent. of No. 1 pavers. In this sorting, owing to many difficulties, mistakes are likely, and in the selection of paving brick for a job such as this, it is necessary to exercise the greatest care.

Engineers Had Many Difficulties to Guard Against—While the history of brick making is that of the human race, almost, even so, in view of the uncertainties involved, the selection and use of over 500 carloads of paving brick for this job represented a deal of painstaking labor, which involved divers precise detailed operations, some of which, however, was avoided, on this occasion, due to the care exercised in the earlier effort dating before it was decided to pave the course.

Methods Employed During the Whole Process—The course is two and one-half miles, being 50 feet wide on the straight stretches and 60 feet wide on the curves. The home-stretch and back-stretch 3,301 feet long, the end straights being 660 feet long, and each of the banked turns being 1,320 feet long on the course line. The curves are each 1-4 of a circle of 840 feet radius on the course line, or 90° of a 6° 49′ 30″ curve. No easement curves or spirals were used.

The curves are banked to an angle of 16° 40″ in cross-section for 50 feet of their width, the remaining 10 feet of width being banked to an angle of 36° 40″, all, as shown in Figs. 2 and 3. The approaches and releases to and from the banked curves are limited to a 2 per cent. grade in sections parallel with the measured course line, and the maximum variation from a level plane at the course line is a 2-10 per cent. grade. The straight stretches are given a pitch of 8-10 feet in 50 feet toward the infield for drainage, thus presenting a fine flat track for the cars.

Base Fill Was Thoroughly Rolled—With a 15-ton three-wheel steam roller the whole course was resurfaced and rerolled until the surface presented a smooth, firm and uniform plane. Two inches of creek gravel was then spread uniformly over the entire surface and rolled with the 15-ton roller. This was followed by a 2-inch layer of crushed limestone (rolled with 8-ton tandem roller), over which was poured two gallons of taroid to the square yard; this surface was then overcast with 1-2-inch crushed stone chips, filling the voids between the larger-size stone, and given another coat of taroid (of a lower melting point than the first coat), 8-10 gallon to the square yard being used in the second coat. Over this was spread a thin layer of crushed stone from 1-2-inch to dust in size, and given a final rolling with a 3-ton tandem steam roller.

This surface, which represented the original idea, did not prove to be satisfactory, and the idea of paving over this surface with brick is the matter with which we are now concerned. In proceeding with the brick paving it was decided to accept the No. 1 specifications of the National Paving Brick Manufacturers' Association, and 3,200,000 pressed paving brick were ordered from the Wabash Clay Company for the purpose.

The association, realizing the opportunity for a practical demonstration of brick as a paving material, has collaborated with the engineers of the speedway company, and has furnished two of its ablest men, viz.: W. T. Blackburn, of Paris, Ill., and C. G. Moore, of Cleveland, O. These men have acted as inspectors and advisory engineers.

The pavement has been carefully inspected as it progressed, every square yard of its surface being covered with a 12-foot straight edge, and any variation exceeding 3-8 inch in the 12-foot length removed before the grout was applied to the brick. Along each side of the straight stretches and around the inside of each curve a 5″ x 24″ concrete curb was placed, the top being flush with the surface of the pavement, and a 1″ expansion joint being provided between the pavement and the curb. No transverse expansion joints were used. At the outside of the pavement on each of the banked curves, and in front of the main grand stand, a 9-inch reinforced concrete wall 33 inches above the track surface has been built.

Two reinforced concrete bridges were built to support the track over a stream running diagonally across the southwest corner of the grounds. These bridges are 30 feet wide and 90 feet long, of a permanent character, located as shown in Fig. 1.

Drainage Regarded as Extremely Important—14.3 miles of tile have been laid to drain the grounds, the water which falls on the track being taken care of by a surface drainage system with flush gratings placed equidistant and three feet from the inside of the track. Agriculture drains have been used to care for the ground water.

Methods Employed in the Big Undertaking—The owners have conducted nearly all of the work themselves, only two contracts being entered into, one of which was rescinded owing to the contractor's failure to prosecute the work. The earth work, grading and forming the base fills, etc., was contracted by the C. C. King Bros. & Son Company, who used two outfits of the Western Elevating Grader drawn by traction engines, loading bottom-dump wagons.

As an auxiliary to these outfits, two gangs of wheeled scrapers were used, and between 2,000 and 3,000 yards of average cut and fill was moved daily by this means, the contractors completing their work within the time limit of 60 days in a satisfactory manner. A contract was also entered into for a portion of the brick paving, but the owners were forced to rescind and prosecute the work themselves.

Over 500 carloads of brick were required for paving and in the cement filler between the brick, and the concrete work incident to the track over 80 carloads of cement were used, 53 being used for the grout filler in the brick pavement alone. The entire brick paving of the track was completed in 63 consecutive calen-

Cleaning up the Completed Surface

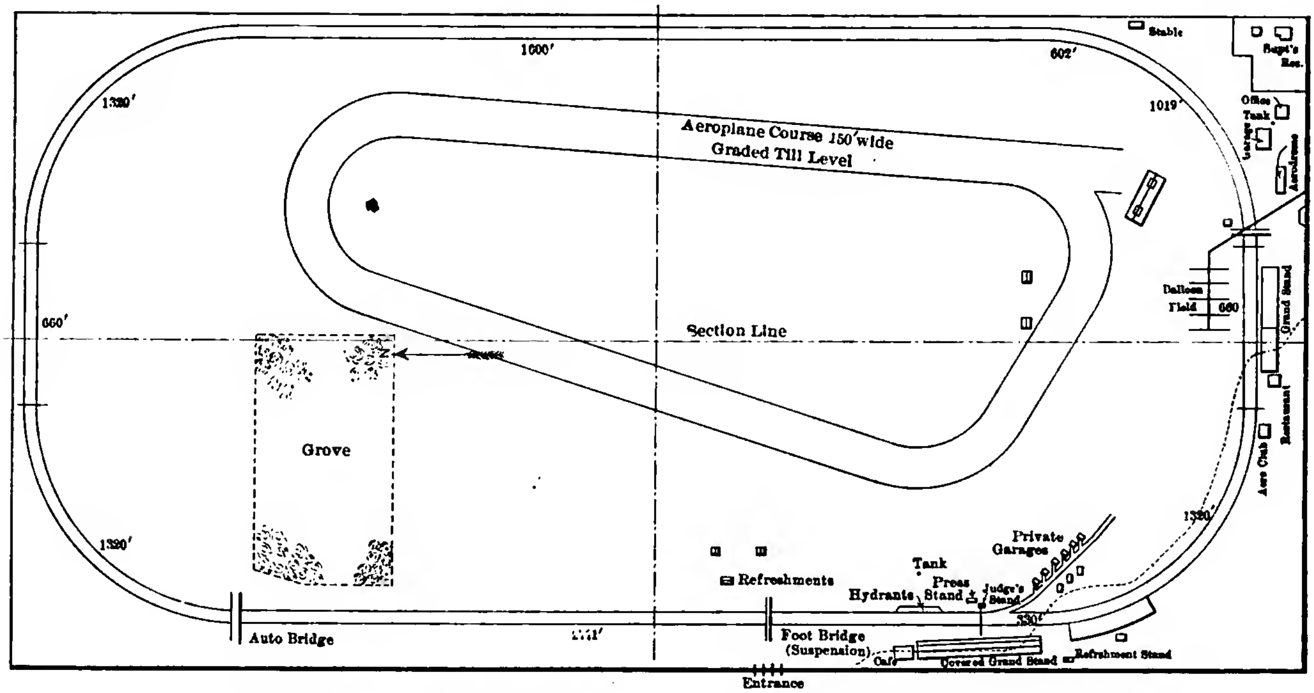


Fig. 1—Plan of speedway, showing present track, location of bridges, buildings in place, and other details

dar days; the biggest single day's work of laying the brick was 140,000 brick laid in nine hours. These brick weigh a trifle less than 10 pounds each, and lie in the pavement 37 to the square yard.

A portable belt conveyor was used for carrying the brick from the piles along the track to the setters; it was mounted on wheels to aid in handling, and was advanced along the pavement following the brick setters at about 10-foot intervals, and was run by an automobile engine.

The brick were piled along the track in piles 10 brick wide, so that a clamp holding five brick would adjust itself to the pile without rehandling the brick. From the pile they were lifted in clamps and placed on the conveyor and removed by clamps and placed where required by the setters, and by this method it was found that one man averaged 11.4 tons of brick from the piles to the pavement in nine hours.

Before laying the brick a two-inch sand cushion was spread over the old track surface and luted to an absolute place surface by a drag working on wooden strips, which were set to grade. On this cushion the brick were laid. A three-ton tandem steam roller then rolled them to a true surface, and the pavement was then subjected to an inspection for grade and plane.

The filler was then applied; it was composed of equal parts of sand and portland cement mixed by hand in special boxes to the consistency of a thin batter and removed from the boxes to the pavement with a 14-inch scoop shovel, but no dump boxes were used for this work.

In order that the joints between the brick be filled absolutely flush with the surface of the brick, a second coat of the filler was applied about one hour after the first coat; this second coat was not broomed off, as the first coat was, but was floated ahead at an angle of 45 degrees with the joints in the brick with a "squeegee" having a rubber face very much like the rubber-faced window cleaners in common use.

Buildings, Lighting Plant and Aviation—The main grand stand is a covered structure 82 feet wide and 500 feet long, and there are two bleachers, one 500 feet by 60 feet and one 350 feet by 65 feet.

An aerodrome 300 x 50 and 35 feet from floor to ceiling is arranged with sliding doors forming one entire end of the structure, which has a truss roof. In addition, there are 42 other buildings, comprising office, superintendent's residence, stables, garages, cafés, clubhouses, rest rooms, etc.

Three miles of tight board fence eight feet high, surmounted with barb wire, surround the grounds, the posts being set in concrete. There are seven miles of wire fence in the infield and around the track, and 1 1-2 miles of eight-foot picket fence. Two suspension bridges for foot traffic cross the track, giving egress

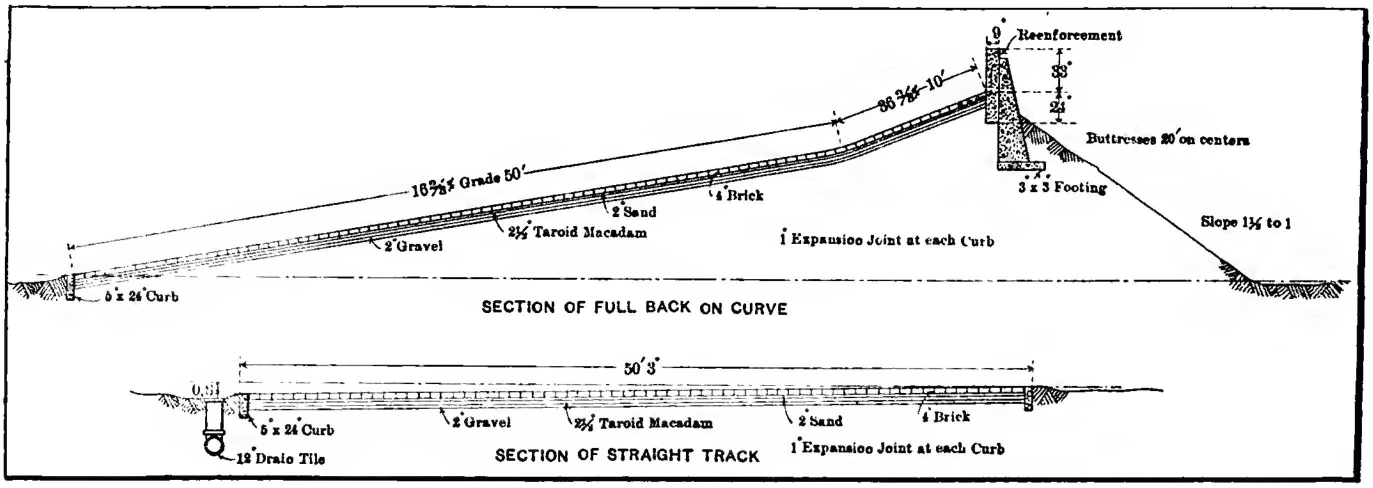


Fig. 2—Detail of embankments, showing buttresses, slope, reinforcement, and other details of construction

from the infield during the races. A truss bridge for vehicles affords entrance and exit to and from the infield during races.

The generators, gas holders, fittings, reflectors, etc., for a night lighting of the entire track at intervals of every 20 feet have been purchased and are on the grounds, and work will be started on their installation as soon as the speeed trials have been run.

An inner course for aeroplanes 150 feet wide and 1 1-2 miles in length is being graded and rolled in the infield to a uniform plane; this will permit an aeroplane to alight at any point in its course and reascend without danger of straining the machine.

Warner Timing Equipment Provided—An automatic timing device was installed by the Warner Autometer Company, which registers in the judges' stand the exact instant at which the tires touch a small hose stretched across the track, serving for the time-honored "tape." In addition to provisions for properly recording time, as the instrument above named, every provision is made to handle the spectators, so that, non-interference with the events will be assured.

Other Uses to Which the Track Will be Put—One of the prime objects of this Speedway is to afford, to the builders of automobiles, at Indianapolis, and in the vicinity, a place to try out new models before they are turned over to purchasers, thus assuring that they will be properly tuned up and so timed that the best possible results will be realized. Advanced models, prior to building in quantity, may also be given the hardest kind of service, within the shortest possible time, and it is the reasonable expectation of the companies at Indianapolis that the track will be of the greatest service, to the makers of cars, and the users as well. That the track will pay interest on the whole investment, is practically assured from the start. The arrangements, from the point of view of policing, are all that can be desired; there is no occasion for anyone crossing the track, and as to accidents, there should be none.

TEXAS ENDURANCE RUN BREAKS RECORDS

Ft. Worth, Tex., Dec. 8—In the recent endurance run from Dallas to San Angelo and return, a distance of nearly 800 miles, all records were broken, not for speed but for mud-plugging. Of the nine cars, and a pilot car, which started from Dallas on Monday morning, but six were left at the second night control, Abilene. Between that point and the finish, another car was eliminated by the fearful road conditions.

In the original program the finish had been planned for Ft. Worth Friday afternoon, but Jupiter Pluvius planned otherwise, and as a result of the week-long downpour a whole day was added and the race finished late Saturday night.

After the technical examination, which kept the committee busy all day Sunday, the winners were announced as follows:

Moline, J. A. Wickes, driver, endurance cup.

Auburn, "Skeet" Hall, driver, economy cup.

Fisk tires, tire cup.

This run was organized and managed by the Ft. Worth *Star-Telegram*. As an endurance run, it was easily the feature event of the year, for the hub-deep mud from one end of the route to the other made even hardened drivers who had been through the Glidden and similar tours get out and work as they had never worked before. Wickes, who drove the Moline, is the same one who took a car of this make through the Glidden. Goldthwaite, who drove a Maxwell, and Illingworth at the wheel of another Maxwell, are both Glidden tour drivers. All three expressed the opinion that the first three days' work of this tour were far harder on both men and cars than the whole two weeks of the Glidden just past. All who witnessed the event, agree that it was conducted in a most painstaking way and that the promoters had the right idea in relation to the mapping out of the course and the management of the details.

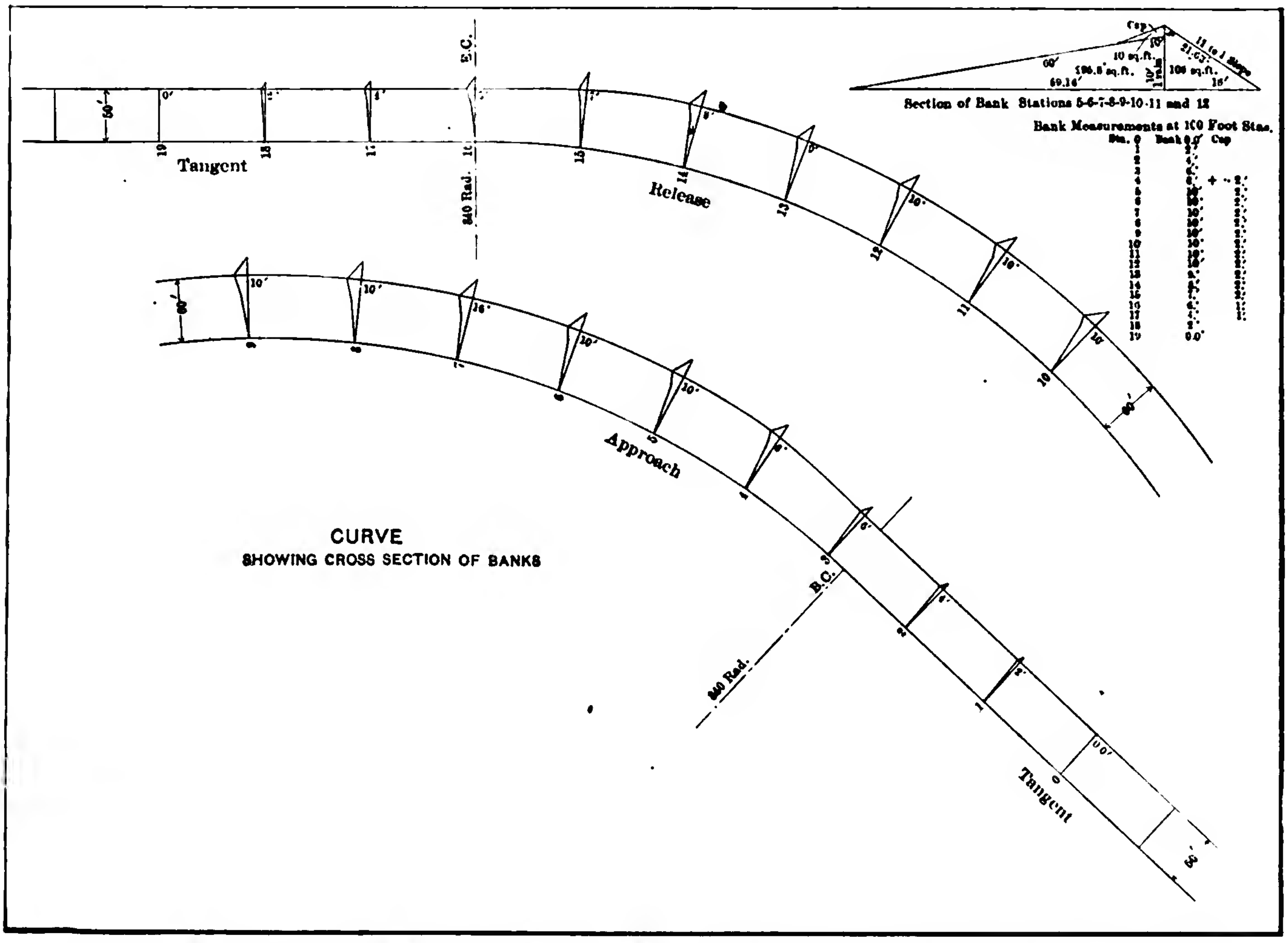


Fig. 3—Detail of curve, there being four, and banking measurements at 100-foot stations, also tangents as connected

Kincaid in National Winning in His Class

Robertson Driving Simplex—Twice a Winner

POSTPONED FORT LEE CLIMB SUCCESSFULLY RUN OFF

FINAL events of the Edgewater-Fort Lee hill-climb on the Palisades, opposite New York City, which were postponed from December 4 on account of the interference of the spectators, were run off last Friday afternoon in the presence of a smaller and more orderly crowd. The conclusion failed to receive the amount of free advertising that the start did, and as a result, many people in New York heard nothing of it. The day, too, Friday instead of Saturday, tended to diminish the attendance

George Robertson, in his Simplex, made the best time, setting a record of 53 2-5 seconds, some three seconds less than Kincaid's mark in the December 4 session. In addition, Robertson won first place in the event for gasoline stock chassis of 451 to 600 cubic inches piston displacement with a mark of 56 seconds. Kincaid bettered his former record by going the distance in 55 seconds. A Stanley steamer, driven by H. W. Bell, made the second best time for the hill, 54 1-5 seconds.

That the ascent was no child's play was again demonstrated by an accident to Ray Howard, driving a Stearns. He attempted to take the sharp final turn at too high speed, and his car crashed into the curb on the outer side of the street. The right front wheel was shattered, but the car did not overturn. Howard got a bad shaking up, but received no injury. The accident was much the same as that which sent motorcyclist Kledes head-on into the foundation wall of the house on that corner. The summary of the final events follows:

GASOLINE STOCK CARS, FOUR CYLINDERS, $4,000 OR OVER

Simplex, George Robertson	90	0:53 2-5
Stearns, E. Badenhausen	30-60	0:58 2-5
Stearns, C. H. Powers	30-60	0:59 4-5
Simplex, R. T. Heitmeyer	50	1:00 3-5
Allen-Kingston, F. R. White	48	1:02 2-5

GASOLINE STOCK CARS, SIX CYLINDERS, $3,000 OR OVER

Oldsmobile, T. Spear	60	1:14 3-5

FREE-FOR-ALL, ALL TYPES AND MOTIVE POWER

Stanley, H. W. Bell	20	0:54 1-5
Stanley, B. G. Faulhaber	20	0:58 3-5
Simplex, R. T. Heitmeyer	50	0:59 3-5
Stanley, F. W. Bellows	20	1:05

GASOLINE STOCK CHASSIS, 451 TO 600 CUBIC INCHES PISTON DISPLACEMENT

Simplex, George Robertson	50	0:56
Simplex, R. T. Heitmeyer	50	1:00
Locomobile, R. Whitcomb	40	1:04

GASOLINE STOCK CHASSIS, 301 TO 450 CUBIC INCHES PISTON DISPLACEMENT

National, T. Kincaid	40	0:55
Zust, U. P. Pisani	35	0:57 2-5
National, F. Hurmance	35	0:59 4-5

AMATEURS—CARS SELLING UP TO $2,000

Stanley, B. G. Faulhaber	20	0:57
Buick, Dr. W. H. Hafle	30	1:04

AMATEURS—CARS SELLING ABOVE $2,000

Zust, J. Derigne	35	0:56 3-5
Stearns, E. Badenhausen	30-60	1:00
Simplex, R. T. Heitmeyer	50	1:01
Allen-Kingston, F. R. White	48	1:03
Locomobile, R. Whitcomb	40	1:09 1-5

DELIVERY WAGONS UP TO ONE TON CAPACITY.

Buick, E. H. Taylor	20	2:34 48-100
Simmons, F. Reitkowski	20	2:58 1-5
Renault, J. Street	14	Not taken

NEW YEAR'S ENDURANCE BY CENTURY M. C.

PHILADELPHIA, Dec. 13—William Reuss (chairman), H. R. DeGroat, Dr. W. H. Moore, T. C. Davis, Jr., W. A. Daily, William H. Booker, H. T. Uhler, F. R. Isaac, E. V. Stratton and H. C. Evans have been named by President Hartman as the committee to manage the New Year's endurance run of the Century Motor Club. Rules and entry blanks have been distributed, and over a dozen entries have already been secured—rather quick work, when it is remembered that the run was not decided upon until the Quaker City Motor Club announced the abandonment of its annual fixture only ten days ago.

The route, as finally fixed upon after reading the report of the pathfinders who went over it last Monday, will touch Paoli, West Chester, Kennett Square, Wilmington, Chester, Media, Morton, Darby, Llanerch, Valley Forge, Phoenixville and Norristown, in the order named—about 150 miles.

OLDFIELD MAKES AN ARCTIC RECORD

DALLAS, TEX., Dec. 8—Barney Oldfield broke the 50-mile circular track record, which has stood for over five years, with a spectacular ride in the teeth of a fierce "norther." He covered the distance in 47.18, as against the old mark of 48.40 1-5, which he made at Fresno, Cal., in 1904. He got inside the old record at thirty miles and broke every mile mark to the end of the run. The car was his 120-horsepower Benz.

The track was frozen hard and Oldfield had his face wrapped in woolen bandages and wore heavy fur gloves and fur overcoat. At the finish his hands had to be pulled loose from the steering wheel by an assistant, so affected were they by the strain and the intense cold. H. A. Green, a member of the A. A. A. contest board, acted as referee, and as the meeting was sanctioned by the national association, the record will probably be accepted as official.

SOME RECENT BRITISH AUTOMOBILE DOINGS

LONDON, Nov. 27—Friday saw a memorable celebration in the shape of a banquet at the Hotel Cecil to commemorate the twenty-first anniversary of the practical discovery of the pneumatic tire. Some four hundred guests assembled, including official representatives of every society or club in any way connected with road locomotion. Prince Francis of Teck took the chair, while the guest of the evening was Harvey du Cros, M. P., to whose keenness and energy the development of the tire was due. At the conclusion of the speech-making Adolphe Clement announced that the French Government had decided to confer the Cross of the Legion d'Honneur on Mr. du Cros.

From the official statistics that are available, it is clear that the recent Olympia show surpassed in number of exhibits any previous European exhibition, while in the matter of attendance it outshone any previous British show, at least. The total number of cars and chassis on view was 597, as opposed to 575 at the 1908 Paris Salon. The British productions totalled to just over one-half. The figures were: Britain, 307; France, 178; Italy, 28; Germany, 26; Belgium, 21; United States, 16; Switzerland, 15, and Austria, 6. One other synopsis shows conclusively which form of transmission has become popular; cars with propeller shaft numbered 556 and those with chains 32. The remaining nine cars had special forms of transmission.

Regarding the attendance at the show, the total number of people passing the turnstiles was 195,000, an excess of 40,000 over the figure for last year. The best day was Thursday, November 17, when 32,567 people entered.

A company has been formed to manufacture a new composite fuel called "Rapidin." This is a German invention and consists in a method of treating the heavier petroleum oils so as to obtain light spirits suitable for automobile use. To quote from the inventor's description. "One hundred kilos of ordinary kerosene of specific gravity 0.83-0.87 are mixed with half a kilo of caustic potash and twenty kilos of benzol of specific gravity 0.9. After having been vigorously stirred, the mixture is allowed to rest for about six hours, after which it will be found to have a specific gravity below 0.8 and to contain as a sediment the matter separated from the kerosene by the caustic potash. If this mixture were distilled it would separate into its components, but if there be first added to it a material rich in carbon, such as a gum or resin, and also a nitro-compound, such as picric acid, the liquid will distill uniformly. The lighter portions of the distillate—about 40 per cent.—are suitable for use as motor spirit, while the remainder can be used as a solvent for fats and also, in part, as a substitute for turpentine.

A season without any road racing has not been altogether pleasing to all sections of the motoring community, and many people are desirous that the same policy of inaction shall not be adhered to for 1910. The first definite proposal was for another tourist trophy race in the Isle of Man, with engines limited to four cylinders of 3-inch bore. Of late, however, more daring individuals have suggested the revival of the Gordon-Bennett race in all its glory, the proposed scene of the contest being the old Irish course. The realization of this idea is not unlikely.

ROUGHING IT ACROSS THE WESTERN PLAINS

ON a pleasure jaunt, driving from Chicago to San Francisco, a party from the first mentioned city recently established a new record between the cities, traveling only by daylight, and making the distance, over 2,800 miles, in 19 days and a few hours. The trip was made in a 30-60-horsepower Stearns, driven by George C. Rew, who was accompanied by W. H. Aldrich, Jr., R. A. Luckey and H. G. Tony. They were prepared to "rough it" in good shape, and they did, for on more than one occasion they camped over night in the big Stearns, building a canvas "lean-to" against the side of the car.

Not only was there a complete absence of mechanical troubles on the trip, but there was also an absence of tire trouble, barring one puncture, and that was caused by a spike while driving on the ties of tracks of the Union Pacific Railroad. As demountable rims are standard equipment on all Stearns models, the change was made in a few moments. Mr. Rew and his party went Charles J. Glidden one better in driving on the railroad tracks, for while the premier tourist of the world used flanged wheels and glided smoothly along, the big Stearns was driven over the ties for many miles. Barring the time when the car was driven down the side of an embankment to make way for a fast mail train, the trip along the roadbed was without incident, except the one puncture noted above.

Near Battle Mount, Wyo., the car was pressed into service to carry water to a band of cowboys working on the annual fall round-up. A small barrel of the precious fluid was taken 25 miles across the plains where there was no semblance of roads. The "punchers" had noticed the water bags on the car, and a request for aid brought a quick response from the autoists.

The trip through the Western mountains was spectacular in many ways. The party chose a route away from the ordinary run of transcontinental travel, passing through many sections where no automobile had been before. When the car finally rolled into San Francisco it was found that the time for the daylight trip between Chicago and the coast had been broken, although no attempt at the record had been made.

George C. Rew's Party, in Stearns, Bringing Water to Cowboys at Battle Mount, Wyoming

WHY FRENCH MOTOR MAIL DELIVERY IS A FLAT FAILURE

PARIS, Dec. 7—Although Paris was the first city in the world to adopt automobiles entirely for the carriage of mails from suburban to central offices, and from the central to the various railroad depots, it cannot be accepted as a model to be followed, so far as details of organization are concerned. Within one year of the complete conversion from horses to automobiles the contracting company has declared itself bankrupt, has abandoned its wornout vehicles to the authorities, and the Postmaster-General after vainly endeavoring to get another company to take over the transportation of mails, has been obliged to do the work himself with the material of the bankrupt company and temporary assistance from taxicabs.

The failure is due to bad management and not to any inferiority of the mechanically driven vehicle compared with the horse species. About five years ago the postal authorities, in order to allow of later closing of the mails in the sub offices, experimented with electric wagons in place of horse vans. The electrics soon proved unsatisfactory, and gradually attempts were made with gasoline vehicles. With a view to economy some of the old horse vans were transformed into unsightly automobiles, and in still more numerous cases the bodies of the horse vans were mounted on automobile chassis.

Towards the end of 1908 a Lyons syndicate connected with the La Buire Automobile Company entered into a contract with the postal department for the entire transportation of mails in Paris by automobile. About 150 closed vans were to be put into service, 30 of this number being considered as reserve. They were of three different types, carrying loads of, respectively, 1800, 2600, and 4000 pounds. The mileage was fixed at an average of 50 per day for each vehicle, and the average speed for the journeys had to be not less than 13 miles an hour.

A bad start was made with only half the necessary number of automobiles, the result being that in order to carry all the mails these had to be kept running for twenty-two hours a day, making proper verification difficult and repairs almost impossible until the vehicle had been completely put out of business.

It was not long, too, before the contracting company found it had made a serious mistake in guaranteeing an average speed of 13 miles an hour in Paris. The central post office is in the most crowded portion of the city; the railroad depots are also situated in districts where street traffic is most intense. The individual journeys were never more than two or three miles in length, with the result that if two or three minutes were lost at the commencement through a block in the traffic, an excessively high speed had to be maintained to gain the time lost. An average of 13 miles an hour in Paris meant speeds at certain moments of 25 to 30 miles an hour.

Such a rate of travel was disastrous to the vehicles, obliged to advance by leaps and bounds, throttle wide open as long as possible, with harsh usage of the brakes when collisions were inevitable. It was equally disastrous to the public, accidents taking place every day, some of them, unfortunately proving fatal. With its 150 automobiles in a wornout condition and ruin staring it in the face, the company a few days ago refused to continue with its contract, although this refusal meant the abandonment of all its vehicles to the postal authorities. Under the contract the company had undertaken to carry the mails at a rate which practically worked out at 17 cents a mile. In view of the high speed and exactitude required this sum was found to be far too low. For an ordinary delivery service, where speed was not absolutely necessary, and in districts outside of Paris, where gasoline is cheaper, it might have been possible to make a profit. It proved impossible to do so in the case under consideration.

At present the postal authorities are running the automobiles themselves, but being without expert management, and having to deal with a fleet of vans almost worn out from neglect and overwork, have to rely considerably on outside aid from the taxicab companies. An endeavor has been made to find a company willing to run the abandoned automobiles, but without success. It will doubtless be necessary for the postal authorities to undertake the service itself to the best of its ability until a fresh company has had time to get together a fleet of automobiles. It is certain that in order to obtain a satisfactory service the postal authorities will have to be prepared to pay a higher price and be content with a lower average speed, unless some badly needed improvements can be made in Paris traffic conditions.

Despite the unsatisfactory nature of this first attempt to abolish the horse in the mail service, the authorities have no intention of abandoning mechanical traction. The time saved and the greater reliability are too considerable to allow of the horse being introduced again. Even when the present badly organized scheme was at its worst relief was obtained not from the horse owners but from the automobile taxicab companies. The only work that is left to the horse in the Paris postal service is in drawing the buses which carry the letter distributors to their rounds. As the distance is not great and the men drop off the vehicle every few hundred yards on reaching the commencement of their rounds, the slow speed of the horse bus is to be preferred to the more rapid automobile.

PARIS TAKING LESSONS FROM NEW YORK

PARIS, Dec. 8—Paris is now taking lessons in traffic regulation from New York. Colonel Eno, who claims to have done much to put traffic straight in New York City, undertook to train the lawless Parisian driver to a true respect for the rules of the road. The first experiment has been made in the Rue de la Paix, at this time of the year one of the most crowded streets of the city between 2 and 5 p. m. Mounted municipal guards were instructed under the direction of the American colonel to perform the same service as the mounted police in New York City. The guards occupied positions at intervals down the center of the street, and made the traffic keep in well-defined lines, not more than three abreast in each direction. It was forbidden to cut across the street in the free and easy manner of the Parisian cab driver, crossings being made on the American system at the intersection of streets only. The experiment having proved such a success, it is intended to extend the system to other portions of the city and continue it until the drivers are thoroughly trained.

PEERLESS OPENS NEW YORK SALESROOMS

NEW YORK, Dec. 13—This city has many magnificent and elaborate automobile salesrooms, but the one just opened to-day by the Peerless Motor Car Company, on Broadway, corner of Fifty-seventh street, will rank with the finest of them. The opening, too, ranks with anything in this line ever attempted. Hundreds of guests dropped in during the day to inspect the decorations. Among others who participated in the housewarming were Vice-President E. H. Parkhurst and Treasurer F. I. Harding, of the Peerless Company of Cleveland; W. H. Johns, E. H. Broadwell, Archie Hughes and Percy Neil, of Philadelphia; G. H. Smith, of Newark; Joe Ball and Harry Pike, of Detroit; E. N. Carples and Frank Bowen.

ACETYLENE BURNER PATENT INVALID

WASHINGTON, D. C., Dec. 11—The Supreme Court of the United States has declared invalid the Dolan patent, number 589,342, which was claimed to cover all commercial forms of acetylene burners. The cases were styled those of D. M. Steward, M. Kirchberger, *et al.*, vs. the American Lava Company and Paul J. Kruesi, and M. Kirchberger *et al.* vs. the American Lava Company and Paul J. Kruesi. The decision supported that of the U. S. Court of Appeals and ends seven years of litigation.

MASSACHUSETTS WARNS CARELESS NIGHT DRIVERS

Boston, Dec. 11—Because of the many accidents that have resulted from improper operation of automobiles at night the Massachusetts Highway Commission has issued a warning in which it says that it will take summary action in all cases in which the requirements of safe and proper operation are not complied with. The text of the warning follows:

A number of accident cases have been heard by the Massachusetts Highway Commission within the last few months which have made plain one frequent cause of great danger to both the automobilists and the public in general. That is the operation of automobiles when there is not light enough to enable the road and the persons using it to be seen clearly, at such a rate of speed that the operator is not able to stop his car in time to avoid a collision. These accidents, and there have been many of them and several resulting in death, have invariably happened when the automobile had no cetylene gas lamps lighted. The operator, without them, could not see far enough ahead at the speed at which he was moving to stop in time.

Automobiles have collided from this cause with derricks, platforms, teams going in the same and in opposite directions; have run over foot passengers and have even run through a board fence and dropped onto a railroad track. While there is no provision of law requiring the use of searchlights and possibly they are not needed in well-lighted city streets, the commission feels that it should call the attention of all automobilists to the matter, since operators who have come before the board have seemed to think that if they were upon the right-hand side of the road, and if they had the lighted lamps which the law does require, and if they were not operating at a greater speed than the law permits at that point on he road, no fault could be found with them if they sruck, for example, a foot passenger who was in the road, and who, they claimed, should have been on the sidewalk.

In one case a foot passenger was not seen because of an electric light which may have dazzled the operator somewhat. Every operator must realize that when he has no searchlights he cannot see far beyond a bright electric light and that he runs quickly into a dark zone. Such conditions have caused two deaths, at least. The board feels that operators cannot be exonerated from blame under such circumstances, and that, whether they have searchlights or not, all persons are bound to operate at a speed which is reasonable and proper under the conditions which exist. And a speed is never reasonable and proper if, under any conditions, the operator cannot stop his car when he sees an object on the road, before he strikes it. If necessary, he must stop his car and cease to operate when he cannot run it so as not to endanger other users of the highway who are exercising reasonable and due care.

This rule should be applied not only where the streets are imperfectly lighted, or where one is dazzled by an electric light, whether a street light or that of a street car, but around corners and curves, or where one's view is obstructed by other vehicles in passing, or when one cannot see clearly because of a fog or mist. The board feels compelled to make this announcement at this time because of the many recent accidents and fatalities in which both pedestrians and occupants of automobiles have been involved. It desires, therefore, to give notice to all automobilists that it will take summary action in all cases coming before the commission when it develops that the foregoing requirements for safe and proper operating have not been complied with.

WISCONSIN OIL INSPECTION LAW IS CONSTITUTIONAL

Milwaukee, Wis., Dec. 13—The Wisconsin oil inspection law of 1909, which requires the official inspection and branding of every gallon of gasoline and kerosene used in Wisconsin, has been declared constitutional by the Wisconsin Supreme Court in the suit of the Wadhams Oil Company, of Milwaukee, a big independent concern, for an injunction to restrain Chief Inspector Edward L. Tracy from enforcing the law. The State charges a fee of 10 cents for every barrel inspected. About 750,000 barrels of gasoline and kerosene are used every year.

TO MAKE ROAD SIGNS COMPULSORY IN MARYLAND

Baltimore, Dec. 10—A bill making it compulsory for the city, county, town and village authorities in every section of Maryland to erect suitable signs and signposts for the guidance of motorists has been drawn up by Col. Sherlock Swann, a member of the Maryland Automobile Commission, and will be passed at the coming session of the State legislature, which convenes in January. The bill says that the officials referred to shall erect and maintain at or near the boundary lines of all important thoroughfares leading out of the various cities, towns and villages, and at every place of intersection of important highways in the counties guide posts for the direction of motorists. These posts shall be not less than eight feet high, and near the upper end of them shall be placed signs of metal or wood which shall contain in plain letters and figures the names of the next towns or places to which each road leads, the number of miles to the same and the figure of an arrow pointing towards such towns or places. The bill further prescribes that it shall be the duty of the State Roads Commission to see that the law is enforced. Persons destroying such signs are liable to a fine not exceeding $25.

DON'T FORGET YOUR LICENSE IN THE NUTMEG STATE

Hartford, Conn., Dec. 13—Police are rigidly enforcing every provision of the new State automobile law and the autoist who forgets to have his license card with him will be liable to land in a police court. Early in the week a repairman at a local garage took down a rear axle to repair it and in doing so removed the rear number. When the member was again in place he thought he would try out the car around the block. He left off the rear marker. A member of the police traffic squad saw that he did not have the rear marker and he was ordered to appear in court the next morning. He pleaded guilty to not having the rear marker in place and although he explained the situation to Judge Clark he was fined $5, and in addition to the five he had to pay $2 more, as a record of the trial has to go to the Secretary of State. For this bit of work the clerk of the police court is reimbursed to the extent of $2.

There are now pending before the Secretary of State three cases where motor-car drivers are liable to lose their licenses. The testimony is all in and the matter now hangs fire.

BILL TO STOP JOY RIDING IN KENTUCKY

Louisville, Ky., Dec. 13—At a meeting of the Louisville Automobile Club, held Tuesday, the secretary was instructed to request every autoist in the State to aid in the passage of the bill to be introduced at the next session of the legislature by Senator Herman D. Newcomb, making it a felony for anyone to use an automobile for any purpose without the consent of the owner and, upon conviction, the offender shall be punished by a term in the penitentiary of not less than one year. This is aimed at joy riding. The bill to be introduced follows:

Be it enacted by the General Assembly of the Commonwealth of Kentucky:—That any chauffeur or other person, who, without the knowledge and consent of the owner shall take or cause to be taken from a garage, stable or from any other building or place, an automobile or motor vehicle and operate or drive, or cause the same to be operated or driven for his own profit, pleasure, use or purpose, shall he deemed guilty of a felony, and upon the conviction thereof shall be punished by a term in the penitentiary of not less than one nor more than three years.

What the Clubs Are Doing These Days

DENVER MOTOR CLUB'S COMPREHENSIVE PLANS

DENVER, Dec. 4—The Denver Motor Club, which is now nearing the end of its second year of existence, is already making plans for the coming season. The officers of the club have decided to call a good roads meeting in the near future to which the county commissioners, the board of public works, the Denver Real Estate Exchange, the Chamber of Commerce, and similar bodies will be invited. This meeting should be the biggest one ever held in Colorado.

The excellent work carried on by the penitentiary commissioners with convict labor has shown wonderful results, especially in the southern part of the State. During the past season 300 convicts were employed in this manner.

Several ordinances have been passed by the Denver council which have greatly pleased automobilists in the city. One of these requires slow-moving vehicles to keep near the right-hand curb, an idea already adopted by other large cities. Much good work has also been done in breaking up joy-riding.

For the coming season the club plans a number of events, which are announced as follows: Two road races, one on Decoration Day and one on Labor Day; a reliability contest in June; a gasoline economy contest in October, and a hill-climbing contest in November.

NEW ROAD BETWEEN PHILADELPHIA AND BETHLEHEM

PHILADELPHIA, PA., Dec. 13—Through the efforts of the Automobile Club of Philadelphia, the stretch of bad going on the Sellersville road, between this city and Bethlehem, is being macadamized, the work being nearly completed. The members of the good roads committee passed round the hat, and, after securing sufficient to start the work, went ahead, relying upon the generosity of automobilists to complete the fund. There expectations seem in a fair way of being realized, as small contributions began pouring in from all directions when the papers began to exploit their enterprise. While the new route is a third of a mile longer, it will furnish tourists with a perfect bit of road and save each car thirty cents in toll charges.

BIG CROWD EXPECTED AT NEWARK, N. J., BANQUET

NEWARK, N. J., Dec. 11—H. D. Bowman, A. B. Le Massena and Joseph H. Wood, the members of the committee in charge of the annual banquet of the New Jersey Automobile and Motor Club January 24, expect a greater number of applications for seats than at any of the previous annual dinners of the organization. The banquet is to be held at the New Auditorium in Orange street, Newark. The membership of the club is now close to 1,900, and additional members are being elected at every meeting of the club's board of trustees. The banquet committee is now arranging for the presence of several well-known men to speak.

DENVER MOTOR CLUB AFTER AUTOMOBILE THIEVES

DENVER. Nov. 27—As automobile thieves are again becoming active in this city, the Denver Motor Club has begun a vigorous campaign. An advertisement has been inserted in the daily papers offering a reward of $100 for the arrest and conviction of anyone stealing an automobile belonging to a club member. The club has had one of its officials sworn in as a special police officer, and in addition has secured the co-operation of the regular police force. Any person caught will be prosecuted to the full extent of the law, as the situation demands most drastic measures. Trouble is also in store for anyone who abstracts tires, lamps, robes, tools or other accessories.

QUAKER CITY MOTOR CLUB'S ANNUAL BANQUET, JAN. 6

PHILADELPHIA, Dec. 13—The decision to drop the punishing New Year's run from its fixture list has given the Quaker City Motor Club's workers an opportunity of concentrating all their efforts on the club's annual banquet, on Thursday, January 6, at the Hotel Walton, and from present indications that affair will be the banner event of the Quaker's social season. Among the notables who have accepted invitations are: Governor Stuart, Mayor Reyburn, Congressman "Hamp" Moore, Director of Public Safety Henry Clay, Mayor Stoy, of Atlantic City; State Senator Webster Grim, Director Neff, of the Department of Public Health and Charities; President Hazlett, of Select Council; President McCurdy, of Common Council; United States Senator Penrose, Director Hasskarl, of the Department of Wharves, Docks and Ferries; numerous prominent lights of the American automobile and newspaper worlds, and others.

The success which attended the recent Fairmount Park race has given the club such prestige that the guest list will be something out of the ordinary, and what would under ordinary conditions have been a strictly local function now promises to attain the dimensions of a national symposium.

NEW YORK COMMUTERS AFTER COWBOY POLICEMAN

NEW ROCHELLE, N. Y., Dec. 11—The board of governors of the Automobile Club of New Rochelle held a special meeting to act on the case of a New Rochelle policeman who shot at Harvey Husted's car on November 15, and called the attention of the police commissioners to the fact that the officer in question was not in uniform and did not display his badge. The governors have given out a statement in which they say that the manner of arrest and the malicious and unwarranted use of firearms were illegal and dangerous to public safety, and that the city of New Rochelle is liable for damages.

LOUISVILLE, KY., LOOKS FORWARD TO NEXT RUN

LOUISVILLE, KY., Dec. 6—Tentative plans were discussed at a meeting of the Louisville Automobile Club for the second annual reliability and economy contest, to be held next year. The second run will probably be through the western part of the State and may extend south as far as Nashville, Tenn.

When Eugene Straus, president of the club, finishes his work on the touring book, it will contain the most complete and correct maps ever made of this section of the country.

ERROR IN ANNOUNCEMENT OF CHICAGO DIRECTORS

CHICAGO, Dec. 11—Officials of the Chicago Motor Club have announced a change in the board of directors of that organization elected at the annual meeting last week. The first announcement of the results of the election included Joseph B. Deibler as a member of the board, but when the votes were recounted it was found that Charles E. Gregory had received more votes than Mr. Deibler. The officials thereupon announced the corrected list of directors, with Mr. Gregory's name in place of Mr. Deibler's.

DELAWARE PLANS NEW YEAR'S ENDURANCE RUN

WILMINGTON, DEL., Dec. 4—George Proud, of Philadelphia, representing the Century Motor Club of that ciy, was here today in the interest of a roadability run to be given on New Year's Day to Wilmington and return, by way of Chester and West Chester, Pa. The club desires to interest the Board of Trade in each town and to get them to co-operate to the extent of having machines in the run representing their cities.

CHICAGO CLUB'S GIGANTIC SIGN-POSTING CAMPAIGN

CHICAGO, Dec. 13—The Chicago Motor Club is bringing to a successful completion a campaign for signboarding the country hereabouts which has been spread over 2 years and which has engaged the services of an energetic committee. The latter has gone about the matter in such a scientific manner that it is thought the groundwork has been laid for a system that eventually will mark the country roads in as effective a manner as are city streets, so that your motorist can travel from town to town in Illinois, Indiana and Wisconsin without having to stop at every cross-roads to inquire the way. If the calculations of this committee prove correct all the motorists of the future will have to do when he comes to strange cross-roads is to consult the cast-iron signboard of the Chicago Motor Club and be "put wise."

In laying this foundation the Chicago Motor Club has been wise enough to peer into the future and realize that eventually this signboarding must be attended to by the various counties because of the fact that when the posts are put up through private enterprise like this there is nothing to protect the post and its sign from the depredations of those miscreants who find their enjoyment in destroying something that has been put up by other than official authority.

Then, too, the cost of such signboarding is so great that it is folly to expect motoring interests to stand all the expense. Therefore, the Chicago Motor Club has figured that by taking four of the big trunk lines running out of Chicago and properly marking them that this will be an object lesson with which it and the allied interests may go before the county supervisors and ask that all roads be treated in a similar manner. Also, after this education has been completed, it will be possible to invoke the aid of the legislature either to compel the enforcement of the old law or enact a new one that will make it compulsory on the part of the road supervisors to see that all the roads in their respective territories are properly marked.

Farmers' Antipathy Gradually Lessening—Much of the antipathy toward motoring enterprises may be done away with by this educational step taken by the Chicago Motor Club. If the farmers see that the motorists are willing to bear their share of the expense and that the object of the motorists is the common good then they will be more amenable to reason. In another five years it will come easy for the road supervisors to attend to this part of the work.

With the ground work well laid through the enterprise and bustle of the signboard committee, at the head of which Joseph V. Lawrence has served for the past two years, the Chicago Motor Club proposes to have for two cardinal points, good roads and signboards, believing that they are the cornerstones to motoring successes in this vicinity. But the club believes there should be a community of interests and that success in both these departments only can be achieved by the banding together of the leading clubs and organizations; that success only can be achieved in this manner.

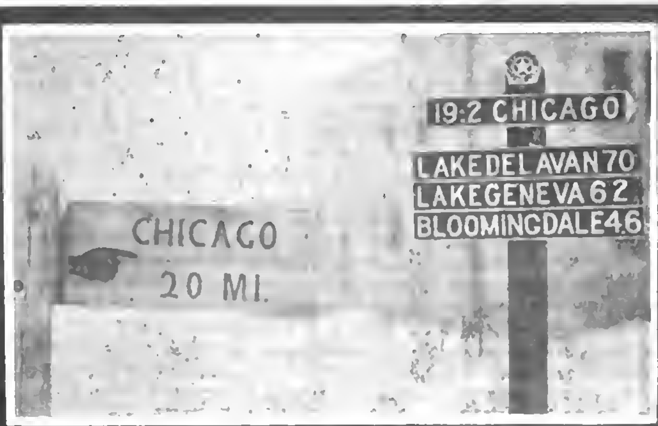
The signboard campaign really started some three years back when the Illinois signboard commission was formed and nearly $100 raised by popular subscription to push the work along. Some signboards were purchased and a few put up, then interest in the commission slacked and eventually the Chicago Motor Club fell heir to the entire proposition. Then it was realized that an organization scheme would have to be mapped out and the scheme followed through to the end.

It was like a huge business enterprise and had to be carried through slowly. First of all financial support had to be sought, then the organization completed, the routes pegged out, the signs ordered, and finally put up. All this has required time and for the last two years, Chairman Lawrence and his commission has been at work on it. It was not until the last month, though, that the motor club was able to point with pride to the success that has attended its efforts.

Announcement of Completion, a Big Surprise—When Chairman Lawrence arose at the annual meeting of the Chicago Motor Club a week ago and announced that he had practically finished three of the four routes selected and that the last one would be completed inside a couple of weeks, weather favoring him, he surprised the lay members of the club who had not known much of the progress of the compaign, so quietly had Chairman Lawrence worked. Without any blare on the publicity trumpet, Lawrence had quietly sent out his forces and when he finishes this month, he will have expended $2,000 in signs and will have put up 290 posts on which will have been placed 787 signs.

Furthermore, as a monument to the enterprise of the Chicago Motor Club, there will be located at the corner of Jackson boulevard and Michigan avenue in Chicago—the north pole of this motoring expedition—a huge tablet on which will be the direction and mileage of nearly every town of importance within a radius of 100 miles of this city.

Ready for touring next summer will be four routes. The first one completed is to Beloit, the signs blazing the trail by way of Elgin, Algonquin and Lake Delevan. Another route will be to Lake Geneva by way of Rogers Park, Niles Center, Wheeling, Wauconda and Genoa Junction, which route was made possible by E. E. Ayer, who contributed the $500 for marking this course. Both these are done at the present time. The route to Milwaukee has been completed to within 15 miles of the Cream City, work being stopped there because of the condition of the roads which, being muddy, would not permit of the



Old Wooden Sign Alongside New Iron Sign at Road Crossing

One of the Scouts Doing Some Preliminary Work

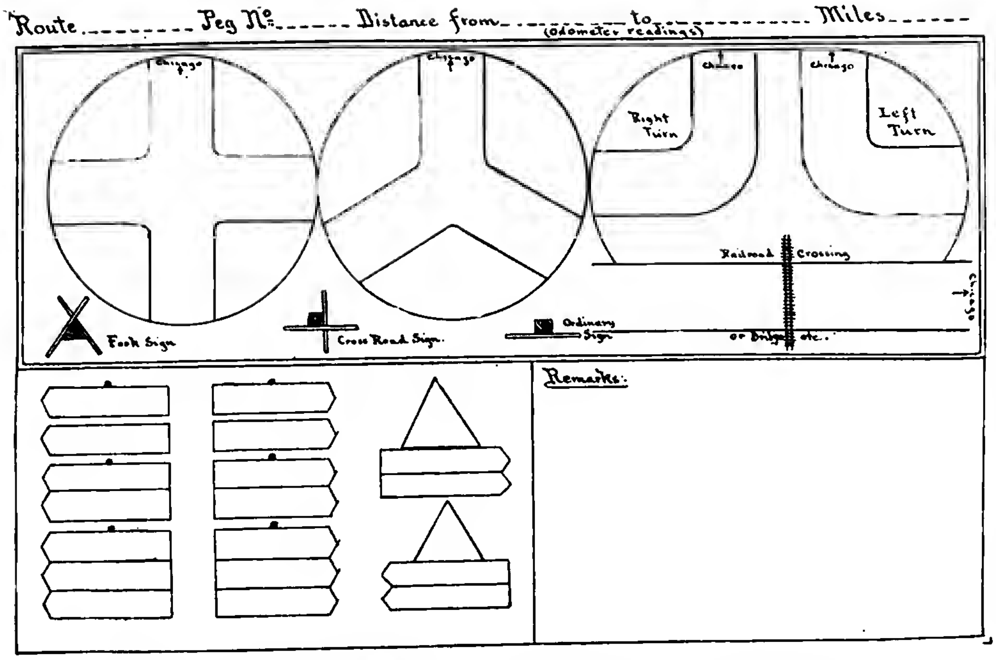


Chart Used by Chairman Lawrence and His Assistants in Preliminary Work

expedition making much progress of a permanent nature.

As soon as the ground is frozen, this work will be completed, the Chicago Motor Car Company, Packard agent, having agreed to finance the proposition. This leaves only the Chicago-South Bend route to be marked and it is proposed to go at this at once so that by New Year's, the four great trunk lines running out of Chicago will have been completed.

Chairman Lawrence then will have completed his task. It being done, he is ready to step down and let others carry on the work. This the motor club proposes to do in an energetic manner, the idea being to interest other clubs and organizations with the intention of appealing to the Legislature for help in this direction.

Very Businesslike Plan Adopted—The plan of campaign followed by Lawrence and his colleagues was most businesslike. He realized that it would be impossible to start at it hit and miss, so the first thing he did was to send out expeditions to mark the various courses, picking out the locations for the signs. To do this he devised a most comprehensive chart, there being a card for each post on which was marked the route, the peg number, the distance from one point to another by odometer.

Then came three cross-road maps in outline. One showed the conventional four corners and on it could be marked just where the post should go. Another showed two roads converging into one that could be marked in the same manner. A third showed a right turn, a left turn, and a railroad crossing. In another part of the chart were the various signboards that were to be put up and the pegger could designate just which one could be used. In this manner, Lawrence and his forces went over the four routes and had all the data required before the signs were ordered. Then the chairman sought bids for the work. It was not his intention to actually put up the signs himself, believing that the work could be done better by paying for it than it could by relying on volunteers. And so it has proved.

From the Featherstone Foundry & Machine Company, the signboard committee secured a bid for the signs. The price agreed on was 65 cents for a cast-iron sign 20 inches long and 4 inches wide; for a double sign the price was $1.15 and for a triple sign $1.75. Where more signs were required on one post it was possible to use several of these styles in combination, as, for instance, the Latrobe steel mills sign at Melrose Park on the way to Elgin there is a sign with seven tags.

In all 787 signs were ordered, the aggregate cost of which was in the neighborhood of $600. Then it came to the selection of posts on which these signs could be placed. The contract for these was placed with the Hines Lumber Company, which furnished 290 tamarack posts 12 feet long and 4 inches square, at a cost of $22 a thousand feet, the total cost being approximately $100.

Equipped with supplies, Chairman Lawrence then sought someone to put up the posts and signs, finally entering into a contract with Joseph T. Elmore and Herbert J. Ross, of the Chicago Ad-Sign Company, to paint, deliver and erect these signs on the different routes at $3.55 a post, the contract netting approximately $1,000. The contract called for painting the

Some of New Signs—At Railroad Crossing, Elaborately Marked Intersection, Dangerous Turn posts with creosote paint, painting the signs themselves with non-rusting paint, painting the letters in white enamel, boring holes in the signs by which they could be fastened to the posts, attaching the signs, and then putting up the posts in holes 4 feet deep. It was necessary to anchor and tamp each post.

How the Signs Were Put Up—Under the contract Elmore and Rose were to provide their own means of transportation. They had intended using a horse and wagon, but Chairman Lawrence was in a hurry to complete the work so he secured from the Randolph Motor Car Company, of Chicago, the use of one of the company's light trucks, the Randolph Company cheerfully donating the use of the machine, but Elmore and Ross paying the expenses of the expedition and the salary of the driver. The Randolph truck proved of greatest benefit to the Commission. Much ground could be covered in a day despite the adverse weather conditions. The truck has been on the job at all times, never giving the expedition the slightest trouble and covering many miles in the course of the day.

The way Elmore and Ross work is to ship a supply of posts and signs along each route, dropping a bunch every thirty miles. Then they come along in the truck, pick up the supplies and place them in the next thirty miles of territory. It requires two men to place the signs. As one man is digging the 4-foot hole in the ground, the other is attaching the sign to the post. It takes about three hours to place a post and sometimes more, according to the conditions. At the Latrobe steel mills it took a day because the ground there is made up of steel filings which made the work specially laborious. In favorable weather the expedition can label a 100-mile course in one week.

Chairman Lawrence reports that his chief difficulty in laying out his routes was to get the necessary permits from the various townships, it being necessary to make several trips to each before these permits would be issued. He found in many places that there was opposition to the idea, the villagers declaring they did not want the signs up because that would bring motorists through their towns, which they apparently did not want. However, after the expenditure of considerable time, all these permits were secured.

In some places, though, Lawrence was greeted with open arms by the villagers, who were sufficiently broad minded to welcome the innovation. At Bloomingdale, on the Elgin route, Lawrence found unexpected co-operation. He had secured the permit and a sign had been erected in that village. It was no sooner up, though, than the report came that some farmers had taken it down and moved it to a point two miles distant for the purpose of misleading the motorists. Just as Lawrence was prepared to investigate, the selectmen of the town acted. They held a meeting and ordered the farmers to put the sign back where it belonged under penalty of prosecution, inside of a week. The sign was moved at once.

In summing up the situation and the expense, Chairman Lawrence finds that in addition to the cost of $3.55 a post, there must be added the sum of 15 cents a mile for pegging out the routes preliminary to putting up the signs.

REDUCED RATES TO NEW YORK DURING SHOW WEEKS

ARRANGEMENTS have been made by the American Automobile Association to secure reduced railroad rates for members of the association who intend to visit New York during the weeks of the two great automobile shows. Open meetings will also be held during these weeks at the National headquarters, 437 Fifth avenue.

The reduced rates apply to points in the following territory: New York, New Jersey, Pennsylvania, Delaware, Maryland, the District of Columbia, Virginia (points of the Chesapeake & Ohio and the Baltimore & Ohio), West Virginia, Ohio, southern Michigan, Indiana, eastern Illinois (points on or east of the C., R. I. & P. from Chicago to Peoria, the T., P. & W. from Peoria to Burlington, and the Mississippi River from Burlington to Cairo), and the cities of Louisville, Ky., and St. Louis. Members outside this territory will find it advantageous to buy tickets to the nearest point at which the reduced rate can be secured, and there buy tickets under the reduced rates.

In amount the reduction will be equal, on the round trip, to two-fifths of the one-way fare. It should be noted that this is not equal to one-fifth of the round-trip fare. Reductions will be made on the certificate plan, the purchaser of the ticket paying the full price at the ticket office, but asking for a certificate. These certificates may be presented for validation to Secretary F. H. Elliott of the A. A. A. The Trunk Line Association will also keep an agent at the Forty-third street entrance of the Grand Central Palace to validate the certificates, for which a fee of 25 cents will be charged. The amount of the rebate will be credited on the return ticket.

Those intending to visit the Grand Central Palace Show may purchase tickets not earlier than December 28 nor later than January 2, and the certificates when duly validated will be good up to and including January 11 on a continuous return trip over the same route. Certificates will be validated on and between the dates of January 4 to 7. No certificates will be validated after this date for any reason, and no refund will be made unless the certificates are properly validated. The reduction is not guaranteed, but is contingent upon at least a hundred certificates being presented by tradesmen desiring to attend the show.

For the Madison Square Garden show the same plan will apply. Tickets may be purchased on and between January 5 and 10, and the certificates will be good on a continuous return as late as January 19. Only members of the automobile clubs associated with the American Automobile Association and individual members will be entitled to these reduced rates. Further information may be obtained from Secretary Elliott, at 437 Fifth avenue, New York.

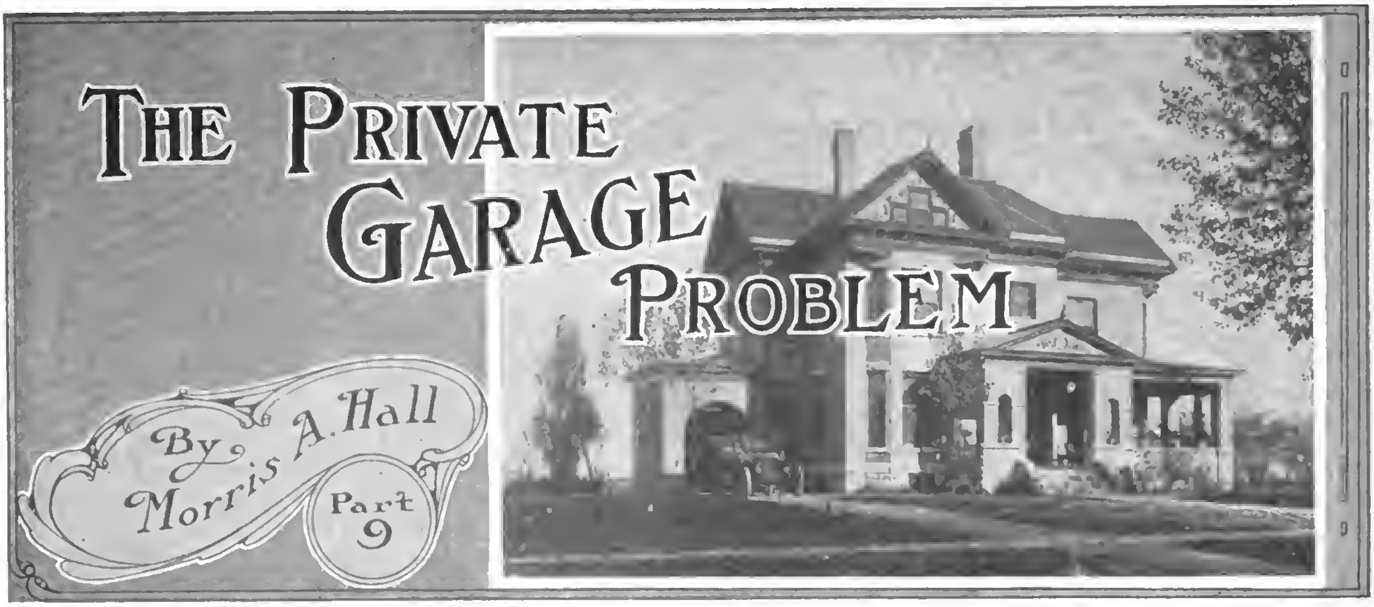
Alfred Reeves, of the show committee of the A. M. C. M. A., has issued a warning that the weeks of the automobile shows are the biggest in the year for the New York hotels, not even excepting Horse Show time, and that prospective visitors should therefore reserve their hotel accommodations well in advance. The Hotel Manhattan will, as usual, be the headquarters of the show committee.

APPLICATIONS OUT FOR NEWARK SHOW

NEWARK, N. J., Dec. 11—H. A. Bonnell, manager of the annual show of the New Jersey Automobile Trade Association, has mailed application blanks to about three hundred dealers in automobiles and accessories. The show is to be held in the Essex Troop Armory, February 19 to 26, and as most of the dealers in Newark have declared their intention of displaying their cars, it is expected that the available space will be contracted for some time ahead. Space on the main floor is to be sold for 70 cents a square foot, and space on the balcony for 40 cents. The applicants or their representatives are to draw lots for the allotment of spaces at noon, January 28. Manager Bonnell is now considering plans for decorations.

OHIO ASKS FOR GOOD ROADS MONEY

COLUMBUS, O., Dec. 13—State Highway Commissioner J. C. Wonders has filed with the State auditor estimates for the needs of the department for road improvement for 1910. He asks for $880,000, or $10,000 for each of the 88 counties of the State. He also asks for additional money for the employment of engineers. Last year the appropriation for road improvement was $5,000 per county.



Iowa Garage Built as Part of Side of the House to Save View of Mississippi River at the Rear

INTERIORS present a fertile source of discussion, principally for the reason that the ordinary person does not understand or else cannot read a drawing. So to these people the showing of a plan drawing means little. A photograph of an interior, on the other hand, may be read and understood by any one, to say nothing of criticising the arrangement of the interior there shown, which is an impossibility with the architect's floor plans.

For this reason the present instalment of the garage story will be devoted to interiors. These present the opportunity to bring out another feature of the garage, which in weather like the present—that is, in the winter time—is of unusually pertinent value. By this reference is had to the question of heating of garage interiors, whatever be the system.

Heating presents a number of problems, some of them dating as far back as the planning of the building in the first instance. By this is meant such a selection of size of building as to allow of the later installation of a heating system without reducing the available floor space to a too small amount, such a selection of materials and form of construction as will reduce the heating problem to its lowest terms, and such a selection of heating means as will call for the least amount of work attending to it, in company with a moderate installation cost, simple form of apparatus to reduce repairs, etc., to a minimum, and high efficiency.

Prevention of Freezing the Real Reason for Heat—Contrary to the common notion, the idea of heating a garage is not to keep it warm in the ordinary sense of the word, but to prevent the water in the jackets from freezing and the oil in the gearcase and crankcase from congealing. To this must be added the proviso that the chauffeurs' quarters be not an integral part of the garage. In that case the two parts must be differentiated between, for the driver and his quarters must be kept warm, while the car and its compartment need not be actually warm.

Typical Small Car Garage Interior, Showing Workbench

The various heating arrangements are as different as the many systems of heating of which the owner and builder has a choice. Speaking generally, it may be said, as of house heating, that there are four systems, with many, many variations and additions to them which constitute the make-up of perhaps a hundred different ones. The four principal ones are, however, unit or localized heating, in which a series of units such as stoves, fireplaces, etc., are used to heat certain units of localities; hot air, in which all rooms are heated from one unit, preferably a furnace; steam, in which system again a single unit of heat conveys warmth to all rooms, and lastly, hot water, which is like both steam and hot air in that a single source of heat is used.

Of course, some of the combination systems are of more than passing worth, and should not be dismissed with a word. Thus the method of utilizing steam or hot water in radiators to heat pure cold air, which is then circulated as a source of heat, is much used. Then the positive differential system, in which the steam supply to each and every radiator may be controlled accurately (this being a modification of the steam system), is very good.

Low First Cost Accounts for Many Peculiar Heaters—For the garage, on the other hand, most of these methods have the initial and apparently insurmountable fault of being altogether too elaborate, and consequently altogether too expensive. So the consideration of garage heating must start with something very simple and of low first cost. This accounts for the use of some peculiar heating methods as previously described.

Thus, in one of the previous issues a large garage was shown and described in which the only source of heat was a large open fireplace. This was, however, very large, provided with a capacious chimney to afford plenty of draft, and after several years' use has been found satisfactory for the heating of this particular garage, or at least sufficient to prevent the two Haynes cars owned from freezing up.

Another three-car garage, shown last week, has no other source of heat than a very big stove placed in the middle of the side of the garage floor. In addition to the car floor, this heats the chauffeur's floor above. The fire may be driven rather hard for the purpose of sending plenty of heat upstairs without actually heating the ground floor very much. But at that the heat should be sufficient to save the plumbing of the building and the water jackets of the three Thomas cars. No one stove, no matter how large.

could actually make this room hot, since it is 25 feet wide by 60 feet long, and liberally provided with windows to carry off the heat as rapidly as the stove can furnish it.

After a close investigation of the subject the writer is forced to the conclusion that the majority of garages are heated by means of stoves in some one form or another.

Use of Stoves Well Nigh Universal—These vary in size with the area of the garage and the attitude of the owner toward the matter of heat. Some owners—and it is a pleasure to state that their number is growing less each year—put the car up for the winter, thus losing the use of it for about four months. These owners, of course, know little and care less about the matter of heating, their interest being confined to drawing off the water when the car is put away and refilling it when the car is brought out in the spring.

On the previous page is shown the interior of a small one-car garage, which has been described and the exterior illustrated in one of the earlier numbers. This interior shows no heating arrangement, but some of the other features are worth calling attention to. The work bench, tool box, cabinet for clothes or spare material, and shelves for the same, may all be seen. It will be noticed that the place is lighted by electricity, one of the sockets serving as a place of attachment for the electric vulcanizer. This can be seen on the far end of the work bench. The bare spot between the work bench and the cabinet with doors at the left was left purposely, the idea being to place a small lathe there later on. It was the intention to drive this by means of electricity, the lathe being direct-driven from a small motor mounted upon an integral part of it and wound to use lighting voltage.

The lamp connection seen at the window would be used for this, so as to leave the present overhead light. At present the connection at the window is used for a portable lamp, allowing the use of the light wherever needed. Similarly, with the vulcanizer, the extension on that permits of using it on the tires, which need not be taken off the machine, but are vulcanized in place.

In the center of the floor the drain, and the slope of the floor sides toward it, give a hint of the washing methods, although the position of the camera was such as to fail in showing the source of water supply at the front entrance, or the entrance either.

Heat Supplied for House in Many Cases—As has been chronicled several times before, the heat may be supplied from the house heating system when the two buildings are sufficiently close together to make this a practical thing to do. When the garage and house are separated by a space of more than 25 feet this method becomes of doubtful utility, particularly in the case where the chauffeur's living quarters are included in the garage building.

In the issue of Dec. 9 the garage of squared field stone shown at the head of the article there was heated in this way, as was also the one shown at the bottom of the same page. Both of these were very close to the house and the source of heat, the former being within 15 feet at the point where the pipes were carried across. In the latter instance the distance was not as small as this, but was about 20 feet.

Cases like the one shown at the head of this article are few and far between, but at that the heating problem was an easy one to solve. In this case the garage was built as an integral part of the house, being the small square extension at the left, in front of which the car is standing. Aside from ease and certainty of heating and the apparent convenience of this location, the owner had another idea in locating the garage as the picture shows it.

This was the view from the rear. The Mississippi River flows past the rear of the house, the bluff upon which the house is situated being one of the banks of the river. With this idea in view the owner built a fine porch or veranda clear across the rear of the house, on which he could sit and view the river, with boats passing up and down. This fine view he did not want obstructed. So the garage had to be built at the side.

As built it has two doors, one at each end, closed by means of sectional steel blinds, which roll up out of the way like a window shade. By opening both the owner may drive through, turn around on the drive back of the house and come back through

Radiator in Plainfield Garage is Large and Prominent

towards the street. At the left side, there are two narrow but very high windows, which have prism glass to increase the amount of light furnished to the interior.

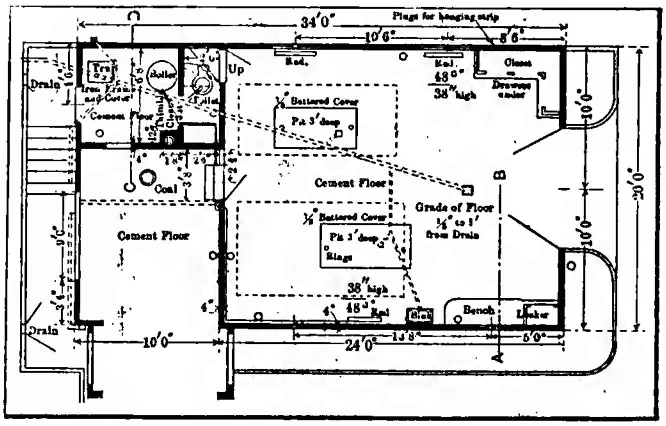
Heat is furnished to the garage interior from the steam plant located in the basement. Steam coils are placed along the side nearest the house. Since the garage is practically a part of the house, the heating offers no difficulties other than the ordinary plumber's pipe-fitting.

Interior of Garage with Superior Equipment—At the head of this page is shown a garage interior in which are to be seen a number of things in the way of equipment which have not been seen in any other garage pictured thus far. This building not only has a large pit, as the picture shows, but means for heating the whole interior adequately, a large-sized lathe, forge and anvil, drill press, electric vulcanizer, and many other little conveniences of value to the owner who has learned to do his own repairing.

Electric drive is utilized for the lathe, as well as all other tools, this being provided through the medium of the small motor shown in place on the bench in front of the lathe at the right. This lathe is also arranged to be run by foot-power should the owner so desire. The stoutly constructed bench carries the usual vise, and adjacent to it, in the corner, is the group of shelves, which are arranged to hold about everything used in ordinary repairs. This picture, portraying as it does but one corner of the whole building, shows but half of the full equipment.

It does, however, show the radiator used for heating purposes. This is an ordinary radiator of large size, suitable for either steam or hot water, the writer not being sure which method of heating is utilized. Other radiators placed in the middle of the other sides (except the front), the same as this one is in the center of this side, act together to warm the whole inside very thoroughly. The heat is more necessary in this case than in the ordinary one, because the owner does all of his work here.

Although long and fairly wide, the pit in the foreground has been so foreshortened in photographing that it looks very small. This is not the case, the appearances being misleading, for the pit



Plan of Two-Car Garage With Complete Heating Plant

Elaborate and Efficient Heating Plant in Paterson Garage

is slightly longer and somewhat wider than in the ordinary garage of medium size, say for two or three small-sized cars.

Electricity, of course, is used for the lighting, while the fire protection may be summed up in two words, hose and extinguisher. The former is not visible, but the latter (at least one of the latter) may be seen in the corner on the top shelf. This last-named is very important, since the building is a frame structure.

More Elaborate Heating System Shown in Plans—At the bottom of the same page is illustrated another garage, in which the heating arrangements are somewhat more elaborate. This one has living rooms above, so the heat furnished and the method of furnishing it must of necessity be more elaborate. As the plan shows, a whole room is given up to it, and another just outside of it to the fuel supply. A vertical boiler of large diameter supplies heat through pipes to three radiators on the car floor and two on the floor above. The three on the ground floor may be seen, one on the side nearest the observer and located close to the work bench, which is an excellent idea. The other two are placed equal distances apart on the other side, being actually located in front of the two windows on that side.

Many points other than the heating will be noticed here. The floor provides two pits, and one drain for washing purposes. Alongside of the bench and occupying the corner of that side with the front is a large locker. On the opposite side, also occupying the corner but much larger in size and capacity, is another locker, lettered closet in the drawing. This is a two-car garage, and built throughout of cement. The dotted lines across the floor show the drain pipes underneath the building, except in the case of the two pits. The dotted lines around these give some idea of the floor space which cars setting over the pits would occupy.

Perhaps the most ingenious thing about the whole garage is not noticeable in this drawing. This is the way in which the design provides several living rooms above, yet without going to the expense of carrying the building up to a second story. The ceiling of the automobile room is very high, but the ceiling of the open shed and boiler room is not; on the contrary, it is very low. This effects a saving in height, which, taken in conjunction with the space provided by the upward sloping of the roof at the center, makes a very large space. In fact, this space is large enough to give the chauffeur several rooms without skimping on them.

Frame Garages Require More Care in Selection of Heating

Small Hot Water Heater—The small cut on this page is that of an interior showing a small hot-water heating system now on the market. This is a special stove developed for the purpose, and, besides economy, has many good points. The stove itself has a deep, non-cleaning fire pot, circular in form and located within the one-piece base. The fire is entirely jacketed within the heater, so that none of the useful heat furnished by the fuel goes wrong. This in part accounts for the economy of the whole system.

Special shape of gratebars allow the use of any old kind of fuel, regardless of size or character. The complete system includes the radiator or radiators, small-diameter tank and smaller tank for the higher position, this providing assistance in the matter of water circulation through the action of gravity.

For heating, the upper tank is filled and the fire started. The water flows by gravity to the coils surrounding the fire pot, where it is heated. From there it proceeds to the circular boiler. This boiler acts as a source of supply from which the radiators are kept full of hot water. The vertically placed reservoir has no other function than to supply the radiators. In the whole system there are no valves or traps, the four parts of the apparatus being complete and self-sufficient when connected up by the plumber.

Compact Hot Water System

Reasons applicable to this outfit are equally applicable to many other hot-water systems, and, in fact, to nearly all fluid heating systems, including steam as a fluid. These are eight in number, as follows:

First—It will reduce the fire hazard to a minimum.

Second—It will eliminate the danger of freezing while in the garage of liquid-cooled cars.

Third—It will furnish hot water for cleaning purposes.

Fourth—It will last a lifetime.

Fifth—It will save you fuel.

Sixth—It will save you time and attention.

Seventh—It will reduce the repair cost on your car. You will have a comfortable place to work—the mechanism of your car will be kept better adjusted.

Eighth—It will keep your car looking better. You have hot water to clean the car—it will be done oftener and better.

One Garage's Very Admirable Heating Plant—One of the best and most complete heating arrangements for garage interiors which has come to the writer's notice is that pictured on this page. The strangest feature about this very complete and most admirable outfit is the fact that the car owned and kept in the garage is not a water-cooled machine, but an air-cooler, and as such not so susceptible to cold weather. Exception might be taken to this last statement on the score that air-cooled cars use more oil, and that, regardless of the cylinder cooling, the lubricating oil should not be allowed to congeal.

As is apparent, the furnace (its size makes that name necessary), located in an alcove so as not to reduce the actual floor space, supplies hot water to the radiators. The latter are arranged around the building, not at the floor line, but slightly above it. Their use is not restricted to any one side or part of the garage, but they are strung continuously around all sides, resulting in very efficient heating, and that, too, of a steady, even nature, so desirable in any heating system.

(To be concluded.)

POINTERS ON VALVES AND VALVE TIMING

By Arthur H. Denison

ADJUSTMENT and timing of the valves and the condition of their seats have much to do with the power developed by the gas engine. Cars that are constantly before the public, in racing and hill climbing events, have infinite care given to these details, and it is due to this care that races are won. The touring car, whether cared for by the owner or chauffeur, will give much better satisfaction, will develop better power and speed, with less depreciation and cost of upkeep, when cared for properly and kept in first-class order.

Valves are a necessity, in order that a suitable combustible mixture be passed into the cylinders, and the burnt products of combustion allowed to escape. Different forms of valves are in use, but in standard four-cycle engine practice, representing the great majority of American designs, the mechanically operated poppet valve, with either a flat seat or with an angle of 45 degrees is in use. Mechanically operated is not a strictly correct term, as the valves are merely opened by mechanical means and closed by the tension of a spring. If the spring is weak the valve will be late in closing. The springs in use on a modern high-speed motor vary greatly, but generally have a tension of about 40 pounds.

The cycle of operations of the engine is usually described as commencing with the suction stroke. A mixture of carburetted air—that is, air and hydro-carbon vapor—is forced into the cylinder through the inlet valve by atmospheric pressure as the piston travels downward on the suction or inlet stroke. At a point near the bottom of the stroke the inlet valve closes, and the piston, traveling upward, compresses the mixture to a pressure generally between 60 and 90 pounds. (Compressing the mixture enhances the value of the explosive pressure many times.)

Following the completion of the compression stroke, and the electrical contact that produces combustion, the piston is driven downward on the power stroke by the expanding gas. At a point near the bottom of the stroke the exhaust valve is opened, and the burnt products of combustion commence to escape. This valve is held open during the following up stroke of the piston. As the motor is developing power in but one stroke out of four, it follows that the most efficient motors are those that draw in and retain the greatest volume of gas on the suction stroke and get rid of the burnt gas with as little back pressure as possible on the exhaust stroke.

Gas Inertia Must Be Considered—All matter possesses weight, and one pound of air at a pressure of 14.7 pounds occupies approximately a volume of 1,488 cubic inches. It will therefore be seen that, possessing weight, it must, when traveling through the intake manifold and passages at speeds up to 10,000 feet per minute—some motors for racing work having reached a speed 50 per cent. greater than this—must possess a certain momentum or inertia that can be utilized to the motor's advantage.

When the piston is traveling at a high rate of speed, the gas does not flow into the cylinder the instant the valve is opened, nor can the column directly follow the piston head at its full density, owing to friction losses due to bends and walls of the passages. As some little time is necessary to start the flow, it is probable that the following is the actual condition of affairs.

In contact with the piston head is a region where there is practically no pressure, or approaching a perfect vacuum and above that a mixture of gradually increasing density, which at the valve probably would be at full atmospheric pressure. Were the inlet valve to close when it had reached the lowest point of its stroke, there would not be a mixture inside the cylinder that would fill it to near atmospheric pressure. One of the peculiar properties of gas is that it will always fill the volume it is contained in, regardless of the pressure, and the small charge trapped in the cylinder will have a lessened compression and explosive pressure value, thus affecting directly the power and speed of the car. In the manifold, the momentum of the column would cause it to ram against the head of the valve with an increasing pressure for an instant, then flow back out of that section of the manifold and disturbing carburetting conditions.

Timing Compensates for Gas Inertia—To take advantage of the momentum of the column of gas, it is customary to time the inlet valve to close when the greatest amount of gas is in the cylinders. The only accurate method of finding the correct valve timing involves the use of costly instruments in the engineering laboratory. When the piston passes the dead center, the crank shaft must travel quite a distance, measured on the crank circle before the piston has traveled an appreciable distance upward. Fig. 1 shows this, in crank-pin movements of 15 degrees.

General practice is to close the inlet valve 15 to 30 degrees.

After dead center, it having been found that the influence of the piston traveling up was, at the point where the valve closed, just sufficient to balance the momentum of the column of gas coming in through the inlet port. Any further opening of the valve would allow part of the charge to be pushed back out through the open port. It must be remembered that the valves are timed to give the engine the greatest power at a certain speed. When a valve opens or closes after dead center, as in the case of the exhaust valve closing, followed by the inlet valve opening, both are said to have a *lag* of "X" degrees. An exhaust valve opening before dead center has a *lead* of "X" degrees.

The exhaust valve is opened from 30 to 60 degrees ahead of the crank dead center. The drop in the pressure is very rapid during the first half of the stroke, after which it is not very effective as a means of developing power. Opening the valve before the dead center allows the gas to expand to near atmospheric pressure by the time dead center is reached and on the exhaust stroke, the piston has a comparatively small amount of gas to force out. Were all openings in the exhaust line to be stopped up, the pressure of the exhaust gas would become so great in a short time that the motor would stop. The exhaust valve closes at dead center or a few degrees after, taking advantage of whatever momentum is in the gas in order to carry out as much as possible. The opening of the inlet valve should follow very closely the closing of the exhaust valve, but both should not be open at the same time.

Manufacturer's Part in Correct Timing—When a car leaves the factory for delivery the motor timing gears and flywheel should be so marked that trouble will not follow if the

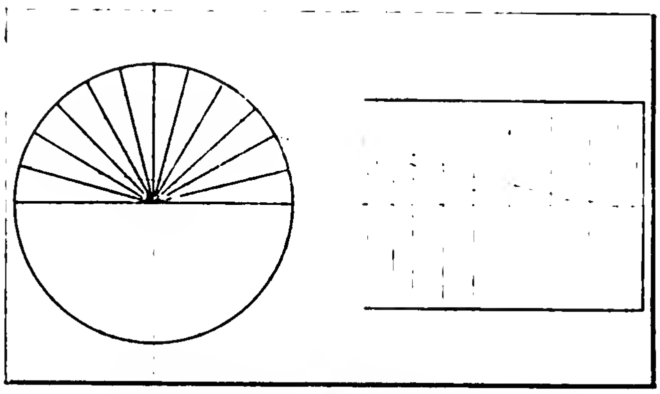


Fig. 1—Piston travel per 15 deg. crank pin travel

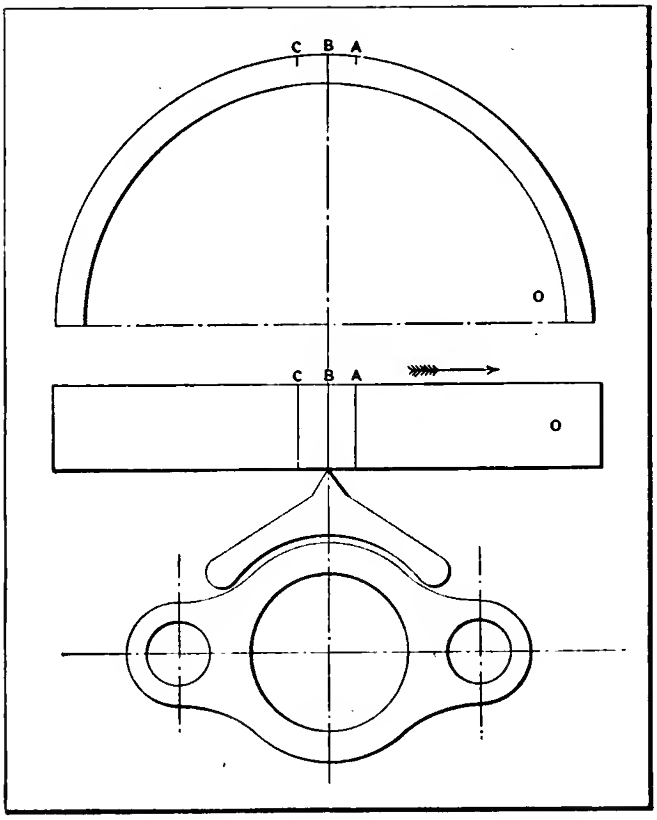


Fig. 2—Method of using indicator to time valves

gears are carelessly removed. Much of the trouble and dissatisfaction at repair and overhauling work is probably due to original valve timing by the mechanic who has been experimenting with gears that were not marked. There may be two, three, four or five gears in the timing case and all should be carefully marked, not with the nearest cold chisel or center punch but with a set of figures or letters. The tooth of one gear and the space of the one that it is in mesh with should be clearly marked with the same symbol, and that symbol used only once.

If there are two gears of the same size in the case as the magneto and pump shaft gears, and placed at opposite sides of the case, stamp the gear and shaft also to prevent getting them mixed up. Carelessness there may result in the gears being meshed otherwise than the way they have been fitted, and they may run noisy. If a gear is held with two keys, 180 degrees apart place symbol marks so that the gear can be readily replaced and the symbol marks coincide. Cam shaft gears may be bolted to a flange on the shaft, and both the shaft flange and the gear should be marked so that the gear can be readily replaced correctly. Were the factory to mark the gears thus, the multitude of scratches and marks often seen would not be needed, nor eccentric and original valve timing cause low powered or overheated engines.

How the Flywheel Should Be Marked—The flywheel should have the timing of all the valves and the head centers of the pistons plainly marked. The mark may be an arrow head or punch mark, and a light scratch should run across the flywheel, with the meaning stamped beside and reading, for example, "1 & 4 INLET OPEN," or "2 & 3 HEAD CENTER." The marks mean that when a pointer, usually placed in the center line of the motor, is pointing to that line that one of the valves designated is starting to open or close, or two of the pistons are at their head center or highest point. Fig. 2 illustrates and should make this clear.

When testing the valves for the points of opening or closing, it is sometimes difficult to determine the exact point at which the lifter is tight. A little clearance between the valve stem and the lifter allows for expansion and the valve to seat tight. If the valve lifters are not spring controlled, the least rattle or shake can be readily detected with the finger, or if this method is not practicable a cigarette paper is the thinnest piece of material to be had, and this may be placed between the valve stem and the lifter. When it is tight the valve may be considered as starting to open.

Correct Valve Lifter Clearance—Valve lifters should be set so that every valve stem has the same amount of clearance. One-thirty-second to 1/64th of an inch is generally sufficient, and more than this will make the motor noisy. A piece of steel or brass of this thickness may be readily obtained, and, placed between valve and lifter, will allow adjustments to be made quickly and easily.

If the motor gears are apart and gears and flywheel not marked, the following is probably the easiest method of replacing the gears so that the motor is timed right. First, place the piston of No. 1 cylinder on its head dead center. This may be found by running a wire through the compression tap or noting the position of the cranks, etc.

Consider a motor with a single cam shaft.

The first cam generally operates an exhaust valve, and this should close at or a trifle after dead center. The cam shaft should be turned until as near as possible in its correct position and then the gears meshed. If two cam shafts are used, one for the inlet and the other for the exhaust valves, the piston does not need to be moved, as the inlet valve must open a few degrees after the other has closed. Then measure the piston travel and find when the valves open and close.

Unless the cams have been removed from the shaft, it is safe to assume that, with the proper opening of the inlet valve and proper closing of the exhaust valve, the other points of operation for the valves are correct. If the exhaust valve closes either at head dead center or within an inch and a half after, and the inlet opens right after the exhaust closes or within a distance of not more than two and one-half inches past the dead center mark, the valves may be assumed to be correctly timed. The measurements are made on the rim of the flywheel, and the above figures are for large-size flywheels.

How a Timing Diagram Is Laid Out—When considering the power output of a motor as low and due to defective valve timing, the flywheel is not marked, and the marks on the gears unreliable, the best thing to do is to make a diagram of where the valves are actually opening and closing. With a compass lay out a circle, of any convenient diameter to represent the rim of the flywheel, and draw the vertical diameter, which will represent the head centers. With whatever means practical find out the time of the inlet valve opening.

Suppose it opens one-quarter of an inch after the piston has passed the dead center and is traveling downward. If the stroke of the motor be considered as five inches this would be 1/20th of the stroke, and measured in degrees 180/20, or nine degrees. With a protractor lay off nine degrees on the circle past the dead center point. Then take the point of inlet valve closing, and suppose it to be one-half inch after the lower dead center. This would represent 18 degrees, and lay this off on the circle in the same manner. Then treat the opening and closing of the exhaust valve in the same manner, and the result would be a diagram like Fig. 3.

Here the exhaust valve has been supposed to open one inch before the lower dead center and to close one-eighth inch past the upper dead center. A glance at the diagram will show that the motor is timed correctly, according to the principles of valve timing. Were the gears meshed one tooth off, it would affect the time about three or four inches on the flywheel rim. Either the exhaust valve would close before center, thus retaining a certain amount of the dead gas and weakening the mixture, or if it closed that amount late, it would likewise open late and make the motor run much hotter, as it would be subject to the heat of the gas for a longer time. The inlet would remain open so late that part of the gas drawn in would be pushed out through open port when the piston should be compressing the gas with the valves closed. Or on the other hand, it would close too early, which would result in a scanty charge being drawn into the cylinders. In actual latter-day practice, the inlet is held open a small amount of the compression stroke, so as to take advantage of the inertia of the inrushing gas, this being sufficient to overcome the slight compression effect produced for the initial 5 or 10 degrees of crank movement past the lower dead center. In some modern engines, this lag of the inlet valve amounts to as much as 40 deg. and more. Thus, Peugeot uses 58 deg., Panhard 45 deg., and De Dion 45 deg.

Why Exhaust Needs Grinding More Often Than Inlet—Exhaust valves, in particular, generally require frequent grinding in. It is a common practice to slow the motor when the car is stopped by closing the throttle and retarding the spark as much as possible. This allows ignition to take place after the piston has passed dead center, and the gas burns slowly, both exposing more of the cylinder walls to the great heat, and also retaining most of its heat till the exhaust valve opens. Thus both the valve and its seat are subjected to a temperature almost great enough to melt the iron were the heat applied continually.

Intermittent bursts of flame serve to warp the valve and make the task of grinding it to a tight fit one of great difficulty, or the valve may be too far gone and a new one needed. Valves may be ground in with emery or carborundum floor and oil, or one of the many preparations on the market for this purpose. A soft lead pencil or a little blue will serve to test the bearing of the valve on its seat. The valve should be ground to hold gasoline.

Valve springs may lose their temper and fail after long use, causing the motor to be sluggish. A good test is to place a washer under the valve spring, thus materially increasing tension.

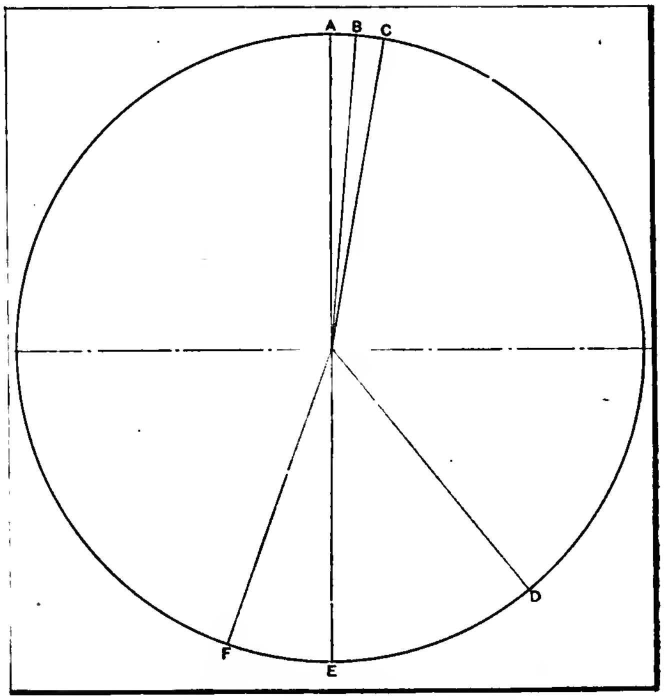


Fig. 3—Principles of valve opening and closing

OIL CONSUMPTION IN THE FRENCH COMMERCIAL TRIALS

By W. F. BRADLEY

PARIS, Dec. 9—Speed, reliability and simplicity are features that have been very closely studied in the modern automobile, but comparatively little attention has been paid to economy. This is doubtless due to the fact that the greatest development of the automobile has been as a pleasure vehicle, the owner of which, although keen to get the greatest value for his initial outlay, pays little attention to the daily and comparatively small expenditure for gasoline and lubricating oil. There are not many owner-drivers who can state off-hand the mileage per gallon of their cars, and still fewer who know exactly how many miles they can run with a pint of lubricating oil. It is only necessary to see the pools of oil left by most cars after standing to realize that the owners and manufacturers are often as careless as they are ignorant on this point.

Even in Europe, where the high rates of gasoline and greater price of lubricating oil, compared with the United States, leads to greater economy in their use, the matter has not received anything like adequate attention. Lubrication methods, however, are far from being perfect, as can be judged from the official results in the recent French commercial vehicle trials. For the first time in any competition an accurate control was maintained on oil and grease as well as on the various fuels used. The test was a really practical one, for it was spread over a period of thirty days and for a road distance varying up to 2,000 miles.

The small number of entries makes it impossible to draw any general conclusions except in one class, devoted to trucks carrying a useful load of between two and three tons. Without entering too closely into figures, it may be stated that the actual load, exclusive of tools and spares, was in every case only a few pounds short of three tons. The vehicles made twenty-four journeys, over various kinds of roads, and under varying weather conditions, the total distance covered being 1,794½ miles.

The best performance was made by a four-cylinder Saurer, which, during the month, consumed 37.7 pints of lubricating oil and 2 pints of grease. This means that 47.8 miles were covered for each pint of lubricating oil. In the official table the grease consumption is, curiously, given in pints, instead of in pounds. This item, however, can be ignored, for in every case but one the consumption did not exceed 3 pints for 1,794 miles.

Thirteen vehicles are included in the official table, these having gone through the month's trial with a clean score so far as regularity is concerned. The average oil consumption was at the rate of 1 pint per 16.4 miles. The Saurer, which held the record with 47.8 miles on a pint, and incidentally won first prize for all round economy and efficiency, was followed by a duplicate vehicle with 34 miles to a pint. A De Dion was also very economical with 25.4 miles to a pint of oil. A two-cylinder Delahaye, which obtained second prize on formula, running the Saurer very close, evidently lost first prize entirely to neglect of economy in lubricating oil. It was the most economical in fuel, whether it was gasoline, alcohol or benzol, but it required a pint of lubricating oil every 12.9 miles.

The value of the test is shown by the fact that whenever there are two similar vehicles from one factory their oil consumption was practically the same, thus showing that it was a test of systems, and not a mere exhibition of the ability of the driver skilfully to economize without risk to his motor and transmission. The test also proved conclusively that constructors had not paid sufficient attention to economical lubrication, otherwise we should not see differences of over 100 per cent. under identical conditions of operation. The following table sets forth the amount of oil consumed for a total distance of 1,794.5 miles and gives the mileage obtained on a pint of lubricating oil. The vehicles were run at an average speed of not less than 9 nor more than 15½ miles an hour.

	Total Miles	Oil in Pints	Miles per Pint
Saurer, 4-cyl., 4.3 by 5.5 ins.	1794.5	37.7	47.8
Saurer, 4-cyl., 4.3 by 5.5 ins.	1794.5	52.8	34.0
De Dion, 4-cyl., 3.5 by 3.9 ins.	1794.5	70.4	25.4
Vinot, 4-cyl., 4 by 5.5 ins.	1794.5	107.2	16.7
Aries, 4-cyl., 3.3 by 4.3 ins.	1794.5	132.0	13.5
Delahaye, 2-cyl., 3.9 by 7.08 ins.	1794.5	135.5	13.3
Delahaye, 2-cyl., 3.9 by 7.08 ins.	1794.5	139.0	12.9
Peugeot, 4-cyl., 3.5 by 4.7 ins.	1794.5	140.8	12.7
Vinot, 4-cyl., 4 by 5.5 ins.	1794.5	149.6	11.9
Aries, 4-cyl., 3.3 by 4.8 ins.	1794.5	161.9	11.08
Panhard, 4-cyl., 3.5 by 5.1 ins.	1794.5	241.2	7.4
Malicet & Blin, 4-cyl., 3.5 by 4.7 ins.	1794.5	260.5	6.8
Cohendet, 2-cyl., 5.7 by 5.7 ins.	1794.5	602.18	2.9

AN INEXPENSIVE HOME-MADE ELECTRIC LIGHTING SYSTEM

By VINCENT B. MINER

BECAUSE of the antics of a poorly designed kerosene rear light, which would stay lighted only with the flame at a ridiculous height, the writer was moved to plan the installation of an electric light at this important point. The idea expanded in its execution to include the two sidelights, also of the kerosene species. It may be well to mention that this system was not intended to replace headlights or searchlight (which would have greatly increased the cost on account of expensive parabolic reflectors), but was intended to supersede the ancient, dirty, uncertain and weak battery of kerosene lamps. As it was a total experiment, so far as the writer was concerned, the expense was to be somewhat limited. As a result of careful simplification, the cost of the complete outfit was kept at $2.91, and the time to install at half a day. Retail prices were paid for everything; and, with the possible exception of the lamps themselves, each article was standard and easily obtainable at any electrical supply store.

Almost any low-tension direct-current or alternating-current generator designed for ignition purposes in conjunction with a vibrator coil, or a six-volt storage battery, will suffice for this system, and their possession is presupposed. The description and directions which follow are intended for those who are using the generator; for those who possess a storage battery only the sole difference would be to tap the wire leading from the storage battery to the coil, instead of the wire leading from the generator to the coil. The writer is using a Western-made, belt-driven mechanically-governed, direct-current generator, which keeps all lights brilliant, even at the lowest possible engine speed.

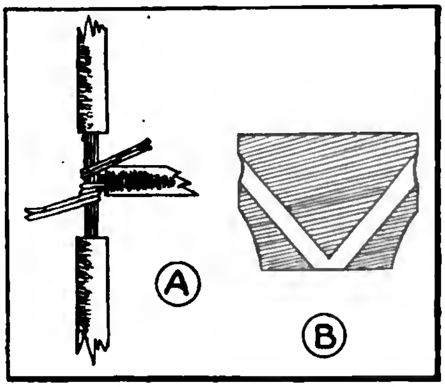
Purchase the following:

3 6-volt 6 candle-power anchored filament tungsten lamps, minimum base	$1.50
1 single-pole porcelain-base snap switch	.20
3 miniature receptacles, porcelain base (depending upon oil-lamp body)	.21
8 feet ¼-inch internal diameter flexduct	.48
3 porcelain cleats (to fit large wire)	.10
1 small can paint (color of car)	.10
12 feet No. 14 D. B. stranded wire, rubber-insulated ("large wire")	.16
6 feet No. 22 S. B. rubber-insulated copper wire ("small wire")	.06
Screws for cleats, switch, and receptacles (fit each) about	.10
	$2.91

The desired position of switch on the dash is first selected, after which the generator wire to the coil is tapped at the nearest or most convenient point to this switch. At this spot about an inch of insulation should be removed, also the same amount from the ends of the large wire. Make the joint as shown in sketch A. After taping thoroughly run this wire over to the switch location and cut, allowing sufficient to go up through the switchbase and connect on the switch terminal. Connect this wire to one switch terminal. Connect one end of the remaining large wire to the other switch terminal, being certain that switch is turned off. Now firmly screw switch to dash at previously determined point. It will now have to be decided whether the wire from switch to sidelights is to run across the top or bottom of the dash.

Cross Wire on Dash, and "Flexduct" Coming Through Floor

Estimate the distance from the switch to the proposed line across the dash, allowing an inch or two over, and at this point cut the second wire leading from the switch. We are now ready for the dash wire leading to the two sidelights. Run this a little out beyond the dash on both sides, having each end leave the dash as near as possible to its respective lamp. Where the dash is surrounded by a dash hood it is necessary to bore holes through same at points near the lamps for the passage of this cross-wire. Be sure to tape the wire well where it runs through these holes, so as to prevent the insulation from chafing. Now secure this cross-line with one cleat placed about the center of the dash. Tap the cross-wire at a point nearest the switch, connecting the short wire from the switch thereto, as illustrated in sketch A. With the aid of two more cleats firmly secure this cross-wire all along the dash.



Sketches of Wire Connection and Plug

We are now ready for the rear-light line, which taps this dash cross-wire, running through conduit to the rear light. Bore hole slightly larger than the conduit in rear end of body at a point exactly opposite the rear lamp. Bore a similar hole in the footboard nearest the dash at a point nearest where it is desired to tap the dash cross-wire. Suspend the conduit along the frame or body, whichever seems most expedient, thrusting the ends through the previously bored holes—the rear conduit end being flush with the rear of the body. Now lash conduit securely to frame by means of very heavy tarred twine or tire tape, or secure it by means of a few U-shaped metal straps. Cut off any surplus conduit which may show at the dash to a point about one inch above the footboard and mat. Run the large wire through the conduit, starting from the rear end. Tap dash cross-wire at point of intersection with this rear conduit wire, as shown in sketch A, and cut at rear end, allowing about 2 inches to project for connection purposes.

Now Ready for the Lamp Connections—Upon attempting to give directions for the successful and easily performed installation of electric lamp receptacles or sockets in the former oil lights, the writer is confronted with the widely varying types of oil lamps now in use. At no part in the construction of this system is it possible to use more ingenuity than in the adaptation of the small porcelain receptacle or socket to the available apertures, or lack of same, in the oil lamp. If the reader has an oil fount and burner which is removable as a unit, as has the writer, he has a "cinch," for the hole left by its removal is a quick way out of possible trouble. However, the writer's rear light has a permanent wick guide or holder, which necessitated an entirely different method of treatment.

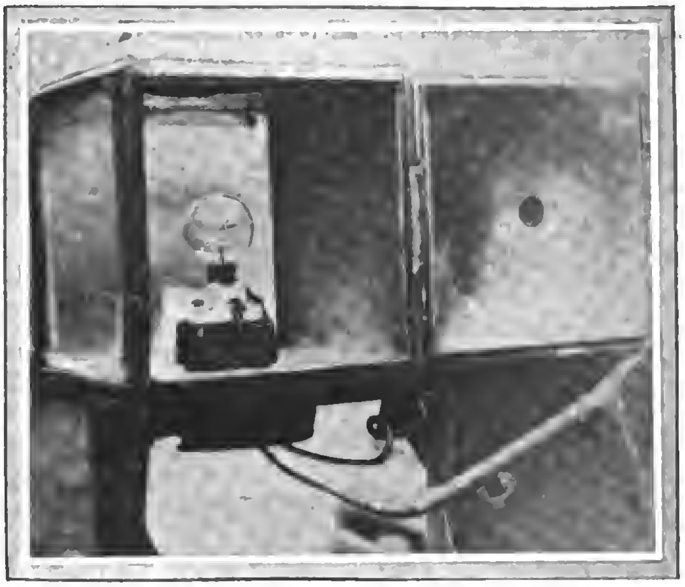
First, the sidelights. When the fount and burner unit is removed it leaves a circular hole. Two wooden plugs of slightly larger size than the lamp aperture are tapered down to a diameter slightly smaller than the aperture, the top of the plug being flat to accommodate the receptacle, thus (B). This may best be done in a lathe, but can be easily whittled instead. The reader will now find that these plugs will fit in the lamp apertures very tightly—no amount of rough driving will jar them loose. Two holes are then drilled in each plug diagonally, starting from opposite sides of the plug above the tapering portion to the center of the bottom, these holes being slightly larger in diameter than the small wires (see B). Paint these plugs to correspond with the color of the car, at the same time painting the porcelain cleats holding the dash cross-wire. After drying attach the porcelain receptacles to the tops of the plugs with small screws, taking care that the two terminals of the receptacles correspond with the two side holes of the plugs. Now measure distance from end of dash cross-wire to one terminal of receptacle when plug is in place in lamp. Allowing a little for connection and slack, cut off this amount of the smaller wire; attach one end to receptacle and thrust other end through diagonal hole, out through base of plug.

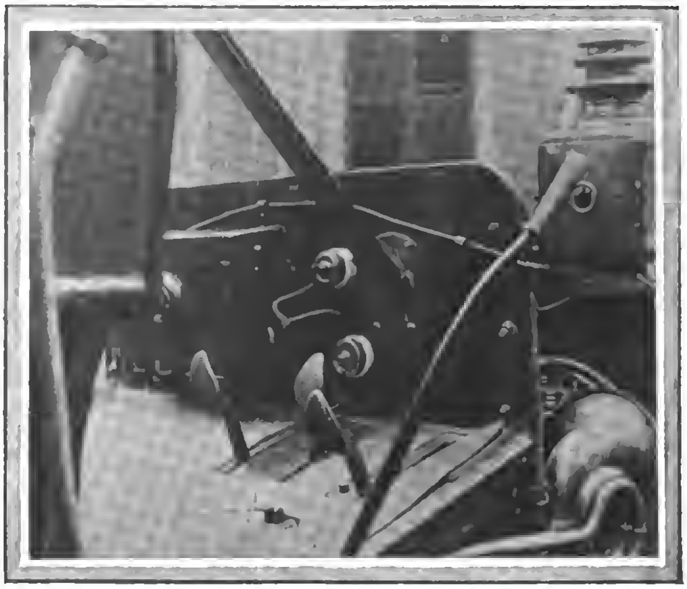
At this stage it must be determined what part of the dash is to act as the "ground," or return circuit. As shown in the photographs, the writer's car has a brass bead completely around the edge of the dash, which forms the best possible kind of a conductor. The screws used to secure this bead to the dash are made to act as the binding posts for the ends of the return wires from the respective lamp plugs. Practically all cars now have metal dash hoods which serve the purpose admirably, it being merely a matter of the owner's desire as to just how he wishes to connect his second or return wire from each lamp to the metal conductor. The rear lamp connection can be secured to the frame at some convenient nut or fastened in some secure manner to the body, if the latter be of metal. Boring two small holes 1-2 inch apart and looping wire through them is a satisfactory method. Measuring distance from lamp receptacles to point of ground, connect these two points, also connecting the end of the dash cross-wise with the first small lamp wire. Take care to tape all connections. We are now ready to connect our "ground" dash bead, dash hood or body to the frame (to complete the electrical circuit), unless this be already done by bolts. Do this by means of a piece of the large wire running from one of the above-mentioned grounds to the frame. The photograph shows clearly how the writer accomplishes this object; the invisible end being connected to a transmission bolt. On many cars this job will be unnecessary and may be left until the last, as a test with a set of dry cells will quickly disclose the presence of an established connection or the lack of it. Our wiring is now complete.

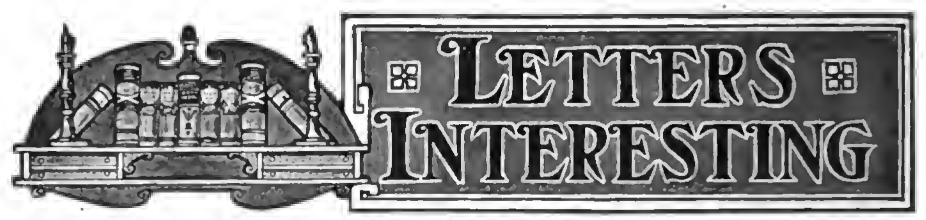
Place the lamps in the receptacles, taking care to screw them up quite snugly. Now cut about 10 inches of tire tape in half, lengthwise. Wrap this tightly about the base of each lamp and top of its receptacle, securing the end on the plug. This is to prevent the lamp from jarring loose. After the writer had first installed this system he was made painfully aware of the insecurity of the plain receptacle thread by hearing the electric bulb dancing around the lamp body. This treatment, incidentally, never feazed the anchored filament of the lamp.

Now for the test. Start engine, turn coil switch to generator (or storage battery), and turn on light switch. If lights fail to burn, go over the whole wiring for a loose connection. If there is a short-circuit the engine will stop when the coil switch is turned from starting battery to generator (or will fail to start in the case of a storage battery). If only one or two lamps burn, the remedy for the remainder is obvious. Up to this point an alternating-current generator is as good as one giving direct current.

To the above system used in connection with a generator there is only one genuine objection: no light when the engine (therefore, the generator) is at rest. If the owner runs his machine off the road into a yard or enclosure while not in use away from home, the above objection fails to hold. Otherwise (and in the great majority of cases) some permanent source of current is indispensable. Therefore, enter the storage battery and, correlatively, the direct-current generator. Upon inspection of one of the photographs the reader will notice a second switch—of the indicating variety. One side of this switch is connected directly to the generator, the other taps the light line between the coil connection and the light switch, thereby controlling the connection between the generator and the coil. From this generator or coil connection runs a second wire to the battery box, wherein the writer intends shortly to place a storage battery, the second connection of the storage battery being grounded on the frame. Thus, the second switch controls also the connection between the generator and the storage battery. So wired, either the storage battery or the generator may be used for ignition or lighting, or both. Or the generator may be switched against the storage battery, thus, during day-time running, charging the battery. In this case be sure to turn off the second switch before stopping the motor, otherwise the storage battery current would short-circuit through the generator, demagnetizing the fields of the latter, and discharging the battery. This extra switch and wiring raises our total cost to $3.22.


Detail of Connection to Lamp, Showing Wooden Plug


Dashboard with Extra Switch for Battery Connection



HOW TO DESIGN AN ENGINE

Editor THE AUTOMOBILE:

[2,117]—Will you please answer the following questions relative to a gasoline engine in the columns "Letters Interesting, Answered and Discussed?"

1. (a) At what point in the stroke does the gas attain a maximum pressure; (b) What is this pressure in pounds per square inch; (c) what is the temperature in degrees Fahr.?

2. (a) What proportion do temperature and pressure of exhaust gas in a water-jacketed exhaust pipe bear to the above mentioned temperature and pressure, i.e., in what proportion does it decrease?

3. What proportion of its volume will water absorb of burnt gas?

4. (a) What is the density of the proper mixture of gas before entering the cylinder; (b) after explosion and when exhaust port is opening?

5. (a) To what volume would exhaust gas from a single cylinder 4 in. by 5 in. motor expand before being reduced to atmospheric pressure if exhausting into open air; (b) if exhausting into an enclosure?

I am working on a single cylinder 4 by 5 motor and trying to incorporate new ideas.

Birmingham, Ala. E. V. SMITH.

Your questions are rather broad and it hardly seems fair to take up the space in the paper to tell you how to design an engine, or to go into the deeper and more abstract features about which you ask, but we will try to give you an answer.

1. (a) The gas attains its greatest pressure at the time of explosion, this time varying with the speed of the engine and the amount of lead given the spark. It varies from 30 deg. before dead center to about 20 deg. after, both being measured upon the crankcircle.

1. (b) No hard and fast rule can be given, which is not very involved. Four times the compression pressure is about right. 75 lbs. compression will yield 300 lbs. explosion.

1. (c) The temperature varies with the pressure and volume, the equation involving volumes and temperatures being:

$$T_b = T_a\left(\frac{V_a}{V_b}\right)^{\lambda - 1}$$

in which T_b is the temperature at the end of the expansion, assuming this to be adiabatic expansion

T_a is the temp. previous to expansion.

V_a is the volume previous to expansion,

V_b is the resulting volume, and

λ is the ratio of specific heats, this being taken as 1.35 for adiabatic expansion.

Barring only the value of the exponent, this same equation answers also for the compression stroke, the figures for that not having been determined very accurately. The same figure may then be used for the sake of immediate computation. If then, T_a be taken as atmospheric pressure (counting always the absolute temperature), the equation assumes the working form of:

$$T_b = 529\left(\frac{V_a}{V_b}\right)^{.35}$$

Using this, for your purpose, you have but to substitute the initial volume of the cylinder contents and either the final volume or temperature, to obtain the other.

In case it is more useful to you to have the relation of pressures than temperatures, the equation is:

$$P_b = P_a\left(\frac{V_a}{V_b}\right)^{1.35}$$

By substituting in this any known volume of the gas on the expansion stroke, the pressure at that time may be figured. This answers questions 2 (a), 5 (a) and 5 (b).

Your other questions as to absorption of gases by water and density of mixture would call for too much space, going as they do deep into the realm of chemistry. In the former case the amount of absorption would vary with the composition of the exhaust gases, which in turn will vary with the composition of the original mixture and the amount or completeness of the combustion. As to the latter case, question 4 (a) and 4 (b), both densities vary with the chemical composition of the gases at those two points as well as their temperature at that time.

All these questions and many more you will find discussed in great detail in the many excellent works on the subject of gas or gasoline engines, among which may be mentioned: The Gas Engine, F. R. Jones; The Gas and Oil Engine, by Clerk; Gas Engine Design, by Lucke; The Gas Engine, by Hutton, and a new book, Carburettors, Vaporizers, and Other Fuel Vaporizing Devices. Any or all of these may be obtained from The Class Journal Company, 231 West Thirty-ninth street, New York City.

USE AND ABUSE OF GRAPHITE

Editor THE AUTOMOBILE:

[2,118]—Will you kindly advise through the columns of your esteemed publication, whether or not it is considered good practice to sprinkle powdered or amorphous graphite on the wearing surfaces of bevel gears and transmission gears for the purpose of polishing same and filling microscopical indentions in the gears. Also kindly advise whether or not it is considered good practice to mix graphite in with other lubricants for transmission or bevel gear lubrication. If so, will you kindly give me a good formula for such a mixture? Kindly advise what steps can be taken to reduce the noise of the gears to make the car run absolutely noiseless. There is a certain kind of hum which seems to be in transmissions, which I should like to eradicate if possible. The car I have in mind is equipped with Timken rear axles, with pressed steel housing, and Cotta Transmission. F. W. B.

Dallas City, Ill.

Yes, this is good practice, although it is something which is seldom done. When graphite is used with other lubricants, the amount utilized is very small, thus, with oil, one tablespoonful of graphite to one pint of oil used. Similarly, with grease a tablespoonful to about 2 pounds of grease would be plenty.

In last week's paper, you will find in answer to a letter (2,110) that boxwood saw dust and heavy grease or sawdust in graphite makes a very good noise deadener for gear boxes. It is doubtful if all noise can be eliminated.

HIGH AND LOW COMPRESSION

Editor THE AUTOMOBILE:

[2,119]—Will you kindly answer the following questions in your "Letters Interesting, Answered and Discussed?" Which is best for high speed work or racing, a moderate compression of say 65 to 70 pounds or a high compression of 110 or 115 pounds? Why is it that automobile manufacturers do not put heavier flywheels on their engines so that they would run steadier at slow speeds? It seems to me that if they would put on heavier flywheels there would never be any need for more than four cylinders. Also, I would like to know how pure castor oil would be for the lubrication of the cylinders of an automobile, nearly all the oil men tell me that it will not do, as it is a vegetable oil, and that it takes a mineral oil.

Great Bend, Kan. A SUBSCRIBER.

For several years the compression pressures in general use continued to increase until they reached a figure of about 90 pounds in ordinary touring cars, and many pounds higher for racing cars. This pressure was found to have so many disadvantages that it was but a very short time before the backward movement began, and is still continuing.

To-day, the tendency is to use a fairly low pressure, or what would have been called low several years ago, say about 60 pounds. This results in an engine which anybody can crank without first arranging for the coroner and undertaker, as was the case with the higher pressures. Not only that matter of personal convenience, but the higher compression resulted in higher explosion pressures, which in turn acted to tear the motor apart with great rapidity. So, it came about that the higher compression motors were not only dangerous to crank, but very costly to operate as well, the repair charges being very high.

Flywheel weight is dead weight, which makers are very doubtful about the utility of, this being added to the dead load on the tires without enough advantages to compensate for it. Thus, with a very heavy, say unusually so, the tire wear will be about double what it is ordinarily. The question then arises if the additional weight is worth that much. We grant you, however, that a moderately heavy flywheel is all right, but believe that nearly all makers are using that kind.

On the subject of castor oil, you are referred to the discussion, which was printed in these columns some time ago, about five months ago, to be exact. Both sides of the perplexing question were then taken up, and discussed exhaustively.

To be exact, letter 1,948 in the July 22 issue started the discussion, this being favorable to the use of castor oil. Following that, in the Aug. 19 issue, there was published a letter from the Joseph Dixon Crucible Co. denying the benefits of its use, and advocating graphite as superior.

MAKER'S OPPORTUNITY

Editor THE AUTOMOBILE:

[2,120]—I am looking for a 1910 two-seated roadster, about 24 to 30 horsepower, weight about 1,600 pounds, road clearance say 10 to 12 in., body set low, 110 to 112 in. wheelbase, selective type of gear shifting, cost from $1,000 to $1,500. Can you put me into communication with the manufacturer of such a car? MAC.

New Rochford, N. Dak.

From the tables published last year at the time of the New York show in THE AUTOMOBILE, we have selected the following cars which seem to meet most of your requirements. Others are invited to write us and the name of this party will be furnished.

Overland ...	$1,250	25.6 h.p.	100 w.b.	1,800 wt.
Kissel Kar..	1,350	30	107	2,000
Cameron II..	1,500	36	112	1,600
E-M-F 30...	1,250	25.6	106	1,800
Chalmers 30.	1,500	24	110	.....

Of these the Cameron is of higher power than you want, being a six-cylinder, but is given on account of meeting the weight requirement so closely, this being the stumbling block in your case. The changes for this season are: Cameron, wheelbase to 114, and weight to 1,675; Chalmers, power to 25.6, and wheelbase to 115.

Following is another list of 1910 cars, which in addition to the above, seem to meet most of your requirements:

Black Crow.	$1,200	24.0 h.p.	107 w.p.	.....
Clark	1,400	25.6	110	.....
Illinois	1,250	25.6	107	2,000 wt.
Jackson	1,250	25.6	105	1,950
Johnson	1,500	28.9	112	2,200
Marathon ..	1,500	28.9	112	.....
Maxwell	1,500	28.9	108	2,500
McIntyre ...	1,250	27.2	112	.....
Middleby ..	1,250	25.6	108	2,200
Mitchell	1,100	28.9	100	.....
Moline	1,500	25.6	110	.....
Moon 30 ...	1,500	28.9	...	.....
Overland ...	1,400	28.9	112	2,200
Parry	1,285	28.9	*114	.....
Regal	1,250	25.6	107	1,900
Reo	1,250	25.6	108	.....
Rider-Lewis.	1,050	25.6	100	1,700
Everitt 30...	1,350	25:6	110	.....†

*Prob. †Clear. 11½.

SUGGESTS NOMENCLATURE

Editor THE AUTOMOBILE:

[2,121]—Isn't it time for some linguistic genius to arise and offer a suitable set of names for magnetos and magneto systems by which the present confusion and lack of accuracy might be avoided? Imagine a school teacher (automobile school, of course) asking his pupils to define a "high-tension" magneto. It is said that grocers classify the staple product of the hen into fresh eggs, strictly fresh eggs, and "just eggs." In the same way we have the high-tension magneto, "true high-tension magneto," and the plain "magneto," which usually satisfies the novice.

The trouble appears to arise from the fact that, while the spark ultimately produced is of the high tension variety in nearly all cases, the magneto in which the impulse originates may be either high or low tension. What the user is mainly interested in is the spark rather than the magneto, since the latter is only a means to the end. Consequently, when asked what ignition system he has or desires, he replies "high tension," as if that ended the matter.

To those in the trade, however, the matter is not so simple. Distinction between types is necessary, and it does not seem more reasonable to describe a magneto according to the ultimate spark than it would be to name the style of carriage according to the breed of horse that happened to pull it.

A magneto containing within itself the elements necessary for producing a high tension spark is fairly described as a high tension magneto, and its makers should not be driven to such verbal shifts as "arc light," "arc flame," or the prefix "true" to indicate his meaning, any more than the automobile builder should be required to prefix "actual" before his horsepower rating.

The real need seems to be for some phrase to describe the type of low tension magneto whose current is delivered to a step-up coil and there transformed to high tension. To call it "low tension" without explanation is impossible, and "low tension with separate coil" is equally so. Why not simply name it the "coil type" magneto, leaving the jump spark to be inferred? Belt driven magnetos having separate coils could then be described as "non-synchronous" magnetos.

A similar need exists for verbal distinction between the various dual, semi-dual, and hemi-demi-dual systems now on the market. Probably at least half a dozen could be counted, ranging all the way from that using the same interrupter, coil, distributer and plugs in both systems up to the only real dual system having the magneto and battery circuits entirely separate, even to the spark plugs. The weight of practice seems to be divided between the real dual system and the system which uses the same distributer and spark plugs, but with separate interrupters for the two circuits and a special coil for the battery circuit. The writer confesses himself staggered by the problem of finding a name even for the second of these two, but some one ought to find it, and when found it ought to be adopted.

New York City. HERBERT L. TOWLE.

CONCERNING WING TIPS

Editor THE AUTOMOBILE:

[2,122]—I am much interested in aeronautics, and have been reading your articles right along. However, I am puzzled to find what you mean by wing tips, and can find nothing about them. I would like you to advise me as to how to get information.

ANSON BILGER.

Oakland, Cal.

To use what may seem a Hibernicism, a wing tip is the tip of a wing. More exactly, it is the outer portion, say about one-third, of the supporting planes of an aeroplane. These outer portions, or tips, differ from the rest of the supporting planes in being flexible. The planes are inclined to the horizontal at an angle of from 5 to 10 degrees, and this angle is fixed according to the judgment of the designer. The tips, however, being flexible, can be set at will at either a larger or smaller angle. A larger angle means a greater lifting effect, although involving at the same time greater resistance to forward movement through the air. If a sudden current of air causes the aeroplane to tilt to one side, the aviator sets the wing tip (or tips, according as the machine is a monoplane or biplane) on the lower side at a greater angle, and decreases the angle of the tips on the side which the current is lifting, and thus brings the machine back on a level keel. In the Wright machine this feature is the subject of a patent, which seems to cover all forms of the warping (as it is called) now in ordinary use on aeroplanes.

TROUBLESOME CARBON

Editor THE AUTOMOBILE:

[2,123]—Kindly publish under "Letters Interesting, Answered and Discussed" your idea of the cause and remedy of the following trouble:

My four-cylinder Winton XIV is fed to the cylinders equal amount of oil as the sight feed would indicate. The oil is cut down as low as safety will permit.

The car after the first two or three minutes will run nicely, without a miss all day long. The plugs in cylinders 1 and 4 will be clean and the cylinders themselves free from carbon but 2 and 3 become very much sooted and considerable deposit of carbon is found in those cylinders. The carbon after letting the car stand a day or so is almost as soft and wet as heavy grease. Can you give any solution why 1 and 4 should be clean and free from carbon and 2 and 3 full of it, and why is the carbon wet instead of hard as in other cases?

Is there anything in Prest-O-Lite decarbonizer which counteracts the firing of a gasoline mixture? I used the cleaner in my car, and it worked beautifully as far as getting rid of the carbon was concerned, but believe me it was two whole days, working on and off, before I could get an explosion in the cylinders. The cylinders had the appearance of being smoky or foggy, so that you could not see an object one-fourth of an inch below the surface. This mist remained in the cylinders for nearly two days, and not until it disappeared could I get the engine to start. F. H. T.

Newark, N. J.

It is just barely possible that the pipes to the sight feed are slightly clogged up so that all of the oil that flows is not indicated there. In that case, you would be feeding much more oil to your cylinders than the sight feeds indicated, and than was desirable. First thing you do, clean out these pipes, so that you may be sure that the sight feeds are honest, that is, indicating all of the oil that is flowing.

Finding that all right, there is the possibility that your carbureter is set to give too rich a mixture at slow speeds, before the auxiliary air valve opens. This would account for the formation of carbon at those times, but it is impossible to account for its being soft and wet like heavy grease as you describe it. This is something of which we have never heard before, as all carbon deposits seen or heard of have been very hard and brittle.

In finding the carbureter in proper shape as well as the oil piping, look to the fuel you use. Much of the fuel to-day is of very low grade, and some bought from unscrupulous dealers may even be doctored. This could only be done with some substance cheaper than gasoline, and the soft mass left in the cylinders might be that residue from the fuel, carried a little at a time into the cylinders, where it collected.

As to the decarbonizer, the exact chemical composition of it is unknown, but it is believed to contain kerosene in a large amount. This would not cause the trouble you speak of, nor would any known mild acid, which might be used for this purpose. It would be advisable to seek the advice of the manufacturers of this substance. They would be able to help you, and glad to do so.

Although the use of decarbonizer is strongly advocated by the makers, it does not seem to have struck the note of popular favor as yet, and your correspondence with the makers might be of interest as shedding light on the situation.

WOODS' ELECTRIC MAKES CHARACTERISTIC PROGRESS

Fig. 1—Coupé, in town service, with inside control, a wide entrance, magnificent upholstery, and driven by ladies

PIONEERS in the vineyard of electric vehicles, the Woods Motor Vehicle Company, with its large plant at Chicago, offers refinements in its 1910 cars that are in keeping with the stand this company has always taken, even when electrics were at a low eb, which, to be sure, was some years ago. The refinements, while they are positive, fall far short of revolution, being confined to such matters as will add to the radius of action of the cars and to the life of the battery. Luxuriousness, insofar as this phase of the business is concerned, reached its apex last year, and in the Woods plant, at any rate, little could be added from the style point of view, for 1910 Fig. 1 depicts a Woods, a coupe, making its daily round in one of the classes of service to which electrics are dedicated by fitness and good taste, roominess, as well as stability, are all sufficiently pictured to depreciate any further effort along this line.

Self-Contained Power Plant Presents Flexibility—It has long been known that one motor is far more efficient than two, and efficiency is the matter of greatest moment in the motor equipment of an electric vehicle, in view of the battery, which must have a wide radius of action and a long life as well, if cost of service, as well as extent thereof, is to be up to a fitting standard. To conserve the battery is to limit its output, and in order to realize a wide radius of action, it is necessary to build up the torque of the motor in keeping with the expenditure of energy, which is a matter of using a unit power plant, and it, too, must have the desired characteristics.

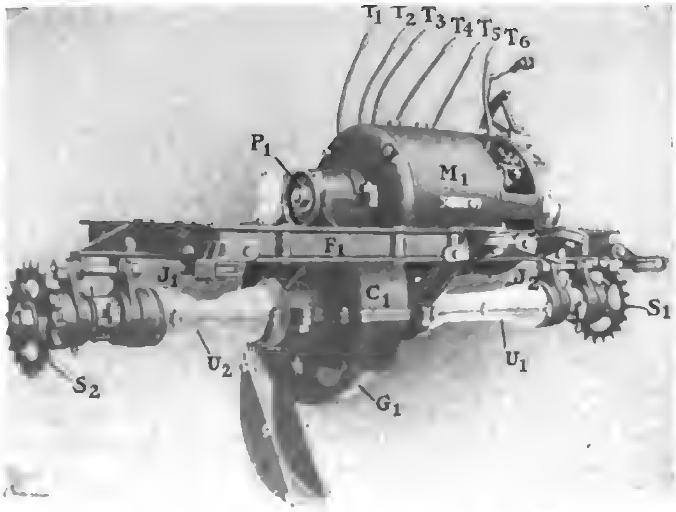


Fig. 2—Self-contained power plant, mounted on a manganese bronze frame, with tumble-shafts, universal joints, and great flexibility

It is not the maximum efficiency of the power plant that counts: the mean efficiency must be noted, and this mean efficiency will be on the highest level if the motor is so designed that the torque (twisting moment) will be in direct proportion to the current in amperes which must be taken from the battery. The torque, for current, of the motor depicted in Fig. 2 has been determined in the Woods laboratory, and it may be set down as follows:

TORQUE IN RESPONSE TO CURRENT EXPENDED

Current in Amperes	Torque in Pounds—Feet
10	2.4
20	8.8
30	16.6
40	25

From the above it will be observed that he torque of the motor is almost in direct proportion to the battery output, and the draft on the battery is limited to that which is safe. In the meantime, the speed of the motor decreases as the torque increases, about as follows:

DECREASING SPEED WITH INCREASING TORQUE

Speed in Revolutions per Minute.	Current in Amperes.	Torque in Pounds—Feet.
1,820	10	2.4
1,600	11.6	2.9
1,400	13.3	4.0
1,200	16.2	5.9
1,000	20.0	8.8
800	28.2	15.0

The above values are as nearly as possible taken from curves plotted for the purpose, with data from actual tests, in a well equipped laboratory, the actual curves to be presented in an article to be prepared on the subject of the laboratory.

From what has been shown, it is possible to predict that the efficiency of the motor is nearly constant for the entire range of performance, and that the maximum efficiency will be at the highest speed and lowest current stated. The fixed losses are very low. This is the reason why the maximum efficiency is at maximum speed, it being the case that the I^2R losses increase with the current, they being in proportion to the square of the current, and by using copper wire of relatively large section the internal resistance of the windings on both the armature and fields is held so low that increased torque is not attended by heavy losses, and the efficiency of the motor at all speeds is maintained nearly constant, as the following tabulation will indicate:

EFFICIENCY IN RELATION TO CURRENT IN AMPERES.

Efficiency in Per Cent.	Current in Amperes
82	10
84	20
81.6	30
75.9	40

When it is considered that these values for efficiency interpret all losses, it will be recognized that electrics have reached a high state, and there are good grounds for claiming that battery life is now satisfactory. Referring again to Fig. 2, M1 is the motor, transmitting power to the gear G1, through the pinion P1, which is equalized by means of a differential gearset within the case C1, and in proportion to the needs the power is transmitted through the universal shafts within the cases U1 and U2, to the sprockets S1 and S2. The frame F1 fastens to the underbody, which acts as a chassis frame, and by means of hinge joints J1 and J2 the motion of the body is compensated for so that the sprocket chains are maintained in perfect alignment.

Electrical connections are made by means of terminals T1, T2, T3, T4, T5 and T6, which lead to the windings of the motor, and by means of the wiring system provided in the body proper connect with the controller, through which to the battery, thus completing the connections for the desired purpose. This electrical wiring system is more completely presented in Fig. 3, which offers evidence of the very systematic way in which the wiring is cared for, it being the case that every part of the wiring is accessible for repair, and what is more to the point, it may be inspected at will. These provisions do not prevent adequate protection of the wiring at every point, so that depreciation, which was in former times a serious matter, is reduced to the vanishing point in these cars, due to the continual effort, which followed in the years of practice.

Design Features of Motor Portrayed—Fig. 2, while it shows the motor in combination with the means for its proper application to the work, is too complicated to properly bring out the design features that make for entire success, so that Fig 4 is here offered for the purpose of accentuating the remaining points to be touched upon. In this figure A1 is the armature, which is laminated and slotted to accommodate the windings W2, of which there are a suitable number, and the alternating waves are commuted at the commutator C1, which is made of a considerable number of "lake copper" segments, each insulated from the other and the frame by means of laminæ of Indian amber mica of the finest selection. The laminæ of the armature are of Swedish iron, rendered soft by annealing and aged to prevent hysteresis deterioration. The armature windings W2 are what are technically designated as "form wound," insulated with "sea island" cotton and taped. They are then saturated with insulating varnish and baked to expel dampness, which process seals up all the little openings and dampness cannot thereafter penetrate into the insulation.

As an additional precaution against that dread foe, dampness, the terminals are all shellacked several times.

The armature revolves on the shaft S1, in Hess-Bright ball-bearings B1 and B2, which shaft is of special steel, ground to exact size after machining, and the whole is balanced both in a kinetic, as well as a static sense, on a suitable balancing equipment after the work is done. The Hess-Bright ball-bearings, B1 and B2, fit in the bore of the housing spiders S2 and S3, which, in turn, bolt to the circular field magnet F1, in which the four poles, one of which is designated as P1, are secured, on which poles the field windings, one of which is designated as W1, are placed, after they are form wound. Current is led to the commutator C1 at four diametrically opposite points by means of brushes, which are clamped into four holders, one of which is indexed B3, they being secured to, but insulated from, the housing spider S2.

The armature windings, which are done in a winding machine, are shaped as in Fig. 5, in which A is the plan, B is looking at one diameter, and C is an end view. The number of

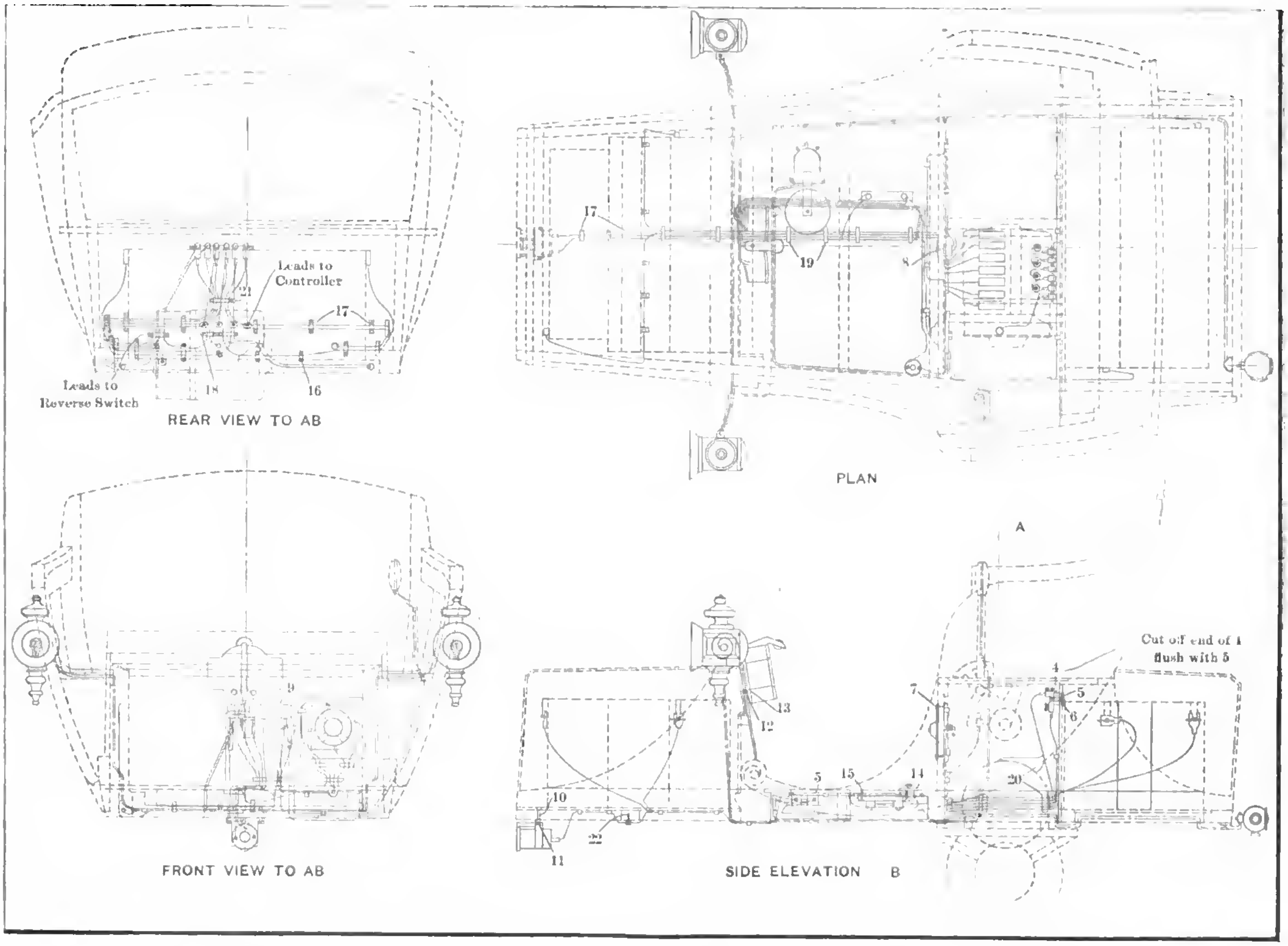


Fig. 3—Skeleton of body, showing how wiring is done, location of controller, and two halves of battery

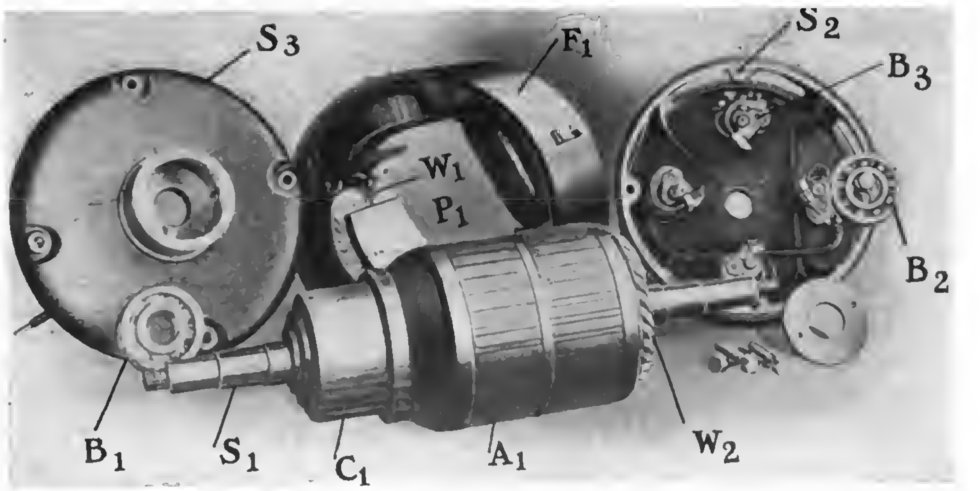


Fig. 4—Component parts of motor, presenting slotted armature, ball-bearing spindle, and form-wound laminated fields, all enclosed

turns, number of complete coils and process of insulating is stated in the figure. The armature slots are presented in Fig. 6, at A-B, on the periphery of L1, there being 33 of such slots. The transformer iron of which the discs are made is shown as respects thickness by L3, the plan of which is offered at L2. The discs are keyed onto the shaft, keyways K1, in L1, and K2, in L2 checking with K3 in P1, and K4 in P2. P1 and P2 are the end plate by means of which the discs are clamped into tight relation on the shaft or armature spindle, as it is called. The respective plates L3 are 0.017 inch thick, and to permanently insulate them, japan is put on evenly by means of a printer's roller, and they are baked in an oven. This is an extremely important process, for if paper is used instead, as it sometimes is, the heat, which is quite high when overloads are encountered, will char the paper and the insulation will then be destroyed.

Laminated Fields Are Form Wound—Referring to Fig. 7, P1 is the plan of the winding, of which four are used, and the terminals T1 and T2 are of heavily insulated flexible wire, leading out to the terminals. There are 63 turns of wire on each coil, and the whole coil is taped in the manner as indicated. P2 is an edge view of the coil and P3 shows the same coil in end view. The details involved in establishing perfect conditions of insulation are stated in the figure. The polar extensions (pole-pieces), as shown in Fig. 8, are of transformer steel, excepting the heavier end plates, which are placed as retainers and to give a backing for the rivets. These plates are 0.031 inch thick, coated with japan and baked, and with the polar horns, shaped as they are, with tangent terminations of the radius 3.0825, the computation is absolutely sparkless, which is a matter of the greatest importance, and fixed losses are confined to a minimum.

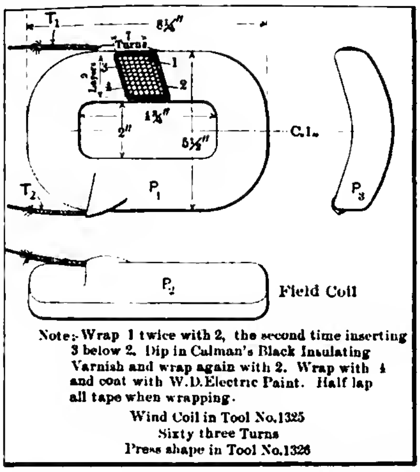


Fig. 7—Form-wound field coils, showing number of turns of wire per coil, shape of winding and method of taping to exclude dampness

Noise, due to friction of the brushes as they press on the bars of the commutator, is scarcely to be noticed at all, due to the very careful manner in which the details of this part of the construction is executed, which, unaccompanied by good design, would scarcely suffice for the purpose. Friction losses, for the same reason, are minimized, and as friction is reduced, wear is eliminated to a vast extent.

How Flexibility Is Retained Without Handicap—In order to clearly depict the power plant with a view to offering the best evidence of flexibility, it will be best to present a section through the motor, universal joints, tumble shafts, etc., as offered in Fig. 9, in which M1 is the motor shell, B1 and B2 are Hess-Bright bearings on the armature spindle, P1 and P2 are the two halves of the herringbone pinion, which meshes with G1 and G2, which are the two members of the herringbone gear, which, in turn, is flanged onto the differential gear housing H1 and is held in place by holding bolts, B3, B4, etc.

The differential system is of the bevel type, with members G3 and G4 keyed to short shafts S2 and S3, and compensation is established by means of planetary pinions P3, P4, etc., which mesh with the gears G3 and G4, which pinions rotate on spindles of the spider S, which in turn rotates on the bearing B5, being threaded over the ends of the shafts S2 and S3, serving to fetch up the gears G3 and G4 on the tapers T1 and T2, keys K1 and K2 also being provided to resist all twisting moments. Hess-Bright ball-bearings B6 and B7 support the differential housing H1, and the power of the motor is duly transmitted to the tumble shafts S4 and S5, through the universal joints J1 and J2. From the tumble shafts S4 and S5 power is transmitted to the sprocket pinion shafts S6 and S7, through the universal joints J3 and J4, from whence the power passes to the sprocket pinions P5 and P6. The stub shaft S6 and S7, on which the sprocket pinions P5 and P6 are keyed by means of keys K3 and K4, runs on Hess-Bright ball-bearings B6, B7, B8 and B9.

The sprocket pinions, on their stub shafts, being in housings H2 and H3, which in turn swing free on hinge joints J5 and J6, connect with the supporting frame F1 in such a way that the distance rods D1 and D2 maintain the center to center distance between the sprocket pinions P5 and P6 with the respective sprocket wheels on the rear road wheels of the car. The distance rods have no more to do than to sustain against the torque of the motor as it is taken by the sprocket chains, and as to the chains, they run noiselessly because the spacing can be accurately maintained. True, in order to assure noiseless sprocket work, the sprockets are cut accurately, using good material in the sprockets, and the most approved machine tools for the fashioning of the teeth, taking into account the desired clearance and absolutely accurate bottom distance of the teeth.

Mud is excluded by means of the shells S8 and S9, which have ball joints J7, J8, J9 and J10 over the universal joints. These shells co-operate with the housing H4, which, in turn, passes up and sleeves over the shell of the motor at M2 For the rest, as the figure depicts, a brakedrum D3 is keyed K5 on the end of the armature spindle and a nut N1 threads onto the end of the spindle, pressing the drum D3 up to a proper fit. The brakeband B10 is faced with friction material F2 and the band is prevented from rotating when pressure is applied by means of the pin P7, which is secured in a reamed hole in the boss B11 of the spider S10. Pressure is applied to the brakeband by means of the lever L1, when a pull is applied to the cable C1 in the groove C6. Electrical energy is supplied to the motor from the battery through the controller by means of the cables C2, C3, C4, C5, C6 and C7.

Noiselessness Attained by Attending to Details—Glancing at Fig. 10, which is of the gear system, it will be plain that designing for noiselessness was the great question, and it comes as an incident that this same desire is only to be carried to a successful termination by the use of superior materials and the closest possible limits of tolerance in the shop. The herringbone idea is reduced to practice in this example by accurately machining two members for the gear and pinion respectively, and they in turn are cut spirally, so that when they are bolted together they eliminate "backlash" and transmit the power of the motor noiselessly.

A Hundred Details Bespeak Quality—Were it possible to present every working drawing of the cars made it would then be a simple matter to point out to what extent details in design are perfected. Rather than space every drawing, which would render this story futile, in a mass of detail, just one or two characteristic examples will be taken instead. Fig. 11, for illustration, shows how cables are secured to brakearms, and since the cables are of silico-bronze, which is permanent and strong, the equalization of the load between the two brakedrums is taken care of by means of pulley blocks. The method here shown offers strength, ease of repair, and eliminates uncertainty.

Fig. 12, of the steering control system, is sufficiently clear as not to require discussion in detail. The tubing used is cold drawn nickel steel, and the ball and socket joints are made from die forgings of special steel, machined accurately, heat treated to render the bearings glass-hard and the whole high in shock ability. Referring to the ball joint on the end of the steering arm L1, the safety member S1 prevents the ball from departing from the socket, and dirt is excluded as well.

Among the other details not shown the drum controller may be mentioned as entitled to space alone, it being of the street railway type, strong, well made, properly insulated, and lasting. This controller is selective in action, and affords absolutely no chance for the operator to make a mistake. The Woods platform springs make for easy riding, and the solid tires, made from a rubber composition by Woods' formula, work so well that road inequalities are readily negotiated The use of Hess-Bright ball-bearings of the well-known annular type in road wheels as well as throughout the power plant is calculated by the Woods designer to eliminate nearly all friction, and tire tests, using the Woods tire dynamometer, have demonstrated many points which were taken advantage of from the tire point of view, showing that there is much to be gained by selecting tires of proper sizes, and suitable material.

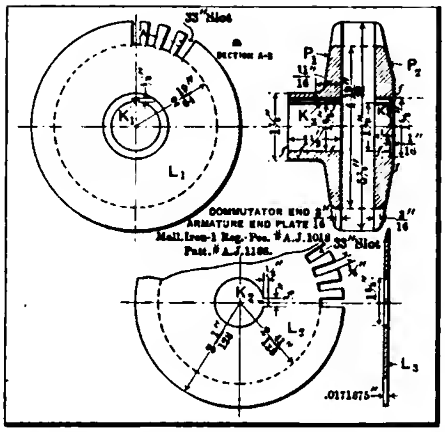


Fig. 6—Armature laminæ, showing plan of slotting, thicknesses of laminæ, method of securing, and details

ELECTRIC VEHICLE INCREASED OVER SIXTY PER CENT.

By LOUIS E. BURR, President Woods Motor Vehicle Co.

ELECTRIC vehicles to-day are an assured success, and their popularity in the larger cities is increasing very rapidly. Vehicles propelled by electric power cannot be compared at present to the gas car from a selling standpoint on account of the very significant fact that in smaller cities there are few garages that have taken the trouble to post themselves on the proper care and maintenance of the electric car. This feature in the care and maintenance is of the very greatest importance in connection with the electric vehicle. Almost any garage is equipped to take care of a gas car more or less successfully, but comparatively few are yet able to give the electric vehicle the attention and care it requires, and for this reason alone the electric car has not made the progress it should in point of sales in the smaller cities. The rather extensive campaign of education that is now being carried on by the storage battery companies and the electric vehicle manufacturers is eliminating very rapidly this feature in connection with the sale of electrics, and it is a question of a comparatively short time only when the smaller towns will recognize the very great convenience of the electric car and its cheapness of operation, and adopt its use just as vigorously as it is being adopted in the larger cities in proportion, of course, to their population.

The several cities in America, where the better class of electrics are manufactured, have larger numbers of garages well equipped to give the electric car the proper care, and for that reason electrics are very popular, as evidenced by the great num-

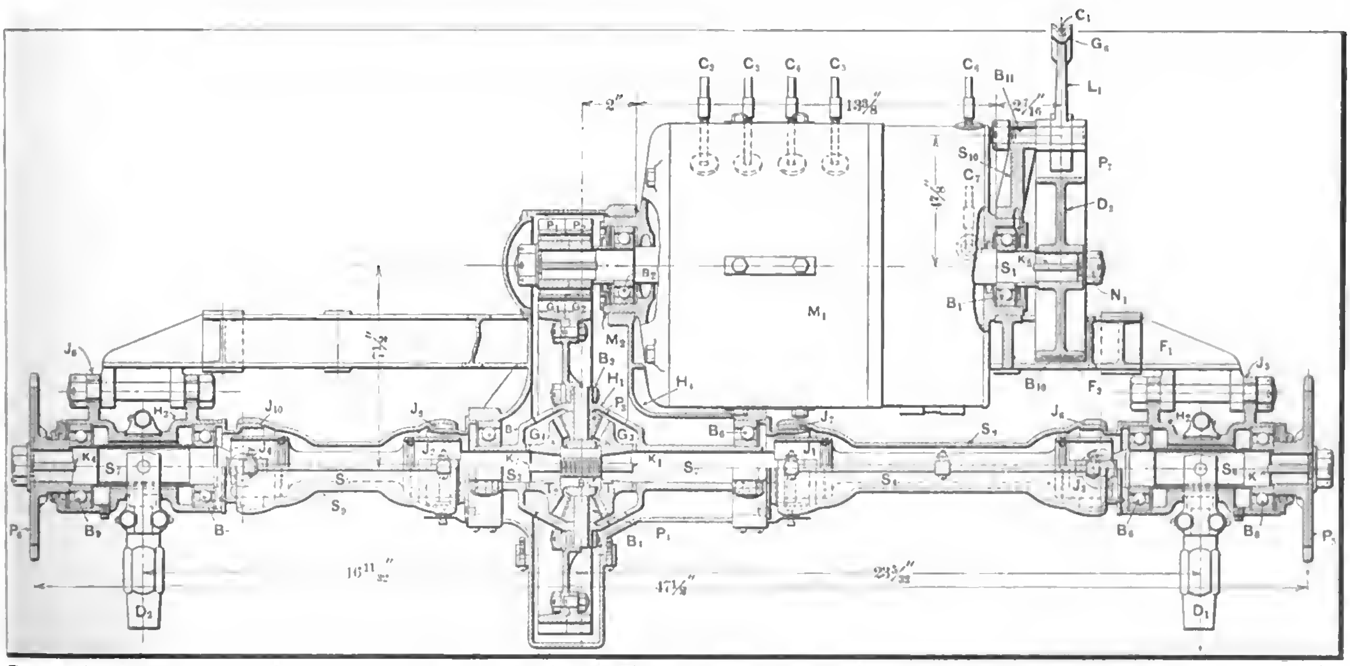


Fig. 9—Cross-section of power plant, from working drawing, showing exact relations of components, precision of fit, and how the differential gear is connected to the system

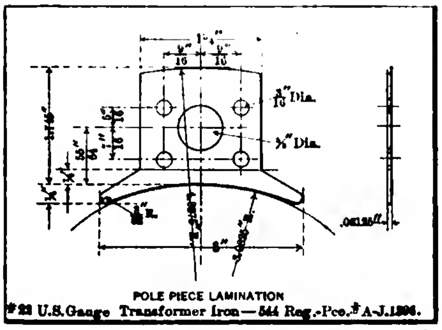


Fig. 8—Laminated pole piece, shape of horns, and method of riveting

bers that may be seen in daily use on the streets of these cities. This fact is easily explained, of course, because the manufacturers of the electric vehicles have taken pains to educate the garages in their own cities, and furthermore have established a more or less regular inspection system which checks up the garages and compels them to give the cars in their keeping at least the ordinary care they should have.

Many people believe that the electric machine is very limited in its use, and suitable only for cities with very level streets. As a matter of fact this is entirely a wrong impression, as very hilly cities like Seattle, Duluth, Kansas City, Pittsburg and Philadelphia have a large number of electric machines in daily use that give perfect satisfaction, and it is only a question of a short time when these cities above mentioned will have their full quota of electrics the same as they have in the gas car line.

To sum the matter up from a selling standpoint, which is the particular feature in this article, the electric car awaits only the education of the people all over the country. This campaign of education is being carried on by those interested in the sale of the electric machine, and it is a question of a short time only when good garages, in all cities, fully equipped to take care of the electric car will be established and the public will become aware of the many advantages accruing from the use of an electric car, not only in point of convenience, but also in the matter of cheapness of upkeep and operation.

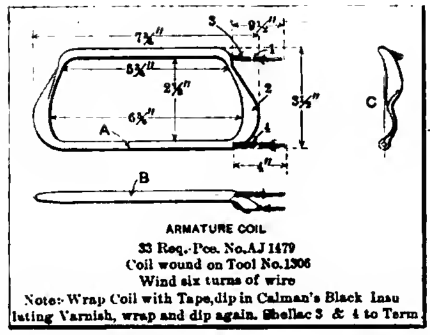


Fig. 5—Plan of armature windings, which are wound in a machine, taped, then submerged in insulating compound, and baked

The electric vehicle should never be compared to a gas car because it fills an entirely different position than that occupied by the gas car, and it is only claimed by the manufacturers of electrical vehicles that its use is suited to those who require a vehicle for moderate distances and moderate speed, and almost entirely for personal use and operation.

Statistics show that the electric vehicle industry has increased over sixty per cent. during the past twelve monhs, and from very good sources information has been received indicating at least as great a percentage increase in the coming twelve months. Is is also well appreciated that electric work is now on a plane as never before; the problems are better understood, and much more care is exercised in every detail of the undertakings. Methods of manufacture are thoroughly well grounded; the most approved processes are used and the engineers, who must be relied upon for results, are in better fettle than ever before, while companiees are more inclined to listen.

THE IMMEDIATE FUTURE OF THE ELECTRIC VEHICLE

By FRED J. NEWMAN

ONE of the greatest uncertaintics on any car, as far as operation without breakdown is concerned, is the pneumatic tire. It makes a great deal of difference as to the power consumption in regard to what kind of a tire is used. In order to make cars light or to have extreme mileage capacity many manufacturers have adopted a special electric type of pneumatic tire, being a development of the single tube Palmer tire of the bicycle days. The construction of this tire is such as to make it very weak, and it is safe to say for a tire that the less power consumption the less life it has. A solid tire rubber composition has been developed which causes the tire to consume less power than the regular composition found in tires on the market. It has been found that either through lack of knowledge in the power consuming qualities of tires or on account of the silvery tongue of a tire salesman regular gas car tires are put on the car with the result that the car runs slower, consumes more power, gives less mileage, and also electrical parts become overloaded. Inasmuch as the solid tire has a very much greater life it is safe to presume that the car will run a much longer time before tires need renewing. As a result the car will run several years before it gets into the above-mentioned difficulties. On the other hand, inasmuch as the solid tire has lasted a long time no good sales argument can be offered to replace these worn tires by those of a different make. Considering reliability: A car will have solid tires.

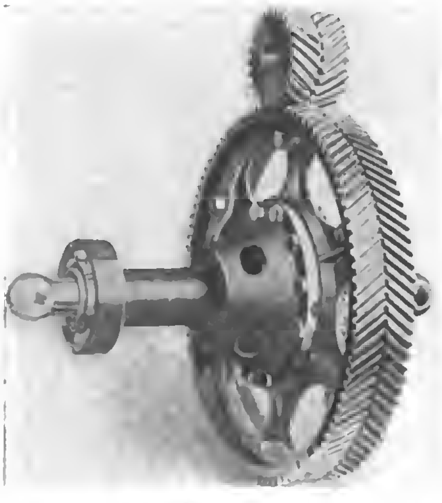


Fig. 10—Herringbone toothed pinion and gear, with the latter flanged to differential gear housing

Solid Tires Demand the Use of Good Springs—To use solid tires it is necessary to have a good spring construction and to make everything below the vehicle springs of as light weight as possible. A good spring construction is not necessarily confined to the spring alone, but to the general "hanging" design. Good springs must have a large deflection with a slow period of vibration and ample margin of safety in regard to fiber strain after the springs have reached their full deflection. Springs of ample deflection cannot be so staisfactorily obtained in the half elliptic construction as in the full elliptic and platform type. Then, again, to get a good deflection without straining the material too much means long, thin plates of good material, properly heat treated and plenty of them. A slow period of vibration necessitates long springs, and to obtain slow periods throughout means a long wheelbase with a well balanced car between.

The limiting dimension for wheelbase is governed by the width of street, gauge of car and front width of chassis frame, consequently the following specifications are developed:

(A) Wheelbase in the neighborhood of 85 inches.

(B) Full elliptic or platform springs made of alloy steel.

The lightest rear axle and a system in which the maximum amount of weight of the gearing and propelling parts is above the springs is obtained by side chain drive. Stiffness is obtained by an I-beam section and life of axles by the use of high grade, properly heat treated materials. To which I am inclined to add the following specifications:

(C) Side chain drive; and

(D) I-beam axles in one piece, of alloy steel, heat treated.

In order to keep the power consumption as low as possible, it is necessary to maintain the axles absolutely parallel and at right angles to the direction of running. When the body surges from side to side, if regular gas car side chain drive construction is used, the rear axle moves out of parallelism; also in case chains are not equally adjusted as to center distances. It is necessary to add a specification to overcome this objectionable feature.

Electrics Are Intended for Winter's Service—Electric cars must of course, run in the Winter as well as Summer. To gain distance over snowbound streets the running in car tracks can be resorted to, so let us add:

(E) Width of gauge; gauge of standard street car track.

Motors for electric cars cannot be satisfactorily rated in horsepower, since no specific standard can be agreed upon. If the motors were rated for a continuous all-day run the publicity departments of the electric companies would be surprised at their low power and, of course, some objection would be had from this source. The discharge of the battery becomes a good safety valve, for outside of good commutation and torque characteristics the capacity of an electric should be stated in terms of time and temperature. For this reason let us write the motor specification as follows:

(F) Motor of such capacity that battery is discharged before motor is dangerously hot.

A maximum speed of slightly less than twenty miles per hour is what this car should have, with three or four speeds below this of uniform graduations. The car should be able to run fifty miles on a charge in hilly cities every day in the year, and to do this it means the battery capacity must be such as to never have to be discharged below a point where there is over 10 per cent. loss in speed from beginning to end of the discharging run.

At least two sets of good and powerful brakes are needed. The construction must be such that much oiling is not necessary, and if it is necessary to oil, place grease cups so prominently that oiling becomes self-evident. This is stated because (especially in public garages) no oiling takes place until it is necessary to use means for removing rust.

The same may be said of the steering gear. In this connection let us add to the specification side lever steering on the left side. Side lever for its simplicity, its quickness of operation, and because the speed and road conditions do not necessitate any other form. Left side because in stopping the car on the right side of a street (the correct side) it is easier to get out of the car.

Ball or Roller Bearings Must Be Used—Anti-friction bearings, the best that money can buy, should be a part of the equipment. They serve the following—reduce the power consumption, eliminate oiling, and produce reliability. The bearings must be properly housed, in order to insure long life. It is necessary to keep out dust and water and retain a large amount of oil and grease.

All working parts should be as accessible as possible, and those parts which require inspection the oftenest should be the easiest of all to get at and the most simple to cope with.

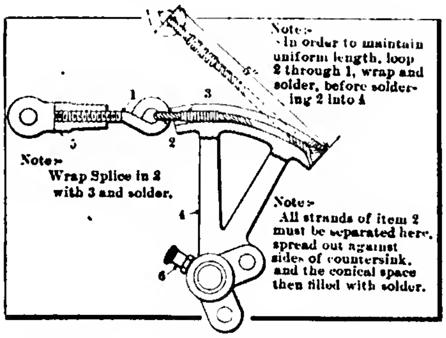


Fig. 11—Quadrant lever to which brake cable is fastened, offered to indicate extent to which details are worked out

About the battery a good deal can be said—what the ultimate construction and type will be is probably as hard to predict as when flying machines will run on schedule time across the Atlantic.

The lead battery of to-day is a commercial success. It will not be necessary to have a battery of imaginative newspaper descriptions to increase the electric in numbers in their chosen field. A battery slightly lighter for a given capacity is not necessary—if it is desirable to have it lighter no great change in design will take place unless the battery is reduced in weight by 75 per cent.

The matter of life now puts the electric vehicle in a high rank at present day transportation economies on account of convenience. There is a great opportunity for economies here, just as there is in any proposition, where operating cost is considered. Taking then only the battery equipment with the possible immediae improvement, we can develop the specifications as follows:

High voltage—within the range of easy insulation problems—is preferable from the standpoint of economy of transmission than low voltage. The transmission loss for a given current transmitted is represented in volts and is independent of the transmitting or impressed voltage. It is therefore evident that as the impressed voltage increases the percentage of volts lost decreases. The limiting maximum voltage is that which is regulated by the maximum voltage obtained in the majority of places. The direct current is necessary for charging and as the 110-volt supply is the most prevalent, 40 cells should be the equipment, for this is the largest number of cells which can be satisfactorily charged from such supply. If a less number of cells be used the difference in voltage must be lost in resistance so that the charging is uneconomical. Then again, if two designs necessitate the same watt capacity, the one with the lesser number of cells is at a further disadvantage, for besides the voltage loss taken care of in the resistance additional current is required on account of the distribution of the plates and the charging becomes uneconomical.

It has been suggested to charge several cars together if the voltage is 100 per cent. too much for one car, but this at the best is only a makeshift scheme and is unsatisfactory. This may not be altogether true in the case of where the supply is alternating current, but it holds true, only to a lesser degree. It is impossible to anticipate the charging supply for any given machine, so it is necessary to provide against the greatest abuses of economies.

Battery Should Be Stable Rather Than of High Capacity—Battery capacity should not be obtained by a multiplicity of thin plates because thin plates mean short life. Thick plates represent the greatest economies because in manufacturing there are certain fixed factors in costs, and as a consequence thin plates cost more for a given weight than thick ones. Obtain vehicle mileage capacity by means of substantial battery plates and make the equipment of such a nature that it can satisfactorily carry a battery of 40 cells and enough substantial plates to give the necessary results.

Body design is a matter of development. The trend now seems to be entirely to an inside operated machine, with decided effort in the direction of greater stability.

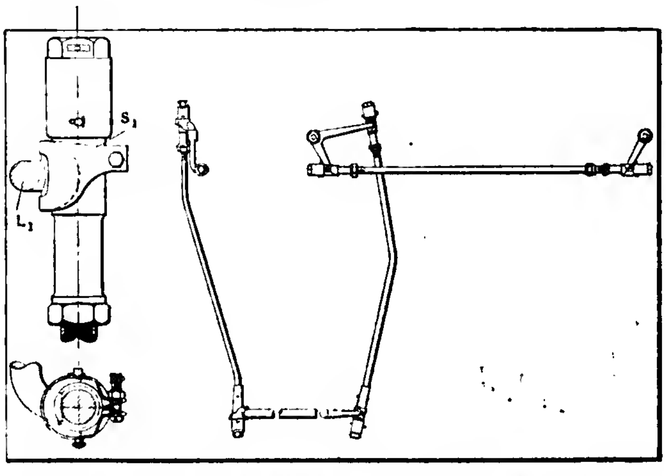


Fig. 12—Diagrammatic arrangement of control system in steering, showing arrangement of parts, nice details, and suitable design

GLIMPSE OF 1911 IN ANHUT CAR

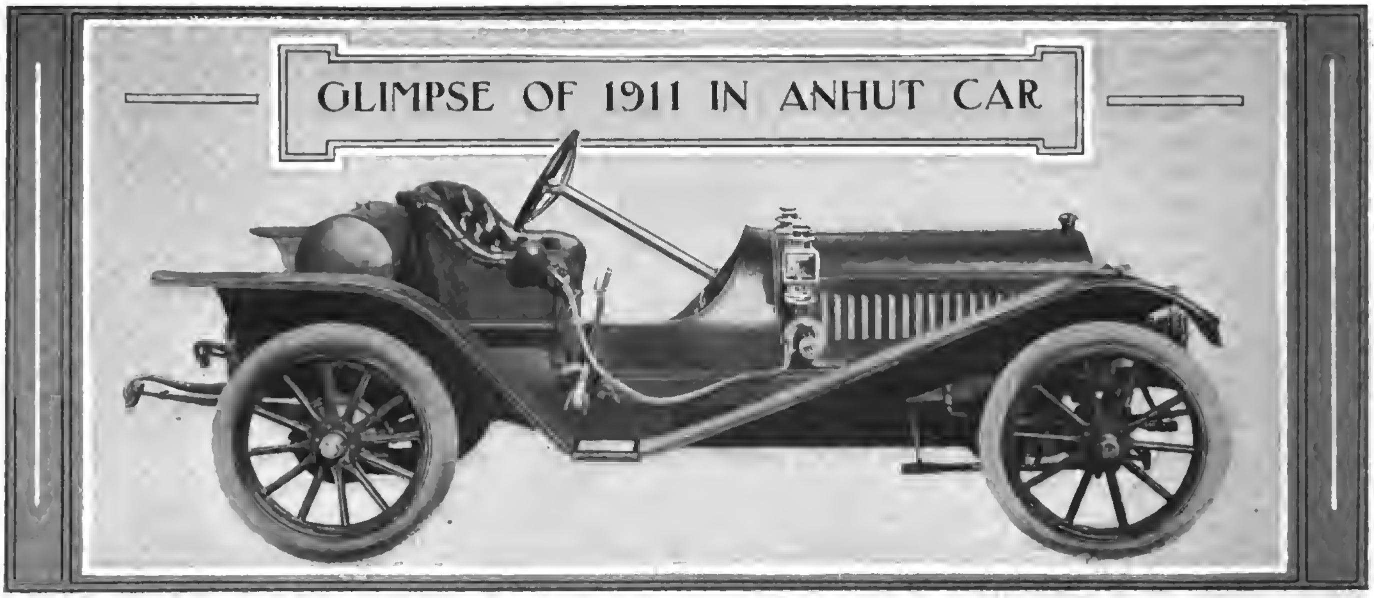


Fig. 1—Roadster, with a round gasoline tank back of seat, flaring mud-guards, 17-inch steering wheel and 110-inch wheelbase.

LOOKING backward, while it has the virtue of enabling one to note progress, affords no such pleasant occupation as "peering into the future." The Anhut maker, Anhut Motor Car Company, located at Detroit, Mich., offers, in Anhut cars, such evidences of standardization as to enable the company to claim that the car of the future is represented in the very automobile that the company is now placing at the disposal of buyers.

This car is a "six," using Brownell motor equipment, and like the motor, all the other units are standardized by time and success. In is the Anhut idea, according to the information at hand, to accept, as standard, the very designs that have faithfully performed from the start, claiming that, while the designer might like to interject his individuality, it is not wise to experiment in the face of certainty. This is not to be construed as evincing a desire, on the part of Anhut designers, to falter in the advance, but there are some things that show principle, deliver satisfaction and, in a word, of all the jewels in a crown, there is the brightest one. Sorting out the jewels requires that the eye of the expert must be utilized for what it is worth, and the principles of design that have earned the title of "standard," according to Anhut representation, will be found in Anhut cars for 1910, and force of deduction, if the first contention is true, makes it possible to proclaim that, in the Anhut, is a glimpse of 1911.

General Scheme of the Anhut Design—Briefly, the power plant, which, after all, is the most important part, is of the unit type, with the motor, clutch, and transmission gear in a single housing, and the whole is suspended on three points. The motor is of the four-cycle, water-cooled genera, with six cylinders. The power is transmitted by means of a propeller shaft, with universal joints, to a live rear axle of standard characteristics, and the wheels, on which the car rolls, are of artillery pattern, with second growth hickory spokes and felloes, of a size to take 34 x 3½-inch pneumatic tires. Semi-elliptic springs, front and rear, with thin, wide plates in sufficient presence. assure easy riding, and the channel section chassis frame is the platform on which the equipment rests. The brakes, in order that they will compare favorably with the rest of the plan, are of assured ability, they being of the external constricting and internal expanding type, engaging drums which are flanged to the rear road wheels. For the steering gear, enough is to say it is of the worm and sector type, and a 17-inch hard rubber rim steering wheel is at the disposal of the driver. For the rest, considering the car as a whole, the wheelbase, which is 110 inches, with standard tread, makes for good road work and lightness as reflected in I-section front axles, and in many other ways, is not at the expense of strength; but this same lightness, considering a 36-horsepower motor, does represent road work, under all conditions, that should be adequate for the needs of the most exacting motorist. In order, however, that the car will be more clearly portrayed, it will be necessary to illustrate the units, and to some extent, at any rate, reproduce actual working drawings, from which the car is built.

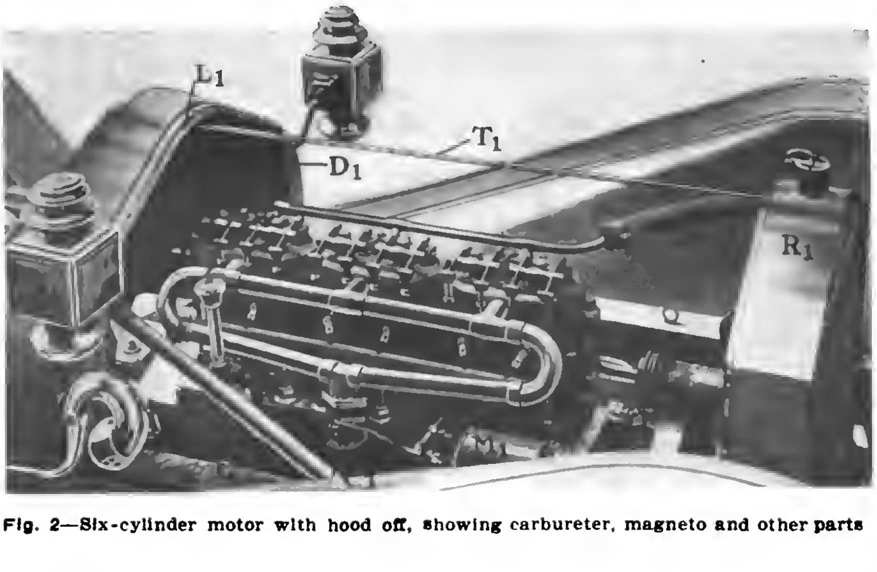


Fig. 2—Six-cylinder motor with hood off, showing carbureter, magneto and other parts

General Appearance of the Car—While the Anhut is made in two general types, the one a pony tonneau and the other a roadster, it will be, for the purpose here, enough to show the roadster. and the title illustration, Fig. 1, discloses much for favorable art criticism. The radiator, for illustration, rests over the front axle; the hood is long enough to accentuate the scheme of the designer, which is to include every evidence of a strictly roadster type of car, and the driver's seat, which is located nearer to the rear than the front axle, is in just the right place to assure the most easy riding qualities.

The seat is low, close to the deck, and the steering wheel is located in the position which was found in racing experience to be the most comfortable and of the greatest utility. The gasoline tank, which is just back of the seat, is round (shape of greatest strength) and is of sufficient capacity (20 gallons) to assure an adequate radius of travel. The springs, especially at the rear, are with but slight bow, and the rear extension of the chassis frame, which engages the spring shackles, is shapely and slender, thus possessing the utility of being limber, and of the appearance desired. Of the mud-guards, it may be stated, they are wide, of flaring set, and rigidly supported; the step, which is just in front of the front line of the seat, is stoutly ironed, and in all the little details which make so much for appearance and satisfaction the fine Italian hand of the designer is indicated by the imprint of its fingers.

What a Peep Under the Hood Discloses—In lifting the hood it will be observed that the character of the work is up to a fitting standard, and, as shown in Fig. 2, a tierod T1 holds the radiator R1 in rigid relation. The tierod being fastened to the dash D1 and a ledge L1 is beaten into form, out of the material of the dash overhang, to serve as a resting place for the hood. The filler F1, for the radiator, is hinged, and a locking bale passes over a cam-shaped rib, by means of which the cover is rendered tight, but it can be swung back at small effort when it is desired to fill the radiator, which, including the cooling system, holds four gallons of water.

Peering in at the motor and its accessories, the carbureter C1 is high enough up to be accessible, and the valve-actuating mechanism is up and above-board, where it can be inspected and worked upon. Likewise, the magneto M1 is above the level of the top of the chassis frame, which is a matter of more than a little moment in these days when accessibility is regarded as of the first importance.

What the Motor and Transmission Look Like—While looking under the hood has the virtue of affording information of a definite character on the subject of accessibility, the fact remains that in order to appreciate the points of merit residing in the power plant proper it is necessary to withdraw it from its surroundings, which is done in Fig. 3. The crankcase C1 is of aluminum, flanged F1 between the motor-case and the gear-case, and split horizontally in the crankshaft axis. The flywheel F2 is in front, and the fan F3 is driven by a round belt B1, while the fan is suspended from a round section bracket B2 and rolls on ball bearings in the fan-housing H1.

The six cylinders of the motor, C3, C4, C5, C6, C7 and C8, are cast in pairs, and in Fig. 3, which is the right side of the motor, the carbureter (a Stromberg) is connected to the intake ports by means of a manifold M1, which balances the pressure by circling around through its two branches, connecting to the three ports of the three pairs of cylinders at P1, P2 and P3 (the latter not shown). The magneto is on the right-hand side also, rests on a ledge cast integral with the uper half of the case, and is driven by a gear of the encased train, as a part of the half-time system which fixes the speed of the camshaft.

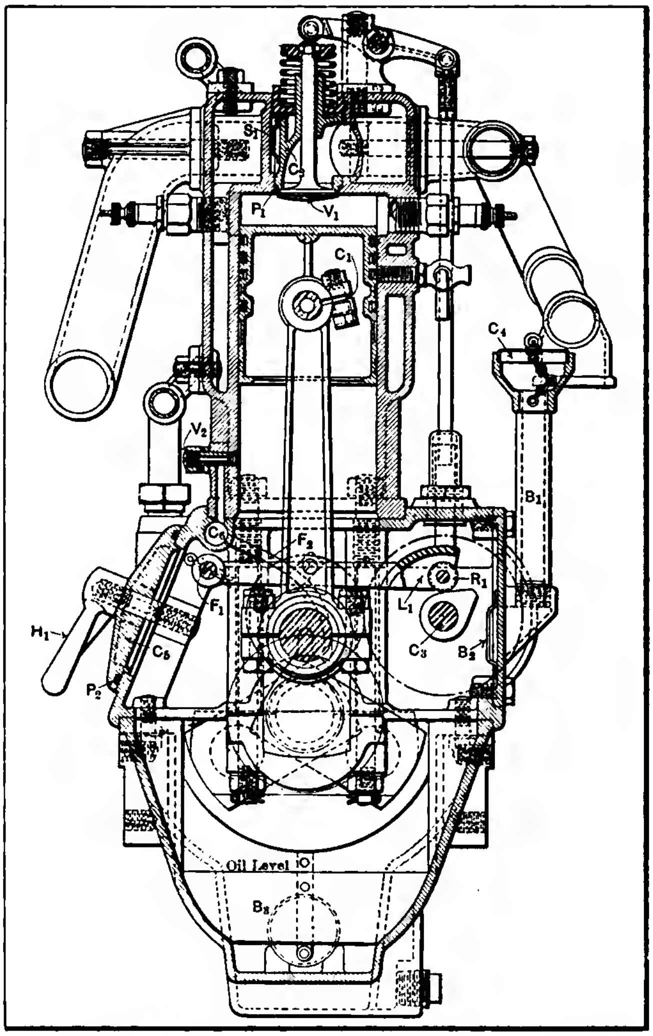


Fig. 4—Cross-section of motor, showing position of camshaft

The camshaft, which is inside, is on the right side of the motor, and the tappet rods extend up from the lifts L1, L2, L3,

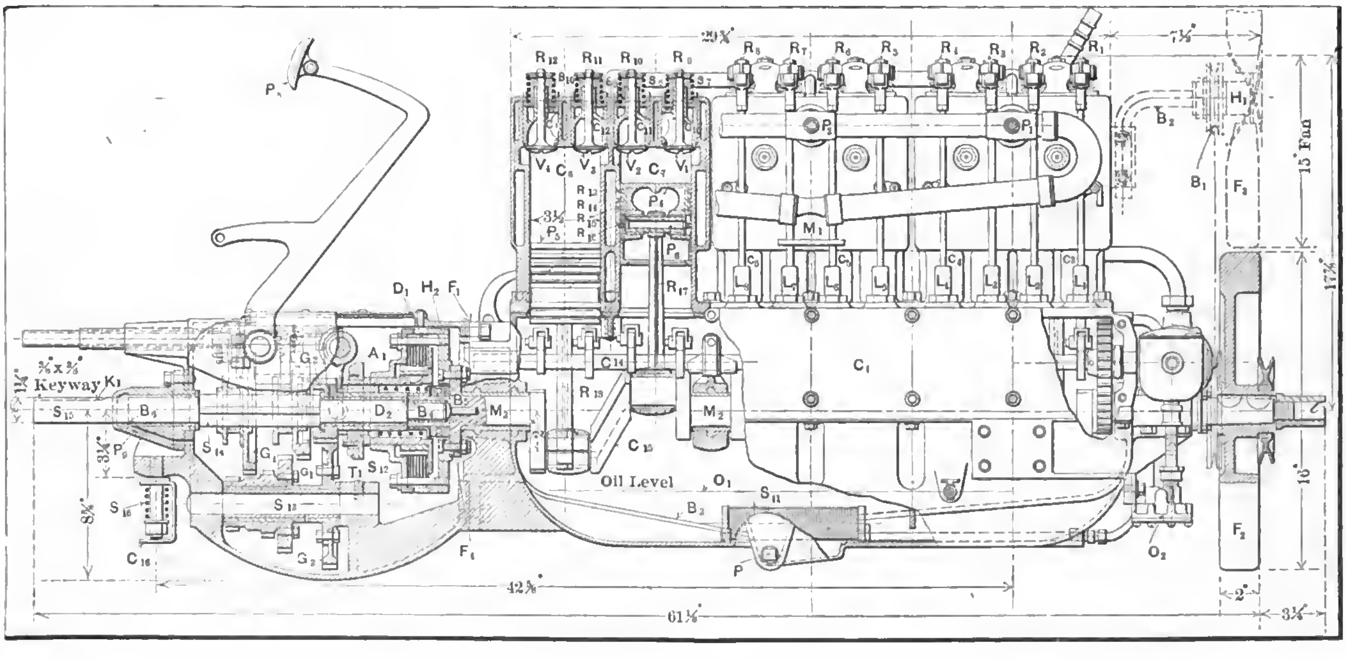


Fig. 3—Sectioned elevation of the six-cylinder Brownell motor, offering evidences of refinement and special means of lubrication

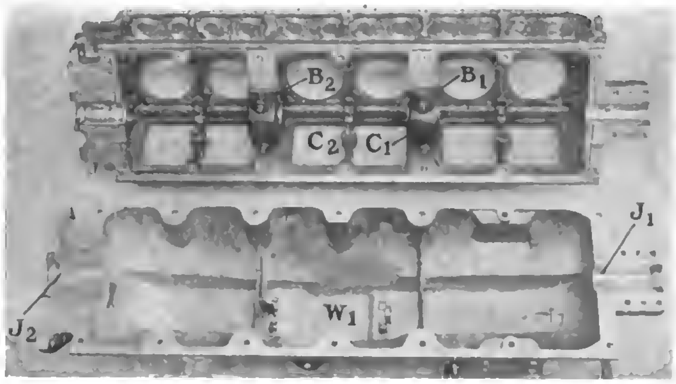


Fig. 5—Top and bottom halves of crankcase, showing caps over journals, formation of bottom half for oil-basin, and strength

L4, L5, L6, L7, L8, L9, L10, L11 and L12 (the last four not shown) to the rocker arms on the top of the cylinders R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11 and R12, R9, R10, R11 and R12 being cut away to show the section of the cylinders, presenting a view of the valve springs S7, S8, S9 and S10, the valve cages C10, C11, C12 and C13, and the valves in the heads V1, V2, V3 and V4, as shown in the section of the last two cylinders, it being

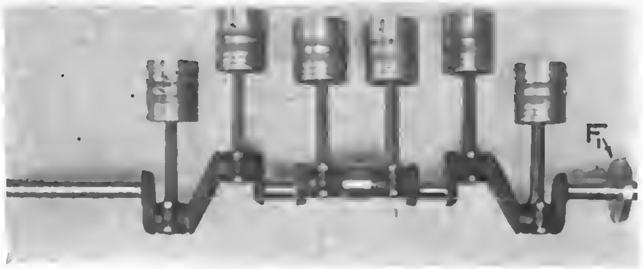


Fig. 6—Crankshaft assembly, depicting flange at rear, flywheel bearing in front, and lightness of reciprocating parts

the case, of course, that two valves (inlet and exhaust) are placed in the head of each cylinder.

The bore of cylinders is given as 3 1-2 inches and the throw of the crankpin is given as 2 inches, thus making the stroke 4 inches. The pistons P4 and P5 are like the cylinders, of cast gray iron, and light. Each piston is provided with three rings R13, R14 and R15, above the crosshead pin, to render the pistons tight against compression, and one ring R16, which passes through a slot in the crosshead pin P6, to keep the pin from floating out. The camshaft C14 is shown at the sectioned end of Fig. 3.

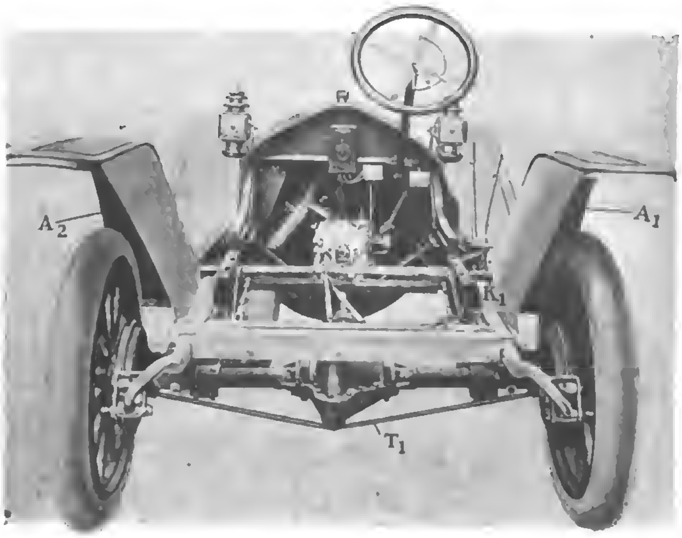


Fig. 7—Rear view of car, presenting live rear axle, method of trussing, and general accessibility with facilities for getting at bevel drive.

and the cams are integral, while the material used is cementing steel and the cam faces are glass-hard.

The connecting rods R17 and R18, as shown in the section, are drop-forged from special steel and the bearing surfaces at both ends are adequate to assure long life. The crankshaft C15 is of high carbon steel, cut from a billet of crankshaft steel, and after rough machining is hardened and ground. The main bearings M2 and M3, as shown in the section, indicate that there is a main bearing on either side of each pair of cranks, and the projected area is such as to assure good running conditions. The journals are of die-cast nickel babbitt, which is regarded in engineering circles as superior for the purpose.

The question of lubrication is of the greatest importance, and the level O1 is maintained by the oil pump O2, and all excess oil drains back to the oil basin B3, while in the process it is filtered through the strainer S11; the plug P7 is available for the purpose of draining the system out, or lowering the oil level. In view of the construction, which places the rocker arms outside, on top of the cylinders, the designer considered it necessary to carefully provide for the proper lubrication of the rocker arm bearings, and this is accomplished by making the shafts on which the arms oscillate hollow. These shafts are plugged at each end, thus forming an oil reservoir, and oil, which is fed from a spring oiler at the top of each rocker arm, maintains a profuse state of lubrication at all times. Small oil passageways are provided so that excesses of oil pass to all bearing points, which are at four places, including the pushrod bearings at the lower end of the rocker arms. Noise, which generally follows wear, is thus aborted, simply because the parts do not generate lost motion.

How the Power Plant Is Made Self-Contained—The rear end of the crankshaft, as the section (Fig. 3) depicts, is provided with a flange F4, which engages the housing H2 of the multiple disc clutch, and the discs D1, D2, etc., are alternately keyed to the driving and the driven members, respectively, so that when the spring S12 is free it presses the discs into intimate contact and the clutch is then capable of transmitting the torque of the motor to the transmission gears. To release the clutch pressure is applied to the pedal P8, actuating the arm A1, the rounded portion at the end of which engages the pocketed face of the thrust-block T1.

The selective three-speed (and reverse) transmission, as it is presented in the section (Fig. 3), shows the lay-shaft S13 below the main shaft S14, and since the drive is "direct on high gear" engagement is made by means of the internal gear G1, with the pinion of the master set G2, which master pinion meshes with the gear G3 to impart motion to the lay shaft. For the remaining speeds the sliding (sleeved) gears G1 and G4 engage their mates on the lay shaft, in response to the demands of the driver, who manipulates the side-lever for the purpose.

Mention of Some Important Details—The telescoped bearing B4 is long, and a ball thrust B5 takes care of the endwise component. The outboard bearing B6 is very liberal indeed, and the stub-end of the shaft, where it engaes the universal joint S15, is splined for a long key K1. Lubrication at this point is well cared for, and by means of the passageway P9 excesses of oil run back into the case. While the front end of the motor is suspended by arms to the side members, the rear suspension is, as shown, at a point with a spring S16, which is placed to impart flexibility. The crossbar C16 is of the channel section and liberal in view of the load.

Fig. 4 is a cross-section of the motor, and in view of specific references to the several parts, as made in Fig. 3, it is offered as showing the clamping means C1 of the upper end of the connecting rod. Flat packing P1 under the case C2 of the bevel-seated valve V1, and the virtue of this method of packing the cage will be seen at a glance, it being the case that expansion is rendered impotent thereby. A little flat spring S1 back of the case C2 prevents the same from working around and aids in assembling.

The cam C3 is of good shape and the roller R1 is forked into a supplementary lever L1, with a fulcrum at F1. This construction assures noiseless performance, since the lifts have but a thousandth or two of clearance, and this distance is below the noise point. A valve V2 controls the supply of oil to the respective cylinders, and by adjustment provided it is possible to regulate at will the supply of oil to each cylinder.

The breather B1 has a cap C4 and a baffle B2 to prevent oil from splashing up and out. The cover C5, over the hand-hole, is provided with a packing P2 and a screwed-on handle H1 to make it tight. It is quick to detach and virtue resides in the plan. The main oil channel C6 shows plainly in this section and the individual oil feed F2 is also plainly in sight. The cross-section of the oil basin B3 offers evidence of capacity, and the oiltight joint J1 is well worth more than passing notice.

Referring to Fig. 5, it will be observed that the crankshaft is suspended to the top half by bearings which are formed in the ribbing system, and the two intermediate bearings B1 and B2 arc provided with caps C1 and C2. In the lower half, which is shown below, the crankshaft is carried by outboard journals J1 and J2, and this view presents further evidence of the method of oiling, with the oil well W1 formed in the bottom of this half of the case. The details of the crankshaft, connecting rods, pistons and rings, are clearly depicted in Fig. 6, and in view of the specific references in Fig. 3 it will not be necessary to more than point out that the flange F1 is placed at the rear end to transmit the torque of the motor to the clutch rather than at the flywheel, which, in a six, is relatively small and unimportant, it being the case that the increments for torque are overlapping and variations are therefore less violent.

Remaining Important Chassis Features—Fig. 7 is of the chassis looking from the rear, and the live rear axle is clearly depicted. The kick-up K1 of the side members shows, and the aprons A1 and A2 of the mud-guards offer, evidences of careful attention to details. The rear axle is trussed T1 to relieve the tube, and a cover C1 makes it easy to open up and examine the bevel drive. There are other features, of course, but they will appear at a glance, unless it is to point out that the selections of material, in the various important parts, is scarcely to be thoroughly well appreciated, since the earmarks of quality, when reference is had to material, are not as surface indications, nor to be seen through varnish. The makers, realizing that future success, which is the matter of moment, depends, to a vast extent, on quality of material, which has been given good attention.

The finished product is delivered to the purchasers either with roadster or pony tonneau body, the color scheme being deep, rich, royal blue, with light cream striping, wheels natural wood, finished with red spiking. Upholstery is in best hand-buffed leather with best hair filling and evidences of superior workmanship. The equipment includes two large headlights, two (side) square oil lamps, tail lamp, horn, jack, and a full set of tools, the whole accessory equipment being of a high grade, and especially selected to suit the car as a whole.

In the roadster accommodation is for two persons, but the pony tonneau has comfortable seating capacity for four persons, and the side entrance, which is provided with a door, is wide. The price of the roadster is $1,700, the pony tonneau bringing a little bit more, namely $1,800.

NEW FRENCH SMALL CAR FOR ONE PASSENGER

PARIS, Dec. 10—In a densely populated country such as France or England many a doctor, commercial traveler, road surveyor and others have objected to be obliged to use a two-passenger automobile, one seat of which was never occupied. There appeared to be a market for a one-man machine, as economical to run as a motor bicycle, but with all the comfort and road ability of a complete automobile.

A machine of this type has just been placed on the market under the name of the Zebra. Except that it has only room for one passenger and has very small dimensions, there is nothing startling in its construction. Its general design, in fact, is most conventional. A pressed-steel frame, dropped to place, the body low, carries a single-cylinder motor of five horsepower under a bonnet in the usual position. The motor has mechanical valves, thermo-syphon cooling through a tubular radiator, and relies on a high-tension magneto entirely for its indespensable spark. The gasoline and oil tanks are mounted on the dashboard, with feed, of course, by gravity with suitable means for proper control and a multiple disc clutch connects the engine to the sliding-gear set, having three speeds and reverse, and final drive is taken by a propeller shaft to rear live axle. On such a light production there is no necessity for torque rods. Brakes are on the rear-wheel drums and are enclosed, with a foot brake on the pulley at rear of the gear box. The steering column, instead of being on one side, is placed in the center, with the brake and change-speed levers in the usual position. Completely fitted with a two-seated body and hood the car weighs 660 pounds. Its speed on the level is 25 miles an hour. Although a very well-finished job mechanically, the small car has the defect of not being sufficiently fitted up in details for the class of users it is intended to serve. The man requiring a one-passenger car generally uses it from eight to ten hours a day, and in consequence calls for a considerable amount of protection not only for himself, but for the organs of the car as well. In this respect the small automobile is rather defective. It is intended to place them on the market in large numbers at $500 complete. The prospects are that the venture will meet with success, the project being in live hands, and all efforts dating from the ground up.

The Zebra, a French Car Designed for One Passenger

Operating Side of the Single-Cylinder Zebra Motor

THE AUTOMOBILE

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INDIRECT GEARING NEGLECTED

Reluctant as some may be to believe it, fashion still plays a large part in automobile design, and only too often causes the neglect of constructions which are essentially good. That type of gearbox in which the drive is indirect on the high gear affords an example. This gearbox was used on all the earlier machines, which of course were rather low in power, and gave good satisfaction.

With the increase of power which enabled cars to run for the greater part of the time on the high gear came the invention of the direct-on-high gearbox. For high-powered cars this deservedly became popular; when the high gear was in continuous use, the direct drive gave more power and less noise. But the fashionability of this design on high-powered and high-priced machines led the makers of machines of low power and low price to adopt it, merely as a talking point. To such a degree has this been carried that to-day a thorough search among the specifications of foreign and American cars reveals not a solitary adherent of the indirect system.

Surely this is not as it should be. The indirect system has advantages susceptible of mathematical proof, which are longingly recalled by veterans of the steering wheel. These advantages are most weighty on commercial vehicles and on small runabouts and touring cars, which are becoming more popular now that the craze for high power has died away. The indirect drive deserves consideration by every designer of these classes of automobiles.

In the indirect drive gearbox the power is transmitted through one pair of gears on each of the forward speeds, and through two pairs on the reverse. In the direct drive gearbox no gears are in mesh on the high gear (or whichever gear has been selected for the direct drive), but two pairs of gears are in mesh on each of the other speeds, and three on the reverse. As a certain percentage of the original power is lost in each pair of gears, it is evident that the direct-drive type has a very high efficiency on the direct-drive speed, and a rather low efficiency on the other speeds. The indirect-drive type, on the other hand, has practically the same efficiency on all speeds, the figure being between the highest and lowest of the other type.

For cars which are intended to run practically all the time on high gear, the direct drive is therefore the better; when they are momentarily compelled to use the lower gears, five per cent. more or less power means little to them. But the high-gear car is not as popular as it was. The public has learned that the automobile is a piece of mechanism, subject to the laws of mechanics, and that its changes of gearing do no more than adapt it to do its work in the most economical way.

For low-priced cars the indirect system has the great advantage of simpler and less expensive construction. A three-speed selective direct-drive gearbox usually has eight gears, counting the reverse pinions, and two dog clutches for the direct drive. The indirect box also has eight gears, but eliminates the dog clutches. The direct gearbox has three shafts, necessitating six bearings; one of these must be an "inside" or "concealed" bearing, which not unfrequently is made too small for its work. The indirect box, on the other hand, has but two shafts and four bearings, and costs much less to manufacture.

AMERICA AND THE SLOPING BONNET

Of all the foreign ideas from which we have in time past borrowed freely, one—and a very prominent one at that—has never found much favor on this side, at least not enough to warrant its adoption. By this reference is had to the sloping bonnet, or, more correctly, the dashboard location for the radiator, the shape of the bonnet being immaterial.

At present this is meeting with more favor than ever before in France, all of the highest grade cars being built in this way. In England, the idea has been adopted broadcast (with the revocation of the Renault patents), and no less than a half dozen of Britain's best cars will be so built in 1910.

In this country, on the other hand, the idea has never taken well, and to-day, with perhaps one noticeable exception of recent date, the American manufacturers stand just where they did several years ago on this subject. And yet, this design has much to commend it, the air resistance is slightly reduced, the design lends itself to simplification in the form of thermo-siphon cooling, the delicate radiator is removed from harm's way, the engine as a whole is made more accessible, and the weight distribution is perhaps improved.

With all these weighty arguments in its favor, and some others of lesser weight, why is it that the American manufacturer has not been inclined toward it, or why has the ultimate consumer, the buyer, not taken to this form? This is a question which is hard to answer, in the light of either past practice or present-day tendencies.

E-M-F AND STUDEBAKER INTERESTS ARE AT VARIANCE

DETROIT, Dec. 13—One of the bitterest legal battles the automobile industry has ever known is promised as a result of the summary action of the E-M-F Company in rescinding the selling agreement entered into with the Studebaker Company last April, and the open declaration of war by both the interested concerns. An imposing array of legal talent has been engaged by the warring factions, and official assertion is made that there will be no truce declared until the aid of the highest courts has been invoked, if such a course becomes necessary.

The trouble arose when President Walter E. Flanders, of the E-M-F Company, wrote the Studebaker Company last Thursday, notifying the South Bend concern that all contracts and agreements made and entered into whereby it was stipulated and agreed that the Studebaker Automobile Company should act as sole distributor of the products of the E-M-F Company would be treated as rescinded and annulled by the latter company. The reasons given by Mr. Flanders for this action were because, he alleged, the Studebaker Company had refused and neglected to take and pay for the number of E-M-F "30" cars ordered during the months of October and November; because of alleged failure to give any valid reason or excuse for such nonperformance of the agreement or any assurance that the expressed conditions would be lived up to in future; and because such action evinced an intention not to perform the contracts and agreements existing between the two concerns.

It was further charged that instead of establishing a fair and uniform line of discounts dealers were forced to handle the E-M-F products on discounts unfair and unprofitable; that the popularity of the E-M-F line was used by the Studebaker Company for forcing its products upon dealers if they desired to get the agency for E-M-F cars; that the Studebaker Company committed a grievous commercial blunder in announcing through the public prints that there would be no 1910 model of the E-M-F "30" car manufactured, when as a matter of fact a new model, differing in several important features from its predecessor, had been brought out; and finally that through its advertisements the Studebaker Automobile Company misled the general public into the belief that it owned a controlling interest in the E-M-F Company, it being alleged that this confused agents and buyers and injured the reputation of the product.

A fac-simile of this letter was published broadcast by the E-M-F Company, and brought officials of the Studebaker Automobile Company to Detroit on a jump, with the declaration that they had fulfilled their part of the agreement, that they regarded it as valid and in force, and that they stood ready to go into the courts and fight for what they deem their rights. Officials of the company declared that the fulfillment of the agreement would be insisted upon to the letter, and that all agents and customers would be protected regardless of cost.

As a preliminary to the war that has been declared, the Studebaker Company has retained the legal services of John S. Miller, of Chicago; Otto Kirchner and Gen. Henry M. Duffield, of this city, as special counsel. Besides these there were present at the council of war held here Scott Brown, general counsel of the Studebaker Company; Frederick S. Fish, chairman of the executive committee; Clement Studebaker, treasurer, and Hayden Eames, general manager of the company.

"The Studebaker Company has observed and has not broken its contract with the E-M-F Company," said Attorney Miller, at the close of the conference, speaking officially. "It has established throughout the country selling agencies to the number of several hundreds for the handling of the E-M-F car. It has expended in exploitation of the car and in agencies and facilities several hundred thousand dollars. It has also made sales of the car to be delivered to the extent of hundreds of thousands of dollars. The Studebaker Company has never failed to pay for cars and the E-M-F Company owes a large amount of money under the contract. The claim that the Studebaker Company has failed to take cars required by the contract is untrue. The E-M-F Company has not yet manufactured or had ready for delivery the number of cars it claims the Studebaker is in default of taking. The Studebaker Company has taken all the cars it is obligated to take, and stands ready to take and pay for all such cars in the future."

Officials of the E-M-F Company, just as positive in their assertions that the terms of the agreement have not been carried out, and insist that they will proceed to handle all sales direct hereafter.

Trouble has been brewing for some time, in fact almost from the day the selling arrangement was effected by the two concerns. Of late, however, the situation has become more acute, finally leading to the open rupture caused by Mr. Flanders' drastic action.

The union of the two companies last April was one of the most sensational deals in the history of the automobile industry. For the purpose of securing the E-M-F line of cars to add to other models made by them, officials of the Studebaker Company purchased the stock of William E. Metzger and B. F. Everitt in the E-M-F Company, paying a premium of something like 200 per cent. The capital stock of the company was increased from $500,000 to $1,000,000, and in the reorganization three directors were elected from the Studebaker Company. However, the individuality of the E-M-F Company was retained, and a majority of the stock remained in old hands, a contract being made with the Studebaker Company merely to market the cars. All contracts with E-M-F agents were cancelled at their expiration, September 1, last, and the entire output was to have been taken by the Studebaker Company. Because of the number of lines handled by the selling concern, as well as for other reasons, the arrangement became unsatisfactory, and the E-M-F Company decided to sever all existing relations and market its own product.

The contract with the Studebaker Company is said to have called for 29,600 of the "30" and "20" models for the year beginning September 1, 1909. It is asserted by E-M-F officials that this number will be greatly exceeded with the increased facilities being installed.

Just what the first step in the legal battle threatened will be is not disclosed. Counsel for the Studebaker Company declines to state what action will be taken, merely asserting that the company proposes to insist upon the fulfillment of the selling agreements, and that it will in every instance protect the interests of agents and customers. Meanwhile, the E-M-F Company, having made the first move, is awaiting developments.

What the District Court Has Ruled

DETROIT, Dec. 14—District Court Judge Swan, Monday evening, refused to issue peremptory restraining order asked by Studebaker Automobile Company in its suit against the E-M-F Company to prevent latter annulling the three-year selling agreement between the two companies. The Studebaker Company was given until Wednesday to serve copy of application on the E-M-F, and the latter until Saturday to serve answer. The matter has been set for a hearing next Monday. The Studebaker application stated it had agreed to pay $900 each for E-M-F cars, giving it gross profit of $350; that from April 29 to August 31 it received 4,500 cars, or 1,700 less than it had orders for; for the first year, beginning August 31 last, it was to take 15,200 "30's", and it already has orders for 8,000, exclusive of Flanders "20's". The Studebaker Company claims it has acquired property right which cannot be usurped. The action of the E-M-F directors disrupts business.

S. A. E. WILL HOLD DUAL MEETING THIS WINTER

JUST as in former years, the Society of Automobile Engineers will hold a dual meeting, that is to say, it will meet on Tuesday, January 4, at the Automobile Club of America, at ten o'clock in the morning and hold an all-day session which will include the election of officers for the ensuing year. Papers will be read, discussions will be indulged in, and a dinner will be given at the club, at eight o'clock in the evening.

When the meeting adjourns, it will be until January 13, to meet at the Engineers Club, the idea being to afford its members who cannot attend the meeting which will be held during the A. M. C. M. A. show (the January 4 meeting), a chance to be present at the adjourned meeting which will occur while the A. L. A. M. is holding its show. The adjourned meeting will be quite as interesting, will open at ten o'clock in the morning at the Engineers' Club, papers will be read and discussed, and in the evening a dinner will be given just as at the first meeting, the only exception being that the second dinner will be held at the Engineers' Club.

The meeting this year should prove of the greatest value to the members and the industry as a whole, it being the avowed purpose of the society to deal in the abstract; avoid trade affiliations and serve the whole industry for a broad purpose. The papers in hand are of a high character, the society membership is large and growing, holding in its makeup every chief engineer from almost every company of importance in this country.

In addition to this large contingent of the foremost American automobile engineers, there is a growing representation from abroad, in what is known as International Members, which is a membership contrived by the society to enable foreign automobile engineers to come across with papers; receive the papers of the society and discuss the subjects at length for the common good.' These exchanges of ideas, as interpreted by engineers, will, in the long run, build up the automobile, as a machine, to a state of perfection which is not to be done in any other way. It is of the greatest value to engineers and the industry as a whole, to meet, discuss knotty problems and evolve the right answer. The time must come when the automobile as a machine must be standardized, and who is better qualified than a body of the very engineers who are now responsible for the splendid machines which now afford pleasure and profit to a vast concourse.

GRAND PRIX CALLED OFF—NOT ENOUGH ENTRIES

PARIS, Dec. 9—There will be another year without racing in Europe, owing to the French Grand Prix having failed to fill. When the entry list was closed, the Racing Board of the Automobile Club of France was in possession of twelve cars instead of the forty-five it had fixed as a minimum for the holding of a pure speed test next year. The firms that had decided to show their speed ability under the no-limitation rule were Benz, De Dion Bouton, Rolland-Pilain and Hispano Suiza. One of these firms, the De Dion Bouton Company, had only entered because of the personal conviction of the Marquis de Dion that it was a mistake on the part of the French manufacturers to allow the automobile industry to become nothing more than an industry, as it is tending to become through the absence of racing and shows. Three or four firms failed to send in their entry fees because of the conviction that the necessary forty-five cars could not be obtained.

There appears to have been a belief among the members of the Racing Board that the necessary forty-five cars could be obtained, for before the race was definitely announced personal inquiries were made in all the factories and the promise of forty-two cars was made. Thus it only needed a few foreign entries to obtain what the club considered a necessary minimum. After promising, however, the big firms banded themselves together against any race and the enthusiasm of the smaller constructors quickly fizzled out. Belgium has come forward with the promise of two races on the famous Ardennes course, one of them to be for limited bore and the other for unlimited cars, but in view of the French refusal to take part in any speed event it is very doubtful if she can carry it through on her national resources.

The abandonment of the Grand Prix doubtless carries with it the death of the proposed aeroplane race from Dieppe to the English coast and return, which was to be one of the items of a week's sport in Normandy. The club was only disposed to undertake this if its automobile road race became a reality. This having been killed, it looks upon an aeroplane race alone as rather outside the field of its activities. The only hope of it being held now lies in the towns of Dieppe and Brighton taking it up. As the event would attract spectators in thousands from all parts of the world, there is a possibility of the townships undertaking the cross-Channel flight programme.

Since the abandonment of the Grand Prix the committee of the Automobile Club has agreed in principle to organize next year an aeroplane race from Paris to Brussels, either in a single journey or in stages. The distance by road is practically 200 miles; thus it would be possible, with a light following wind, to make the flight without a stop. Brussels has been selected as the finishing point of the flight by reason of an exhibition which will be held there next year. A better choice might have been made, for the northeast of France is a manufacturing district having very few attractions for the automobilist, while the roads, especially in Belgium and on the French frontier, are far from being the best in Europe.

EX-CHAIRMAN HOWER GETS TESTIMONIAL

BUFFALO, N. Y., Dec. 11—At the Automobile Club of Buffalo last Monday evening Frank B. Hower, former chairman of the Contest Board of the A. A. A., received a chest of silver from the directors of the national organization. It was intended to present the gift to Mr. Hower at the A. A. A. annual meeting in New York, but the plan fell through owing to the absence in the West of the intended recipient.

Chairman George C. Diehl of the Good Roads Board made the presentation speech. Mr. Hower was the most surprised man among the 350 members of the club who were present. His speech, thanking Chairman Diehl as the representative of the A. A. A. was brief, but his manner expressed plainly his pleasure.

KENTUCKY TO CELEBRATE GOOD ROADS LAW

LOUISVILLE, KY., Dec. 13—Arrangements have been completed for a monster banquet in celebration of the recent victory of the Bosworth-Wyatt amendment to the constitution providing for good roads in the State of Kentucky. Prominent Kentuckians from throughout the State will assemble around the festal board on the evening of December 15 at the Seelbach hotel. Final details for the banquet are being worked out by Julius V. Beckmann, secretary of the Kentucky Good Roads Association; Dr. Ben L. Bruner, Secretary of State, and Sam P. Jones, president of the Commercial Bank and Trust Company. Specially invited guests will number about seventy-five. Among the speakers will be Governor Augustus Willson.

WORK STARTED ON ELABORATE PALACE SHOW EFFECTS

THIS week operations were begun on the interior decorations of the Grand Central Palace, New York City, for the Tenth International Automobile Show which opens on New Year's eve, under the management of the American Motor Car Manufacturers' Association. Unitt & Wickes, the official decorators, started a force of 125 artisans at work on the trellis garden decorative effect which will be used for the first time in a New York automobile show.

Decorative Plan of Main Hall, Grand Central Palace

While past automobile shows in New York have been elaborate in decorative effects and have given the gorgeous machines and polished chassis an excellent setting, the trellis garden decorative scheme will linger long in the minds of the public for its simplicity, while it will be impressive and totally different from any preceding show.

Heretofore it has not been possible for the decorators to get into the Palace so far in advance of the show, but this year all work will be completed before the private view at three o'clock, on Friday, December 31.

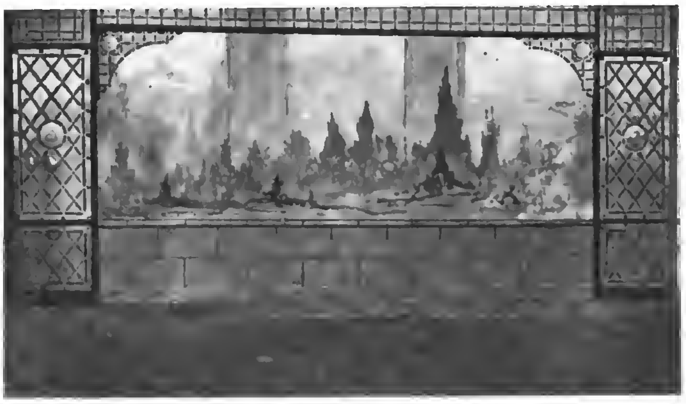
The work of transfiguring the first gallery has already been begun and as soon as this is completed, the artists and carpenters will start work on the second gallery and will then give their attention to the main exhibition hall. Special attention will be given this year to the ceilings under the two balconies, which, heretofore, have not been given much attention by the decorators, but Unitt and Wickes have conceived an excellent decorative effect which will completely hide from view the previously barren ceilings.

One of the most spectacular features of the decorative scheme will be a huge electrical marble fountain stationed at the end of the main hall where last year's statue of Age Instructing Youth was erected. The base of this fountain will measure 16 feet, and it will be over 14 feet in height. Back of the fountain will be an immense plate glass mirror, and surrounding the two will be a beautiful peristyle of green trelliswork, 40 feet in length by 25 feet in width. At the base of the fountain and surrounding the peristyle will be planted low-growing trees, shrubbery and potted plants. The fountain itself, which involves some cunning mechanical ideas, will be operated by a rotary pump and the electrical effects will be produced by a combination of colored mirrors and electricity, which it is expected, will excel anything of its kind ever seen in this country.

Another striking effect which will greet the visitors, even before they enter the building, will be a beautiful porte cochere of green trellis work and frosted glass, which will be illuminated at night by hundreds of parti-colored electric lights, and the whole surmounted by a reproduction of "Miss Liberty at the Wheel" which is also outlined in electric lights.

One of the decorative schemes which will add unusual attractiveness to the Palace will be 100 paintings, measuring 30 by 15 feet in dimensions. These paintings harmonize with the regular trellis scheme and depict various garden and country scenes. Each will be surrounded with lattice work so as to give one the impression of gazing upon midsummer scenes, which will be a marked contrast to the climatic conditions outside of the Palace. The paintings are now being placed in position and will extend around the entire inside of the main floor and the two balconies.

Briefly, the color scheme and decorative effect for this year's show will be nile green lattice work on a soft caen stone background, while the roof will simulate a large trellis arbor hung with grape vines, through which the blue sky is faintly seen. The whole is softly illuminated by scores of immense electric lights, which are hung by chains from the roof of the arbor.



One of the 100 Paintings with Trellis Effect Used

The signs, too, have been specially designed and the names of the various exhibitors will appear in raised gilt Egyptian letters on a green ground surrounded by the usual lattice framework. This idea will be followed all through the main floor and the two upper galleries, except in the central court on the main exhibition floor where trellis standards surmounted by illuminated alabaster signs, will be employed.

DAZZLING DISPLAY OF TROPHIES AT GARDEN SHOW

RACING trophies, great and minor, naturally increase in number each year, but 1909 has been an unusually active one in automobile contests and the aggregate of cups and things now in the hands of motor car manufacturers and agents is enough to make a solid silver monument of heroic size to the Hon. Wm. J. Bryan, or some other man deserving such a fate.

A fine display of these automobile trophies will be made collectively at Madison Square Garden during the week of the Tenth National Automobile Show, January 8-15, and the public then will have the first good opportunity to see the prizes of which it has heard a great deal, assembled all under one roof and in a group and displayed with an amply attractive setting.

The show committee has arranged to make this display of cups, placques, medallions, etc., a feature and a special department of the show. A big case will be provided for the trophies and they will all be ticketed and a pamphlet furnished telling the details of each trophy, its cost, history, etc., and by whom it was won. Big and little, there will be scores of prizes in this loan collection.

Prominent will be the classic Vanderbilt Cup that was won by Harry F. Grant in the Alco; this will be loaned by the American Locomotive Company. The Glidden and Hower trophies, both awarded to the Pierce-Arrow Motor Car Company, are objects of perennial interest, also, and these will figure conspicuously.

Lozier Motor Company will contribute the handsome trophies won in 24-hour races by their six-cylinder car and the splendid statuette won in the Long Island Motor Hunt. The Indiana trophy, the Massapequa Cup, the Merrimac Valley prize, and the Detroit trophy, won in the Glidden tour, will be among the many exhibits made by the Chalmers-Detroit Motor Company. Dewar Cup, awarded by the Royal Automobile Club, of London, in its standardization test, will be loaned by the Cadillac Motor Car Company. The Knox Automobile Company and several others, also, have declared their intention to participate and it is quite possible that some of the recently admitted members of the Association of Licensed Automobile Manufacturers, who will not have any cars on exhibition, will be represented at the show in this display of trophies.

PREPARING FOR THE SALT CITY'S BIG SHOW

Syracuse, N. Y., Dec. 11—The next automobile show under the direction of the Automobile Dealers Association of Syracuse, it was announced this week, will be held in the State Armory from March 14 to 19, inclusive. The dates follow immediately upon the heels of the Boston show, which the Syracuse dealers consider a most opportune time.

The directors of the Dealers Association have been holding meetings at the Hotel Yates this week and starting active preparations for the exhibition, which they claim is going to eclipse anything outside of the New York shows. It is to last two days longer than that of last year and much money will be spent in decorations and illumination in an effort to make the big Armory as beautiful as possible. Those at the conferences included President C. Arthur Benjamin, Vice-President H. D. Van Brunt, Secretary M. W. Kerr and C. H. Norris.

From a complete directory of dealers in Syracuse, prepared at the office of the Automobile Club of Syracuse, it is shown that there are no less than 35 makes of cars sold by eighteen dealers. Since last December the number of dealers in this city, and the number of makes of cars represented, have almost doubled. This is representative of the prosperity, which is everywhere evident in the Salt City, not alone among the dealers and repair men, but at all of the factories as well, most of the latter being now at work nights as well as during the entire day.

SIMMS VIEWS SITUATION WITH OPTIMISM

New York City, Dec. 11—When interviewed by a representative of The Automobile here to-day, Frederick R. Simms, of London, Eng., expressed himself very optimistically on the present situation, both as to automobiles, and what is more close to him, as to magnetos. Mr. Simms was in the city for about a week in connection with the new branch office which he has just established on Broadway to supply the American trade with Simms' magnetos.

For the present, the business will be confined to the exportation of assembled magnetos, followed very shortly by the shipping of parts, which will be assembled on this side (the duty on parts being less than on whole machines). Ultimately, however, the intention is to establish an American factory not far from New York City, where the magnetos will be manufactured complete from the present specifications.

Just at this time, the English and Continental demand for the product is such that the works at Kilburn in London, turning out 600 magnetos per week, is unable to supply the demand. To relieve the situation there, a factory addition is now under way, which will be occupied by March 1. This addition will raise the output to 1,100 machines per week.

On the subject of the present prosperity, Mr. Simms expressed some interesting ideas. He thinks that the present American situation will be continued without change for about two years, or three at the outside, when factory outputs here will have increased to such an extent that overproduction will have taken place, and that the automobile industry in this country then will pass through a crisis, the extent and seriousness of it depending wholly upon the extent of overproduction.

Relative to the other side, and speaking on the same subject, he voiced the opinion that in England, France, Italy and Belgium automobile firms have passed through their critical period and are now on the recovery. England, in particular, coming into her own this year, in connection with the very successful Olympia show which has just closed. Germany, he says, is just emerging from her critical period.

Aeronautics have experienced a great boom on the other side, far greater than can be realized over here, where so little has been done. He said advisedly that the majority of automobile and engine builders in England and France are doing something in this line, either a complete machine or a light engine. The latter have brought a demand for an especially light magneto, and his company is making one, in which the weight is reduced by half or more. His prediction is that in five years aerial machines will be more common that automobiles are now, and that in the meantime, the Atlantic will have been crossed. On the subject of crossing the water, the machine to accomplish this would be a combination of dirigible and aeroplane.

One interesting point which he made was that double ignition, or, as it is often called, dual ignition, is losing ground very rapidly on the other side, the magneto being relied upon for all purposes, even to starting.

ALDEN SAMPSON MANUFACTURING COMPANY WILL CONTINUE

When on December 5, at Pittsfield, Mass., Alden Sampson was laid to rest, the automobile world lost an ideal pioneer, one of its most accomplished engineers and a pillar of stability, of which there were but a few to conjure by.

It will come as no surprise to those who enjoyed the confidence of the late head of this pioneer company that it is to go on; the expressed wish of the late Alden Sampson was that not a moment should be lost; not a thing should be changed; not a single effort should be made which would even tend to dim the luster that clings to a name connected with pioneer effort, original investigation and ceaseless effort in quest of quality—that quality which has the patience to await commercial success as a just reward of its efforts.

Of the trucks made in the past, none was allowed to go into any service for which it was not well fitted, and this year's trucks, of which the company has a goodly number in process, will be placed with the same discriminating care for the future welfare of the company. G. E. Mitchell, long associated with the company, is at the helm, and The Automobile, in expressing its deep regret at the sad event, is compensated in some measure by a situation which assures that the efforts of Alden Sampson will not be lost to posterity.

Specially Fitted Ambulance Built by the Premier Company

NEW AMBULANCE ON PREMIER CHASSIS

Appearing at first glance like a rather long limousine, the motor ambulance just finished by the Premier Motor Manufacturing Company, of Indianapolis, Ind., for an undertaking firm of that city, the A. M. Ragdale Company, has a number of excellent points. It was completed very recently, and put into service for the first time in connection with the Speedway races. The chassis is the same as those used on the regular Premier four-cylinder cars, with a motor rated at 36.1 horsepower.

In the construction of the ambulance, speed, ease in riding and a wish to avoid the morbid curiosity of pedestrians were incorporated in the design. A double floor practically eliminates all sound from the machinery. There is an entrance on each side of the car back of the driver's seat and half of the back of the car opens, forming an entrance for the stretcher, which is of folding canvas design. The canvas is mounted on a folding steel frame, which folds and locks to hold it in place. The stretcher is operated over a roller concealed under the cushions of the rear seat, and fits into steel grooves fastened to the front and rear of the interior of the body. The sides, back and front of the interior are upholstered in black leather. There are two folding chairs, one of which is moved to make room for the stretcher, while the other forms a seat for the physician. Half of the rear seat is also available when the stretcher is in use. The double floor in the car also serves for storing the stretcher when not in use, or for storing the extra chair not used when the stretcher is in place.

Dark green is the body finish, needle-striped with red. Each window is fitted with curtains which bear the company's name. When the ambulance is approaching the patient's home or hospital, however, these curtains are raised, thus removing all appearances of an ambulance and assuming that of an elegantly appointed pleasure car.

UNITED MFRS. WILL SUPPLY TRADEMARKS

New York, Dec. 13—Believing that the could materially assist motoring public, dealer and themselves, five of the oldest and best known accessory builders organized some months since a selling and distributing company to be known as the United Manufacturers. The various units comprising this organization are the Jones Speedometer, C. A. Mezger, Inc., Weed Chain Tire Grip Company, Connecticut Telephone & Electric Company and the N. Y. & N. J. Lubricant Company. The principal object of the formation of this selling organization, is primarily to reduce the cost of these accessories to the consumer; to protect the reliable dealer, seeing that he gets a profit that will enable him to give the consumer the best possible service; and protect themselves and the public against shoddy substituting and infringing. The management of the United Manufacturers states that it believes that all fair-minded dealers are opposed to substitution of any standard product by unscrupulous manufacturers, and therefore, the efforts of the United Manufacturers to stamp out this insidious competition will meet with the hearty approval of their customers among the automobilists.

The United Manufacturers announce that they will supply every reliable dealer in the country with a trademark sign of their own. This is rather a novel idea, and will act as a guarantee to all motorists who are seeking their standard products. Of course that economy is made possible through co-operation is obvious. It naturally decreases the cost of production and selling. The savings made possible by this co-operation really go to the benefit of the consumer, and for that reason, the advent of the United Manufacturers in the accessory field is certain to receive the support of dealer and consumer.

WARNER TAKES UP AERO ACCESSORIES

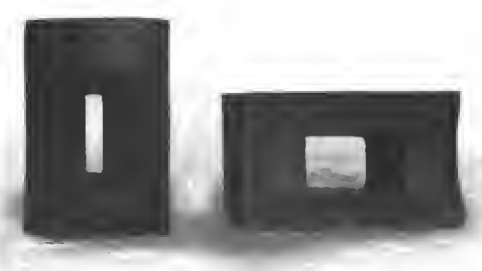
The anemometer, an instrument for showing the velocity of the wind, renders aviators almost invaluable assistance. When stationary, on the ground, it indicates any movement of the surrounding air; when mounted on an aeroplane, it indicates the rate of movement through the air. Although sometimes made in a windmill form, the most common type of anemometer is that with cups mounted on radial arms. The concave surfaces of the cups give the wind a good grip, while the convex surfaces of the cups returning against the wind offer the minimum resistance. In combination wtih the revolving parts some form of speed indicator is used to measure the velocity in miles per hour. This must be suitably calibrated, of course, as on account of friction and other resistances the movement of the cups is slower than the movement of the air.

The Warner Instrument Company, of Beloit, Wis., has found that its magnetic speedometer, as used on automobiles, may be advantageously adapted to anemometer service, and accordingly has brought out a complete anemometer with indicator attached. This instrument is now being sold on a commercial scale. The anemometer measures 17 1-2 inches across opposite cups and weighs, complete, two pounds. The scale is calibrated to read from 0 to 60 miles an hour, which is a sufficient range for ordinary service. One of the anemometers has been in use for some time on the Curtiss aeroplane purchased last summer by A. P. Warner, the vice-president of the company.

VANADIUM STEEL DIES FOR FORGING

A customer of the Pennsylvania Forge Company, of Philadelphia, was using carbon steel dies for very severe service in hot forging and drawing work. These dies were giving an average service of two days, breaking from crystallization or defects in the steel brought out by the constant and heavy blows. It was finally decided to try vanadium steel, in the hope that the remarkable properties of vanadium in retarding crystallization would give the dies a longer period of usefulness.

Some vanadium steel was obtained from the Bethlehem Steel Company and the dies shown in the illustration were made therefrom. The Pennsylvania Forge Company vouches for the fact that the dies were used in the same manner, by the same man and for the same service as the carbon dies. At present they have been in use for over four months, and the illustration shows their condition. The American Vanadium Company, of Pittsburg, gives the analysis of the metal as .75 carbon, .90 chromium and .25 vanadium (contained).



Vanadium Steel Dies That Have Been Used Four Months

Recent Purchasers of Studebaker E-M-F "30's," of Dayton and Springfield, Ohio, Who Have Formed a Studebaker Club

QUAKER CITY TRADE HAD A FINE YEAR

PHILADELPHIA, Dec. 13—Enthusiastic to a degree was the annual meeting of the Philadelphia Automobile Trade Association last Tuesday at its Odd Fellows' Temple quarters. With a sizable balance in the treasury, with fifty-three concerns on the books, and with the success of next month's show already assured, the optimistic spirit that prevailed was not to be wondered at. The past year was the most successful ever experienced by the local automobile trade. A careful estimate indicated a one-third increase over last year, with more than 3,000 cars disposed of for local use alone, not to mentioon upward of 1,200 more distributed to agents in this territory through the various factory branches located here.

The report of Secretary Beck showed fifty-six concerns engaged in the selling of automobiles, of which fifteen were branch houses and forty-one agencies. Twenty-one of these concerns remain unrepresented in the association. The report also showed twenty-eight accessories jobbers and retailers, twenty-one tire houses and seventy-two garages. All of the members present reported the outlook excellent for 1910 as the biggest business year in their history.

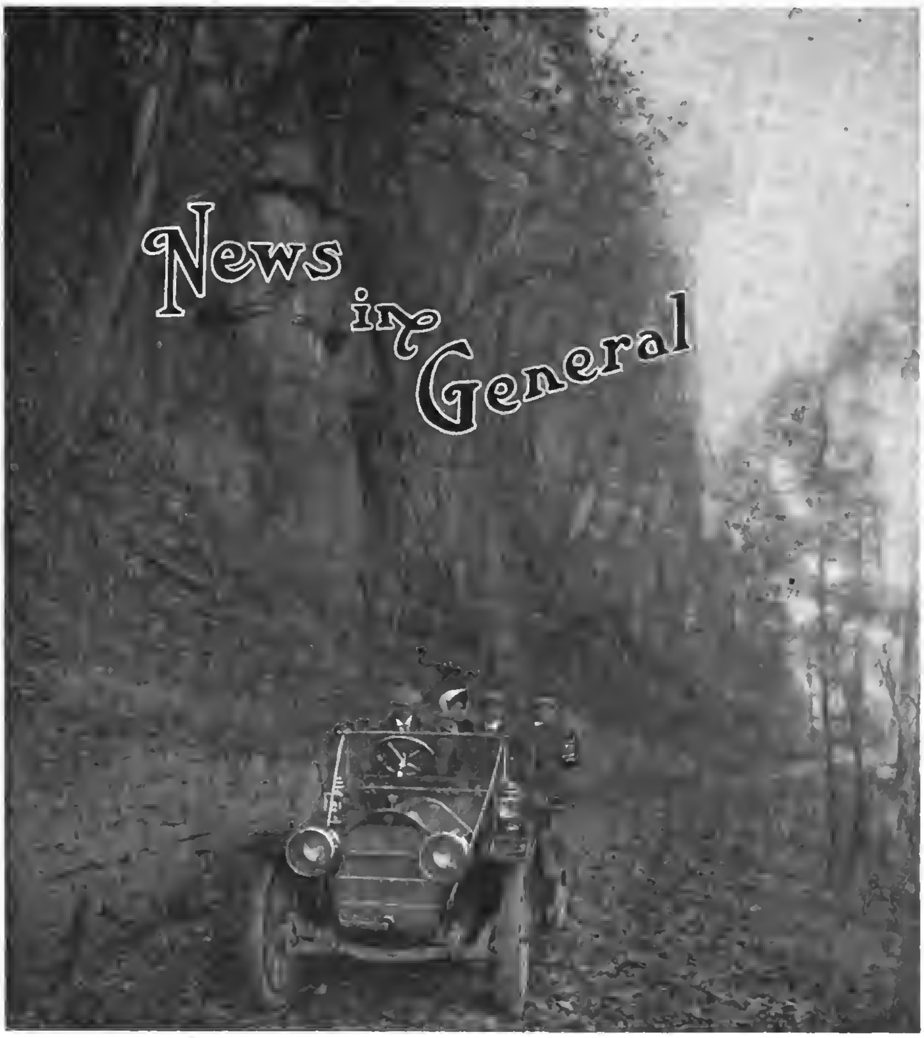
In that section of his report which referred to the coming show in the Third Regiment Armory, Secretary Beck was particularly enthusiastic. Not only had all the available space for the first week been preempted, but that for the second week (which it had been the original idea to devote almost entirely to an exposition of electrics, commercial vehicles and accessories) was almost gonc, the large number of left-overs from the gasoline pleasure class which had been assigned the first week taking up more than half of the second week allotment. An air navigation annex will be a feature of both weeks, whilc the electric display promises to take on the proportions of a national exhibit, as an arrangement has been entered into with J. C. Bartlett, of the big Woods garage, at a minimum of expense, whereby salesmen and demonstrators will be provided for out-of-town manufacturers who may desire to exhibit their cars, which will be received, taken care of, and shipped home after the show. This scheme has already borne fruit, no less than eight electric concerns having applied for space during the second week.

The annual election of the association resulted in the choice of the following officers to serve during the ensuing twelve months: President, J. A. Wister (Elmore); vice-president, H. B. Larzelere (Chadwick); treasurer, W. J. Foss (Pierce-Arrow); board of directors, L. C. Block (Ford), A. E. Maltby (Winton); committee on admissions, Fred C. Browning (Autocar) and F. C. Vanderhoof (Olds-Oakland).

INSURANCE MEN INDORSE AUTO ENGINE

LANSING, MICH., Dec. 6—That the insurance companies would have fire departments equipped with automobile engines if they had their way is shown by the endorsement of the work of the Lansing, Mich., machine by the Michigan Millers' Mutual Fire Insurance Company. The village of Bath, about 10 miles distant from Lansing, was nearly destroyed by fire last week, and would have been entirely wiped out but for the prompt assistance of the Lansing auto engine, which made the run in a few minutes, a feat impossible for an engine drawn by horses. The Millers' Insurance Company was enthusiastic in praise of its work. As insurance companies seldom grow enthusiastic about anything of this nature, it is taken as a huge compliment to the automobile.

Nearly Completed Four-Story Addition to the Plant of the Moline Automobile Company, Moline, Illinois



Along the Face of the Palisades in a Simplex Car

Industry Needs Machinists—Robert Jardine, who is now superintendent of the Royal Tourist Car Company's plant, at Cleveland, says that the greatest need of the automobile industry is a supply of intelligent machinists. The average man now learns to operate but one machine, and as a result, if a man cannot be used on that particular one he is, as a rule, temporarily unavailable. All-round men are badly needed. The trouble seems to be that young men who have passed through the high-school will not enter a plant as apprentices, and with others who have not had that much education the operation of a machine must be learned by rote. Naturally the latter kind are not found very adaptable.

Bergdoll Buys a Blériot—Louis J. Bergdoll, the Philadelphia automobilist, has purchased a Type XI (cross-Channel) Blériot monoplane, and will attempt flights shortly. He purchased the machine from Rodman Wanamaker, the direct importer, and has had it set up in his garage. Some interesting details are given of the construction of the propeller. It is made by Chauvière, of Paris, 6 feet 10¾ inches in diameter, and weighs but 9.9 pounds, although revolving at a speed of 1600 revolutions. The wood is selected French walnut, laminated, and the laminæ are so arranged that the grain extends from tip to tip. The slip is said to be but 15 per cent.

More Electric Stations—Charging stations at frequent intervals are absolutely necessary to convenient use of an electric car, and the interest taken by electric power plants has greatly helped to popularize this type of motive power. According to O. B. Henderson, of the Baker Motor Vehicle Company, many electric plants are realizing the advantages of supplying current for electrics, and in many cases have completely equipped establishments, with expert attendants. They understand that the automobiles use much more current than curling irons or chafing dishes, and that a moderate patronage will more than pay the expense of providing charging facilities.

Apperson Feats in West—During the past summer Harris Hanshue, of Los Angeles, has driven his Apperson "Jack Rabbit" in eight events on the Pacific Coast, and of these has won five firsts and two seconds. In the 50-mile Ascot race at Los Angeles, in which he was unplaced, a tire blew up and tangled a driving chain, breaking it. He won the 150-mile Ascot race, the Pasadena-Altadena and Redlands hill-climbs, and the heavy car classes at Santa Monica and in the Portola race, at Oakland, Cal. The car is now two years old, having been for one year the property of a private owner in Chicago before being taken to the Coast.

Hartford Likes Its Fords—Two Ford runabouts ordered for the use of the fire chiefs of Hartford, Conn., have just been accepted by the commissioners. President Clark, of the fire board, has given a demonstration at the rate of 48 miles an hour. In the purchase of these two cars the city saved over $1,000, as the appropriation was $3,000 and the Fords cost but $1,997. They went into commission on December 12. The Fords previously used by Chiefs Krug and Loomis have made good in every sense of the term. Chief Krug does not think it is possible to beat his old car, and says that if the new one cannot beat it he will retain the old one.

Baseball Celebrities Converted—To the list of baseball celebrities in the ranks of the automobilists have been added Charles A. Comiskey, president of the Chicago White Sox, and "Hughie" Jennings, manager of the Detroit Tigers. Mr. Comiskey purchased a Studebaker-Garford "40," with a limousine body, from the Chicago Studebaker branch just before leaving for his annual hunt on the Mississippi. The Tiger manager got a Studebaker-E.M.F. "30" in Detroit and drove it to his winter home in Scranton, Pa., where he practises law.

Free Half-Barrels of Oil—The following automobilists are now the recipients of half-barrels of Mobiloil, distributed as the result of an ingenious program scheme at the Vanderbilt: Miss Grace Driggs, New York; J. R. Salmon, Boonton, N. J.; R. C. Warner, East Orange, N. J.; C. J. Allen, Moorestown, N. J.; F. S. Hastings, Richmond Hill, L. I.; B. J. Sjaberg, Elmhurst, L. I.; T. N. Benedict, New Rochelle, N. Y.; C. A. Kochlen, Morris Park, N. Y.; C. A. Baker, Richmond Hill, L. I.; B. H. Harrison, New York.

Rambler Wins At Slow Driving—At times it is fully as important to be able to drive slowly on the high gear as it is to drive fast. In recognition of this, at a recent meet in Texas, a prize was offered by H. T. D. Wilson, of Houston, to the driver making the slowest quarter mile on the high gear. Four cars were entered, of which two were disqualified by their inability to travel slowly on high without killing the engine. A Rambler won the event, taking 4 mins. 35 secs. to cover the distance.

Empire Tire Branch in Philadelphia

Under the management of E. B. Richardson a new branch has been opened in Philadelphia by the Empire Tire Company, Trenton, N. J. The office shown above is located at 322 N. Broad street, where a full line of Empire tires is always kept on hand.

Factory in Springfield, Ill.—The Illinois capital is about to acquire its first automobile factory. This is a 500 by 260-foot building of brick and concrete, with saw-tooth roof, now und r construction for the Springfield Motor Car Company. The car to be built in this factory will be a 40-horsepower, seven-passenger, selling, complete with Bosch magneto, top and lamps, for $2,500. It will bave a four-cylinder 5 by 4 3-4-inch motor, 128-inch wheelbase, and tires 36 by 4 front and 36 by 5 rear.

Franklin Family in Vermont—The Proctor family of Vermont, which has for years taken a prominent part in the political and industrial history of that State, owns nine Franklin cars. The first, an 18-horsepower runabout, was purchased in 1906, and was used mostly for trips between the family marble quarries. Recently a 1910 Franklin 18-horsepower runabout was sent for the use of Redfield Proctor, son of the late senator of tbat name. All of the nine are in steady use.

From the Sunflower State—The Stafford Motor Car Company, of Kansas City, has been organized with a capital stock of $100,000, fully paid up, and will take over the property of the Stafford Motor Car Company, of Topeka, which it succeeds. The plant will be moved to Kansas City about January 15. Terry Stafford continues as president, and the same car will be manufactured. Others interested are C. L. and F. C. Merry, W. G. Whitcomb and C. C. Hoefer.

"Seeley Cure" for Autos—The High-Frequency Ignition Coil Company, of Los Angeles, Cal., which makes the Seeley ignition system, says that this ignition bas been adopted by tbe Columbia Motor Car Company, of Hartford, Conn., for use on its 1910 product. In the Ascot Park races at Los Angeles a Corbin car with Seeley ignition took first in a five-mile and second in a ten-mile.

"Silent Sioux" in Waukesha—The "Silent Sioux," a four-cylinder, 40-horsepower car that was built at Sioux Falls, S. D., last season, will benceforth be made in Waukesha, Wis. The concern, of which R. J. Wells is president, bas leased the former plant of the Waukesba Motor Company on North street, and its equipment is now being removed. The output will be increased to ten a month.

"Red Wing" From Minnesota—The Red Wing Boat Mfg. Company, of Red Wing, Minn., has changed its name to the Red Wing Motor Company, and coincidently increased its capital from $50,000 to $250,000. The reorganized company will build automobiles, which, it is said, will be fitted with a modification of the motor formerly built by the company for use in boats.

The Kero-Car from Dayton—Dayton, O., business men are forming the Kero-Car Motor Company to build an automobile driven, as the name indicates, by a kerosene engine. Tbe new engine is said not to be a freak, either in appearance or operation, closely resembling the standard automobile engine. It will burn, however, either gasoline, kerosene or alcohol.

IN AND ABOUT THE AGENCIES

Rushmore Lamps, Berlin, St. Petersburg, Riga and Christiania—The Rushmore Dynamo Works has recently placed agencies in the capitals of Germany and Norway, and in St. Petersburg and Riga, Russia. Branches have also been opened at 1 Crow street, Dublin, and 33 Victoria Building, Deansgate, Manchester, G. B., in addition to the well-established London and Paris branches.

Speedwell and Perry, Philadelphia—Harry L. McCullough has been selected to manage the Continental Motor Car Company, wbich recently secured the Philadelphia rights for the Speedwell and Parry cars. He is carrying on business from Room 1541 Land Title Building, until repairs are completed on the building at 1416 Vine street, just off the "Row."

Peerless, New York City—The Peerless Motor Car Company announces the opening of new salesrooms and offices at 1760 Broadway, near Fifty-seventh street, New York City. This is the splendid new building of the Peerless branch, wbich affords a location and facilities unsurpassed in the city.

Everitt "30," Philadelphia—The W. Wayne Davis Company of Philadelphia, distributors and factory representatives of the Metzger Motor Car Company, makers of the Everitt "30," is carrying on business in temporary quarters at 207 Nortb 22d street, pending the securing of a location on the "Row."

Thomas, Philadelphia—Frank J. Fanning, formerly of the Chalmers-Fanning Company, has closed with the E. R. Thomas Motor Company to represent the Thomas Flyer in Philadelphia. Mr. Fanning already has the local right for the Mercer, built in Trenton, N. J.

Simms Magneto, New York City—An American branch of tbe Simms Manufacturing Company, Ltd., has just been established at 1780 Broadway, New York City, from where the American trade in Simms magnetos will be pushed with characteristic vigor.

Everitt, Detroit—John A. Sibley and W. J. Casterton have organized the Security Auto Company, and will act as Michigan agents for the new Everitt. A garage 60 by 250 feet, on Woodward avenue near Warren, is to be ready by February 15.

Remy Magnetos, San Francisco—The Remy Electric Company has established a branch distributing office in San Francisco, at 170 Golden Gate avenue, where a complete line of magnetos, fittings and parts will be carried in stock.

Continental, Wimbledon, N. D.—The Indiana Motor Sales Company has appointed More Brothers, Wimbledon, N. D., agents for the Continental in North Dakota and part of South Dakota.

Pullman, Birmingham, Ala.—The Pullman Automobile & Supply Company bas been organized, and has arranged for a garage at Avenue C and Twenty-first street, where it will handle the Pullman.

Palmer-Singer and Simplex, Kansas City, Mo.—In the future the Palmer-Singer and Simplex cars will be handled in tbis city by the L. C. M. Motor Car Company, located at 3816 Main street.

Thomas, Boston—C. S. Henshaw, manager of the E. R. Thomas branch in the Hub, has leased a new salesroom at 587 Boylston street, on Copley square, and will take possession December 22.

Velie, Geneva and Oneida, N. Y.—The Kerr-Doane Motor Company, of Syracuse, N. Y., has appointed Baker Brothers, of Geneva, and F. B. Petrie, of Oneida, subagents for the Velie.

Monogram Oil, Boston—The Boston branch of the Columbia Lubricants Company, maker of monogram oil, has removed from 35 Hartford street to new quarters at 1000 Boylston street.

Mason, Shelby, O.—The American Motor and Supply Company, of Shelby, O., has the State agency for the Mason car, and is erecting a fine two-story garage and salesroom building.

Parry, Baltimore—The General Auto Company will be the local representative of the Parry. The firm bas its salesroom at 12 West Eager street. Joseph M. Wright is manager.

Austin, Boston—Tbe Austin Company has been established to act as agent for this car, and has established quarters in the former Kenny-Clark building at 94 Massachusetts avenue.

Howard Rim, Philadelphia—A Philadelphia branch has been opened at 1411 Race street by the Howard Demountable Rim Company, of Trenton, N. J. H. T. Eisenberg is manager.

Continental, Indianapolis—The Reliable Auto Exchange, of Indianapolis, has been appointed Indiana State agent for the Continental, with an allotment of 100 cars.

Marmon, Louisville, Ky.—The Atlas Machine Company, which represents the Empire, has moved to 735 West Market street and assumed the agency for the Marmon.

Overland, Omaha, Neb.—H. H. Van Brunt has obtained quarters on the south side of Farnum street, near Twenty-second, where he will handle the Overland.

Moline, Houston, Tex.—George W. Beardsley, who has a bicycle establishment on Texas avenue, has taken the agency for the Moline.

Demot, Houston, Tex.—The Imperial Motor Car Company, of Houston, has been appointed agent for the Demot in southern Texas.

Corbin, San Francisco—Tracy Holmes has been appointed agent for the Corbin and will open headquarters on Van Ness avenue.

NEW FIRMS IN WINNIPEG

Winnipeg, Man., Dec. 8—Two new concerns have entered the automobile field in this city during the past month, and there is every prospect of a further increase before the opening of the 1910 season, as the Regal Motor Car Company is looking over the ground with a view to the establishment of a branch in connection with its Canadian factory, under construction at Walkerville, Ont.

The Central Garage Company has secured a long lease on the modern garage erected by an English syndicate as a speculation. The building has a frontage of 200 feet on two thoroughfares and is 110 feet deep, the construction throughout being brick and steel. The company has secured the local agencies for the Knox, KisselKar and Oakland.

The other company is the firm of McRae & Breen, a reorganization of the carriage firm of A. C. McRae. They will place on the market the Overland, Detroit Electric and a good line of commercial vehicles. General trade prospects in Western Canada have never been better. The number of orders already placed exceeds last season's total.

TOLEDO, O., AGENCIES FOR 1910

Toledo, O., Dec. 4—Arrangements have practically been completed by the dealers of this city for their 1910 agencies. The following have been announced: Toledo-Mitchell Company, W. A. Kavanaugh, manager, Mitchell; H. J. Adams, Toledo and Fostoria, O., Babcock Electric; Lichtie Auto Company, Cadillac; Olds-Oakland Company, Oldsmobile and Oakland; Gamble Motor Car Company, Baker, Rauch & Lang and Columbia electrics, and Peerless and Stearns; Patterson & Rault, Rambler; Norris-Toledo Sales Company, Demot, Parry and Velie; Wood-Kessler Company, White steam and gasoline, and Black-Crow; Buick Motor Car Company, F. S. Rockwell, manager, Buick; Regal Motor Car Company, W. S. MacMurray, manager, Regal; Atwood Automobile Company, Overland; Twenty-first Street Garage, Detroit electric and Jackson, Stearns and American; Blevins-Studebaker Automobile Company, Studebaker; Dosson Carriage Company, Paterson, De Tamble and Brush; Union Supply Company, Chalmers-Detroit and Hudson; Roberts-Toledo Auto Company, Ford; Banting Machine Company, Whiting and Grabowsky.

MORE NEW BUILDINGS FOR WILLYS

Toledo, O., Dec. 6—With the mortar hardly dry on one addition, President Willys of the Willys-Overland Company has announced that plans are being made for another, on which work will be started as soon as the weather permits. This new department will be used for the manufacture of commercial cars of both the delivery and truck types. Mr. Willys sees immense possibilities in this line and has determined to enter it as soon as possible. Orders are already being taken for delivery on May 1. Specifications have not yet been published.

MAXWELL AGENTS IN OHIO

Columbus, O., Dec. 6—The Maxwell-Briscoe Columbus Automobile Company, of which Frank Corbett is manager, has announced a number of sub-agencies in its territory. They are: E. D. Valentine, Springfield; R. W. Ferris, Mt. Vernon; J. B. Griffith, Jackson; J. W. Patton, Marion; W. A. Biddle, Urbana; R. C. Fulton & Company, Athens; Dwyer Brothers, London; O. W. Bonnell, Delaware; Martin & Michael, Washington Court House; Amos Johnson, Wilmot; F. P. Arnold, Cambridge; W. P. Bletzacher, Lancaster; M. A. Ryan, Circleville, and S. Siegrist & Sons, Coshocton.

The company will move shortly into the new salesroom at 58 East Spring street, which will have a space of 40 by 140 feet for salesrooms and a repair shop 50 by 16 ft.

NEW THERMOID RUBBER FACTORY

Trenton, N. J., Dec. 4—The Thermoid Rubber Company is now occupying its new building, which is devoted entirely to the automobile lines, the manufacture of brake lining, tubing, etc. The building is of brick and steel construction, 120 by 120 feet, and two stories high. The first floor ceiling is 16 feet high, and the second floor 14 feet on the sides, running to 27 feet in the center. The interior walls are painted white and the machinery black. The building is equipped with lockers and lavatories for the workmen.

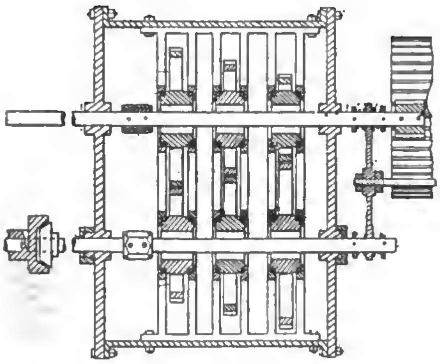
New Brick and Steel Building of the Thermoid Rubber Company at Trenton, N. J.

SOME SELECTED AUTO PATENTS

Issue of August 31, 1909.

932,467. Power Transmitting Device—L. J. Harris, Worcester, Mass. Filed January 10, 1902.

This gear-changing device works, generally speaking, on the individual clutch plan, in which the gears are always in mesh. In all the forms shown in the patent drawings the gearing is of the indirect-on-high type; there are but two solid shafts, the power from the engine being applied to one and the drive to the rear wheels being taken from the other. In addition, the gearing is of the progressive type; the gears must be engaged in their regular order. It will be remembered that the "indirect progressive" was the earliest form of sliding change-gear to be applied to automobile use, and although it has since gone out of fashion, it nevertheless possesses advantages which lead some experts to believe that it will be revived for use on certain classes of vehicles, particularly motor trucks. However, it is probable that the inventor can adapt his gear to the more fashionable direct-drive and selective systems without material modifications.



Harris Individual Clutch Change-Gear

The most noticeable difference from ordinary individual-clutch practice is that the gears not working are not allowed to turn idly. This is accomplished by having the gears on both shafts free, instead of those on one only. Further, it is specified that the gears are actually not in contact with their shafts unless engaged by the clutches. The gears are carried on their own bearings in a separate frame.

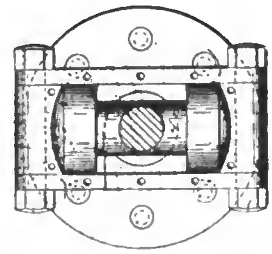
Means of locking the gears to their shafts is provided which has considerable novelty. A hexagonal block of hardened steel is keyed on the shaft. The gears are formed with hexagonal holes through their hubs, adapted to fit the block. By sliding the gears and shaft relatively to each other, the block engages in turn with the hubs of the gears, giving a positive drive. The corners of the block are beveled to guide it into engagement.

The patent covers various combinations of the shafts, gears and hexagonal block, as well as other suitable means, by keys or otherwise, of locking the gears to the shafts as desired. The engaging means, it will be remembered, are provided on both driving and driven shafts. It is possible either to slide the locking devices, the gears remaining stationary, or to slide the frame carrying the gears, the locking devices remaining stationary. The locking devices are suitably cushioned by springs to give smooth action.

Issue of December 7, 1909.

942,087. Universal Joint—Willard C. Lipe, Syracuse, N. Y. Filed November 25, 1905.

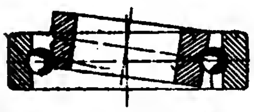
This joint appears to be simpler than many in use at present, and combines both the universal action and the sliding movement necessary to compensate for the variation of distances between centers. It consists of two members to be attached to the two shafts, respectively; two side plates for one of the members and bolts for their attachment. The first member is formed with two projecting arms parallel to its axis, the opposite interior faces of which are formed with concave cylindrically curved surfaces. The two plates mentioned bolt across between the two arms, forming an open-ended socket or rectangular cross-section. The end of the other shaft is formed with a T-head, the ends of the T being suitably rounded and sliding in the concave surfaces of the member on the other shaft. The rotational driving moment is transmitted between the plates which form the sides of the socket and the ends of the T. It is apparent that the device has longitudinal freedom, limited only by the length of the projecting arms of the first member and consequently of the socket.



Lipe Universal Joint

942,392. Ball Bearing—Gustav A. W. Koch, Paris, France. Filed July 14, 1908.

This is a ball bearing of the annular type, and the patent covers especially the method of assembling the same with the balls in place. The bearing is presumably of the "full" type. The patent calls for a ball bearing in which one of the rings forming the races is provided with an "eccentric frustoconical surface" at one side of the raceway to facilitate forcing that ring into its proper relation to the other ring with the balls in place. An additional claim covers "a confining ring for a ball bearing having a concave circular race-way, and a marginal surface on one side of said race-way whose surface is inclined to the cylindrical, the angle of said inclination varying continuously from a certain minimum to a certain maximum."

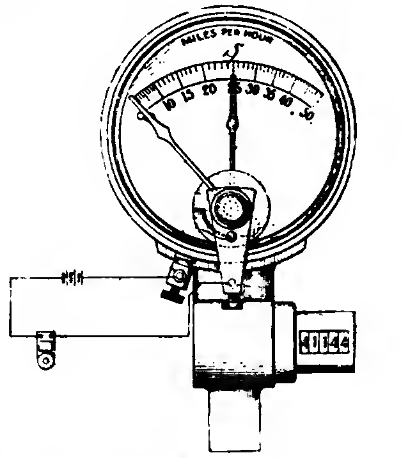


Koch Radial Ball Bearing

942,497. Speedometer Attachment—William R. Harris, Irvington-on-the-Hudson, N. Y. Filed July 28, 1908.

A new field for the inventor's talent has been opened up by the demand in some quarters that automobiles be provided with a device that will show when a certain legal maximum speed is being exceeded. Several devices of this nature have been brought out in England, but this is the first which has come to notice in this country.

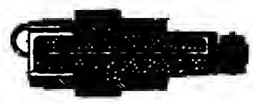
The speedometer itself may apparently be of any ordinary type. It is provided with a second hand, like the "maximum" hand recently brought out, which may be adjusted to any desired position on the scale. This hand carries an electric contact piece connected to one side of a circuit. The speedometer indicating hand carries a similar contact adapted to touch that of the extra hand whenever the figure indicated by the latter is reached or exceeded. The electric circuit of course is provided with a suitable alarm bell which rings when the contact is made.



Speedometer with Harris Speed-Limit Bell

942,567. Automobile Tire—Iva B. Kempshall, Boston, Mass. Filed August 13, 1909.

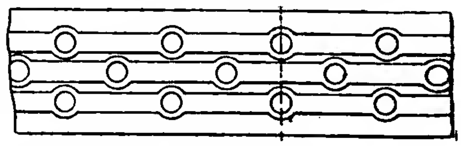
Anti-skid tires are another fruitful field for inventors. This tire is one which has been on the market with considerable success. The patent covers the shape and arrangement of projections on the face of the tire. These are specified as a "series of continuous longitudinal ribs, each of which presents continuous edges around the tire, and is formed with a series of pockets" and a series of continuous longitudinal ribs presenting continuous edges extending around the tire, each of the ribs being formed with a series of enlargements forming protuberances on said edges. These two claims, although embodied in the same patent, seem to cover quite different and distinct ideas in tire construction, as the former, with its "series of pockets" should have a sucking action on the road surface quite different from the effect of the protuberances in the other claim.



Jeffery Non-Sooting Plug

942,646. Electric Igniting Device—Joseph A. and Benjamin A. Jeffery, San Francisco. Filed August 15, 1906.

Although disguised as an "electrical igniting device," this is really only a spark-plug, with an ingenious means for preventing fouling. The claim is for an "electric sparking device with separated terminals, the exposed area of either of said terminals being restricted to a limit where the proximity or surface contact therewith of a medium of lesser conductivity will be insufficient to carry the current without heating such medium to the point of disintegration." In other words, the electric current passing between the points is so concentrated that the "medium of lesser conductivity," that is, the soot or carbon, is simply burned away before it can have any injurious effect. The patent appears to cover some forms of spark-plugs which are at present on the market, although the anti-fouling device is both new and ingenious.



Kempshall Anti-Skid Tire with Ribs

Information for Auto Users

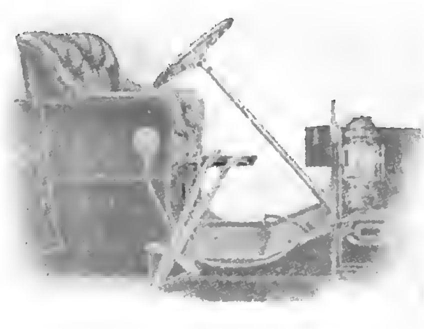
Bi-Motor Wind Shields—These shields manufactured by the Bi-Motor Equipment Company, 177 Portland street, Boston, are in several styles, known under the trade names of the "Boston," the "Hartford" and the "Lincoln." The "Boston" is folding and adjustable. It has no cams, springs or catches, and can be placed in any position with one hand. It cannot be broken by slamming, as it stays in any position in which it is placed. The resistance is adjustable, either for wear or to suit the individual taste. The frame is of 7-8-inch seamless brass tubing, and the glasses are genuine French plate.

The "Hartford" is a drop shield, and is particularly adapted to cars which have the steering wheel so near the dash that there is not room for a hinged shield to swing. The upper glass moves up and down in a vertical position close to the

BI-MOTOR WIND SHIELD, "BOSTON" STYLE

stationary glass. It is made of the same materials as the "Boston" and sells at the same price. The "Lincoln" is a cheaper shield, of the folding type. Its mechanism is different from the "Boston," involving the use of set screws to hold the swinging glass in the desired position. The materials are the same as in the other shields, the lower price being due to the less expensive mechanism. All three shields are made either 36, 39 or 42 inches wide, with 5, 8 or 10-inch mahogany filler boards. Special attention is paid to packing for shipment, to insure reaching the purchaser in good condition.

"Out-o-Site" Seat.—The McKinnon Dash Company, of Buffalo, N. Y., has brought out a simple and inexpensive folding seat with which the capacity of an automobile can be increased in an emergency. It is intended principally for children, although strong enough to support the weight of an adult if necessary. The cut shows it attached between the two front seats, a position which, of course, would be impractical unless the occupant was small enough not to encroach on the driver's elbow



"OUT-O-SITE" SEAT ON A CADILLAC CAR

room. It can also be used in the tonneau, back to back with the front seat, or on the inside of the tonneau doors. It folds flat into the thickness of its own cushion, so would not obstruct the opening of the doors in this position.

The seat consists of a light frame of round steel, handsomely oxidized, which is attached to the framework of the body by four screws, and the seat cushion, also with a steel frame, upholstered in imitation leather. There are no diagonal struts. The seat when open is held in a horizontal position by hook-like extensions of the cushion frame. To close, the cushion is swung up vertically and then dropped down into the supporting frame.

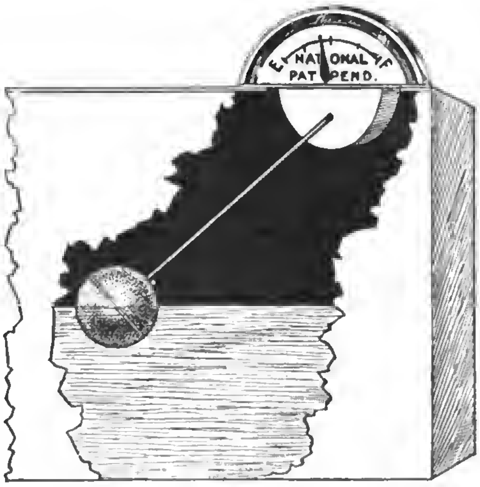
1910 Gabriel Horns—The Gabriel Horn Manufacturing Company, of Cleveland, will continue to manufacture its horns which have given such satisfactory service in the past. In the 1910 models, however, the two lower notes will be operated together, making a perfect chord, which, in combination with the high note, two octaves above, produces a singularly sweet musical effect and also gives great carrying power. The sizes and weights are as follows: No. 2 horn, 2 1-2-inch tube, 30 inches long; weight, 4 pounds; No. 3 horn, 3-inch tube, 32 inches long; weight, 5 1-2 pounds; No. 4 horn, 3 1-2-inch tube; weight, 6 1-2 pounds.

The 1910 valve is the same as formerly except that the lever is made from 3-8-inch stock, and the screws which fasten on the discs are better placed, so as to greatly increase the strength. The valves are made in sizes to fit 3-4 to 3-inch steel tubing and 1 to 2-inch iron pipe. The valve can be used for a muffler cut-out by removing the disc in the main channel.

The Gabriel trumpet is another novelty which this company has recently placed on the market, and which has proved very popular. It consists of four single tubes with a valve on each controlling the tube individually. These are operated by a keyboard carrying four keys. All the ordinary bugle calls can be played on this instrument. The keyboard is also fitted with a small lever which opens all four valves, thereby giving a perfect chord for signalling purposes simply on pressing the foot pedal.

"National" Gasoline Gauge.—For simplicity this gauge will certainly take the prize. It has but one moving part, a bent wire, pivoted, one end of which carries a float and the other the gauge pointer. There are no gears, springs, pulleys, or anything else that could get out of order or stick. The float is of spun brass. The dial is an arc of about 90 degrees, and reads from the side. This makes it easy to see while filling the tank, and at the same time protects the glass from breakage. The dial projects only three-quarters of an inch, so that it will go on almost all tanks under the seat. The gauge body is of brass, nickel plated, and is dust-proof.

Another good feature of this gauge is that it can be adapted to any depth of tank up to 12 inches simply by lengthening or shortening the wire which carries the float. The length of wire for a given depth is specified by the maker. This



FEW PARTS IN THE "NATIONAL" GAUGE

makes easy work for dealers, who do not have to carry in stock different sizes for different tanks. The "National" gauge is made by the National Motor Supply Company, Cleveland, and sells for a very reasonable price.

INDEX TO ADVERTISERS

THE AUTOMOBILE

FRANCE HOLDS A RELIABILITY RUN

BY W. F. BRADLEY

PARIS, Dec. 9—France is holding an automobile realiability trial. It has adopted both the idea and the word from across the English Channel, and explains that the foreign word means "that in which you can have confidence." Thus, as confidence needs to be established more in the smaller types of cars than in their big brethren, the trial has been limited to voiturettes, with dimensions fixed at 4.9 by 5.9 for a single-cylinder engine, 3.9 hy 4.1 for a twin, and 3.1 by 4.7 for a four-cylinder motor.

The reliability trial is simplicity itself; 15 daily stages, totalling 2,000 miles, to be covered at an average speed of not less than 15½ miles an hour, with no other stoppages than filling gasoline, oil and water tanks and changing tires when necessary. As each day's run is finished the car is pushed into a closed garage and locked up until the official starting hour in the morning. Six courses have been selected, but the particular one to be followed is never made known until a few minutes before the start. To come through with a clean score practically amounts to a sealed bonnet competition, but in order not to decimate the ranks too much it is allowed to clean spark plugs, carbureter in case of obstruction, tighten nuts and adjust brakes and driving chains without penalization. Any other work on the car entails the loss of points.

Thirty-three small cars entered for the trials, but on the Sunday morning appointed for the start the number had been reduced to 29 actual competitors, the firms represented being Sizaire-Naudin, Gregoire, Delage, Alcyon, Hurtu, Corre-La Licorne, Barré, Demeester, Doriot-Flandrin-Parant, Turicum, Fouillaron, Rolland-Pilain, and Zenith. This list comprises all of the French voiturette constructors of any importance with the exception of one.

Although the one-lunger has been most highly developed in France for small-car work, it is somewhat surprising to find that they are in a decided minority in this competition. There are only six single-cylinder cars, compared with 23 fours, and no twins. The only firm putting in a full team of single-cylinder cars is Sizaire-Naudin; even they are about to start the construction of a four. Doriot-Flandrin-Parant has one single and two fours, and the others in the one-lunger class are Hurtu and Fouillaron. It would not be safe to conclude from this that the one-lungers are going out of use, but rather that the manufacturers have more confidence in their fours, or prefer to push them in preference to the singles, the public demand for the former being greater.

Delage No. 7, Driven by Haye, Passing the Barre Car in the Climb of the Cote de Bonnieres

From an external examination only it would be impossible for the most expert automobilist to distinguish the ones from the fours. Ninety-nine men out of a hundred would swear, indeed, that the single-cylinder Sizaire-Naudin had a multiple-cylinder motor under its bonnet, while the Doriot-Parant single is an exact counterpart externally of its four-cylinder brethren. If anything, the single cylinders are quieter than the fours, for the former are well muffled, while the latter have that peculiar ring of a small high-speed four-cylinder motor with its exhaust not completely muffled.

Although 15½ miles an hour is all that is required of the cars, no driver is satisfied with such a crawl. On the first two days the average speed of the conservative drivers was 25 miles an hour, while some of the daredevils went very much higher. There was not a single case of failure to make the controls on time, though

Georges Sizaire on the One-Lunger Sizaire & Naudin

Four-Cylinder Zenity—Friction Transmission, Shaft Drive

several failed by reason of minor adjustments which were not allowed under the rules. Although the roads are particularly heavy by reason of persistent storms, it is certain that several will come through with a clean score, and elimination is likely to be caused more by reason of small adjustments than for serious mechanical defects.

One of the most important conditions is that the cars shall be completely fitted with hood, wind shield, running boards, lamps, etc., as for winter touring. In the majority of cases this regulation has been strictly adhered to. A four-cylinder Corre-La Licorne, indeed, with an engine only measuring 3.1 by 4.3 inches bore and stroke, has a closed four-passenger inside-steering body of a nature that is not usually classed with voiturettes. In several cases the letter of the law rather than its spirit has been adhered to, the wind shields being mere apologies for this article. Most, however, are fairly well fitted, though passengers' comfort has not been so well considered on the open touring car as by the English neighbors. The sides of the bodies are too low, side doors are not used, and there is a lack of adequate protection.

Mechanically there is not a great deal of variety in the competing vehicles. Large car lines are followed in the majority of cases for both external and internal features. The four-cylinder motors are for the most part in a single casting, the bore varying from 2½ in. to the maximum of 3.1 in. A long stroke is generally favored. High-tension magneto, without batteries as a stand-by, is to be found on every car in the competition. There are two cases of friction transmission, in one of which the final drive is by single chain and in the other by cardan shaft. In price the voiturettes vary from $850 to $1,200 complete.

The first two days of the trial resulted in six small cars receiving penalization. In each case the defects were minor ones, which did not prevent the cars reaching control on time. Georges Sizaire broke a spring clip; the radiator fan belt jumped its pulley on a Barré car, one Doriot-Flandrin had to tighten up a nut on the intake pipe, and another of the same make had a leaky radiator; a Turicum had to tighten up nuts on its friction plate, and the driver of a Fouillaron stayed outside the garage, filling tanks and looking over his car, until his time had passed.

AMERICA'S STOCK CAR SUGGESTIONS NOT ADOPTED

PARIS, Dec. 15—America's suggestions for stock car races were not adopted at the International Conference of Recognized Automobile Clubs. William S. Hogan received the proposals from the Automobile Club of America too late to give the necessary three weeks' notice, with the result that the matter was introduced to the meeting, but could not be discussed.

To judge from expressions of opinion gathered from the European manufacturers, the American method has little likelihood of finding favor here. Purely stock-car races never have been held in any country of Europe, speed events here being an opportunity of trying out new ideas and not of testing the standard product. Further, Europe is opposed to a piston displacement rule. Such

Turicum Four-Cylinder with Single Chain Drive

Four-Passenger Corre-La Licorne—Inside Steering Body good results have been obtained by classifying cars according to cylinder bore only, leaving manufacturers to adopt as long a stroke as possible, that it would be impossible to convert the European to a rule tending to development of short-stroke engines.

The most important work of the conference was in connection with an international triptyque. The Touring Club of Italy had proposed through its spokesman, the Automobile Club of the same country, that an international triptyque should take the place of the numerous national documents now in use. The matter has been before the road conference and the recent government conference, and there met with approval. The recognized automobile clubs, in order to help the matter forward to a practical issue, decided that each club should study the matter and present a detailed scheme for the realization of an international triptyque at the February 1 gathering of the conference. At the same time they should use their influence with their respective governments toward the adoption of a scheme having for its object the creation of an international automobile passport. There is no real opposition to the Italian scheme, but there are plenty of objections on the part of officialdom against doing things in a way that is not in accordance with their routine. As the scheme would provide an open door into every country in Europe merely on the accomplishment of a single formality, it is one that is worth working for. America's interest in it is real, for she provides a large proportion of the automobilists who travel annually over the highways of the Old World.

John Bull has reason to be satisfied with the results of the meeting, for it was decided that the automatic electric timing apparatus in which he is interested shall be given official recognition, and this or a similar type of instrument made compulsory for all races, either on road or track, of less than five kilometres distance. Colonel Holden, a member of the Royal Automobile Club of Great Britain, invented a timing machine which automatically recorded the passage of a car, and did it so well that the passage of the front and rear wheels was separately recorded at speeds of 80 miles an hour. The machine was proposed for compulsory adoption, but not immediately accepted. Now it has been decided that this method of timing shall be employed wherever it is desired that the records shall have official recognition. In order not to give the English colonel a monopoly, the conference declared that any type of automatic machine could be employed provided it was capable of recording one-fifth of a second.

The relations between the National Automobile and the National Aero clubs is a matter now troubling Europe, and have been placed in the hands of a special committee.

Gregoire Voiturette Leaving Garage to Compete in the French Reliability Trials

NINE VEHICLES SUCCEED IN MILITARY TRIALS

Paris, Dec. 15—Intimation has been given by the Minister of War that nine different types of automobiles proved satisfactory in the recent commercial and military trials held by the Automobile Club of France, and have met with the approval of the military jury. As soon as the necessary funds have been voted by Parliament, and this will be done within a few weeks, these nine types can be offered to private users with the advantage of a subsidy on condition that their owners guarantee to present them for annual inspection and to place them in the hands of the army in case of mobilization. The subsidies amount to $600 per vehicle for the first year and $200 for each of the three succeeding years. All that the army requires is that the subsidized vehicles shall be similar in every respect to those presented in the competition. This will give France a fleet of commercial automobiles ready for army purposes at a moment's call, and always kept in the best of condition, the annual inspection and the fact that they are employed for ordinary commercial purposes assuring this.

The vehicles selected are two four-cylinder Aries trucks carrying three-ton loads; two four-cylinder Aries carrying four-ton loads; a 15-horsepower three-ton two-cylinder Delahaye; two four-cylinder Delahaye trucks, each taking four-ton loads; two Berliet, two two-cylinder Cohendet, two De Dion, two Saurer, and two Vinot-Duguingand.

STRIKE OF HARTFORD TIREMAKERS

Hartford, Conn., Dec. 21—As a result of a wage cut, about 100 tiremakers at the Hartford Rubber Works Company went on strike this morning. The strike proper began Monday morning, when a number of the tire builders failed to show up for work. The factory has been running twenty-four hours a day for some time, so that there are two shifts of workmen. Those in to-day's demonstration were of the day force. Rumors of advanced prices in crude rubber have been spread for some time, and it was said might be used as a reason for a general wage reduction. No definite cause has been stated as yet. The local tiremakers are paid by the day—earning from $1.75 to $3—and the cut, which ranges from 15 to 33⅓ per cent., averages 24 per cent. for the whole body. The tire builders have no union, and this phase does not enter into the question. The strikers congregated at the works this morning and induced others to join them, and then formed a demonstration and marched to a nearby hall for a prolonged meeting.

Justen D. Anderson, president of the Hartford Rubber Works Company, when asked as to the strike, said that he had nothing to say.

Aitken, Driving the National, Broke All American Records for Stock Cars

SPEEDWAY RECORDS DESPITE ZERO WEATHER

INDIANAPOLIS, Dec. 18—Considering the weather conditions, the speed trials on the Indianapolis Motor Speedway yesterday and to-day could be termed eminently successful. The events, which were the first on the course since the track has been paved with brick, merely gave an indication of what may be expected when the weather is more favorable.

The speedway management, in fact, is fairly well satisfied with the results. With the thermometer hovering near the zero mark, causing frequent carbureter trouble, and with the drivers suffering from the intense cold, some remarkable time was made. The most notable feat was that of Strang in his 120-horsepower Fiat covering five miles in 3:17.70, establishing a new record, the former record for thed istance being 4:11.3, held by Oldfield and established on the local course last August.

Inclemency of weather detracted somewhat from the mass of interested spectators, yet the total attendance was quite satisfactory, being of the substantial sort, to whom a little detail like zero weather would have but small influence in the face of the expected performance, nor can it be claimed that they were disappointed. Then, there were opening speeches, congratulatory opportunities, the meeting of workers in the vineyard, they who stood shoulder to shoulder in the good fight.

Ceremonial Placing of the Last Brick

Just prior to the first trials yesterday afternoon, the ceremony of placing the last brick in the course was held in front of the judge's stand, at the finish line. This brick is of coin silver, plated with gold and weighs about fifty-two pounds. It was placed in position by Governor Thomas R. Marshall, assisted by his private secretary, Mark Thistlethwaite.

Stillman, Warmly Hooded, at the Wheel of the Marmon

Newell Motsinger, driving a 20-horsepower Empire, was the first to start after a record on the new brick course. He entered in the class for cars having a piston displacement of 160 cubic inches and under, and was the only entrant. Summary of the afternoon:

Class 5—160 inches and under piston displacement—Empire No. 10 (driven by Newell Motsinger, only entrant), one-fourth mile in 18.73 seconds, one-half mile in 38.18 seconds, one kilometer in 48.31 seconds, one mile in 1 minute 20.46 seconds.

Class 4—161 to 230 cubic inches piston displacement—Cole No. 9 (driven by Endicott, only starter), one-fourth mile in 15.69 seconds, one-half mile in 31.70 seconds, one kilometer in 39.88 seconds, one mile in 1 minute 05.97 seconds.

Class 2—301 to 450 cubic inches piston displacement—National No. 5 (Aitken, driver), one-fourth mile in 11.60 seconds, one-half mile in 23.20 seconds, one kilometer in 30.20 seconds, one mile in 49.20 seconds.

National No. 4 (Kincade, driver)—One-fourth mile in 11.80 seconds, one-half mile in 22.60 seconds, one kilometer in 30.20 seconds, one mile in 50 seconds.

Class 1—451 to 600 cubic inches piston displacement—Packard No. 12 (O'Donnell, driver, only starter)—One-half mile in 27.80 seconds, one mile in 58.60 seconds.

Free-for-all, Flying Start

Car and Driver	1-4	1-2	Kil.	Mile
Christie (Christie)	:08.78	:18.13	:23.91	:47.06
Christie (Christie)	:09.02	:19.17		:46.22
Fiat (Strang)	:11.60	:21.96		:46.18
Fiat (Strang)	:09.10	:18.84		:40.61
Fiat (Strang)	:09.21	:18.83	Time not taken	
National (Aitken)	:14.99	:21.04	:23.13	:50.53
National, 6 cylinder (Aitken)	:09.81	:21.08		:45.00
Motorcycles				
Indian (Huyck)	:12.22	:25.02		:54.38
Indian (Huyck)	:12.85	:25.51		:52.60
Thor (J. Merz)				:54.56
Thor (J. Sink)				1:04.28

Free-for-all; Twenty Miles

Car and Driver	5	10	15	20
No. 5. National, 40-hp. (Aitken)	4:06.56	8:12.10	12:17.01	16:18.41
No. 4. National, 40-hp. (Kincaid)	4:04.73	8:10.60	Gasoline gave out	
No. 9. Cole, 30 (Endicott)	5:20.51	10:41.35	16:02.44	21:22.11
No. 10. Empire, 20 (Motsinger)	6:28.14	12:45.22	19:13.27	25:50.43
No. 6. Marmon, 32 (Stillman)	4:17.40	8:33.10	12:47.10	17:02.74
No. 7. Marmon, 32 (Marmon)	4:25 88	8:50 83	13:21.20	17:52.88
No. 12. Packard, 30 (O'Donnell)	4:42.69	9:23.35	13:59.81	18:43.83

Strang's Five Miles Fastest on Saturday

The sun to-day was a bit warmer, but nevertheless the wind made driving decidedly unpleasant. Nothing longer than five miles was attempted, in which, however, a new record was established for one mile on the track, and also a new record for five miles. These trials, briefly summarized, were as follows:

Car and Driver	1-4	1-2	Kil.	Mile
Christie (Christie	:09.04	:18.11		:50.10
Christie (Christie)	:08.92	:18.23	:24.50	:42.58
Christie (Christie)	:08.37	:17.53	:22.86	:43.03
Christie (Christie)	:08.70	:18.08	:23.45	:43.77
Fiat (Strang)	:09.07	:18.62	:23.65	:39.21
Fiat (Strang)	:08.92	:18.39	:23.36	:39.36
Empire. 20 (Motsinger)				1:17.03

Strang's time for the five miles—3:17.70—was easily the sensation of the meet. He had a flying start before starting on the five miles. This mile flying start was as follows: One-fourth mile, :08.05; one-half mile, :17.82; one kilometer, :22.70, and the mile, :40.02. His first mile of the five miles is given above, being in :39.96. His time for the first lap of two and one-half miles was 1:38.80. The first mile of the second lap was made in :39.66, the quarter of this mile being :09.02; the half, :18.62, and the kilometer, :23.52.

The drivers suffered intensely from the cold. Despite the fact that they wore heavy gloves and had their faces protected by woolen bandages they were almost frozen during the trials. When they stopped their cars they could scarcely move their bodies and frequently had to be lifted out. Once after Strang had completed a trial he found his face was almost frozen and washed it in the icy water of the stream that runs nearby.

C. H. Werner, of the Werner Instrument Company, Beloit, Wis., had charge of the timing. The same special Werner timing device that gave such excellent satisfaction at the previous local meet, as well as at the one at Atlanta, was used. Only once was trouble encountered, and that was when the one kilometer wire was damaged.

Officials of the meet were: Honorary referee, Gov. Thomas R. Marshall; referee, Frank H. Martin, Chicago; starter, Fred J. Wagner, New York City; announcer, E. A. Moross; paddock manager, O. G. Temme, Chicago; board of judges, C. G. Sinsbaugh, Chicago, Robert H. Kramer, Mudlavia, Charles Root, Chicago, Thos. Hay, Chicago; board of timers, F. W. Kohl, Cleveland, Frank Remy, Anderson; scorer, John S. Cox, Terre Haute; timing director, C. H. Werner; representative of racing board of A. A. A., C. W. Sedwick; clerk of course, W. H. Wellman; director of contests, E. A. Moross, Indianapolis.

The trials were with the sanction of the A. A. A. Not a single accident marred the two days' events, and from indications, as it would seem, this track will have a vast influence on the future of racing, partly because of the new records, which were established under adverse conditions, and again, since safety is established under speed conditions. That the banking angle, as

Strang at Wheel of Record-Breaking 200-Horsepower Fiat

it obtains at Indianapolis, is a wise one, seems to be proven, and those who may have had to struggle with this important matter will fully appreciate how apparently simple it looks to fix the angle of banking, and yet, in an actual trial the simple fixing fails to deliver satisfaction.

Despite the exactness with which the present angle of banking seems to satisfy the conditions of racing, which angle, it will be remembered, is maximum at 36° 40", other means of safeguarding the course are available, as for illustration, the buttresses are reinforced, all around the curves, as shown in the title illustration, so that they project up, and above, some 33 inches. These reinforcements are of concrete, with a 9-inch thickness of wall at the top, tapering off to give strength and stability. Under the new conditions safety is further assured. due to a 15-foot sweep on each side of the brickway, the same having been leveled off after having been filled in with a depth of filling, the same having the characteristic of rolling down firm, and the further property of remaining so, even under conditions of protracted inclement weather. This wide sweep on each side of the track assures that a disabled car going at top speed will have a wide field in which motion may be arrested, thus affording the driver and his mechanician reasonable opportunity.

The management is to be congratulated for its persistence, having expended a vast sum of money in brick-paving the track, after it was found that no other class of pavement could be regarded as safe, considering the possible speeds of modern racing automobiles. That all records will be broken, under fair conditions of weather, is now assured.

Governor Marshall, of Indiana, Placing the Golden Paver Which Completed the Track Into Its Position

Yielding Wheel with Steel Side Plates Removed

ANOTHER FRENCH SPRING TRUCK WHEEL

PARIS, Dec. 8—France, always active in the spring wheel line, has produced another. This one, shown in the two accompanying pictures, is not strictly a spring wheel, in that no springs are used, at least springs do not form the major part of the design. They do, however, belong in the same class, for the idea is to do away with pneumatic tires. As the illustrations show, there is an outer tread of hard rubber, within which a layer of soft rubber forms a yielding felloe. The latter is made in many small sections, with holes through them, through which holes the bolts to hold on the steel side plates pass. Below this, in turn, there is another felloe of wood, attached to the ends of the spokes in the usual manner. But between the two is a sort of air bag, which may be inflated somewhat, increasing the yielding effect of the whole wheel, which is the desired object.

Same Spring Wheel Complete Ready for Use

OLYMPIA SETS NEW BODY FASHIONS

LONDON, Dec. 7—As was stated in the last report of the mechanical features of Olympia, chassis fashions have not altered greatly, except in details. The same thing, however, cannot be said about the carriage work, for on all sides there is evidence of great improvement. The reason for this is not far to seek. In previous years the attention of both manufacturer and user has been centered on the "machinery" to such an extent that there has been comparatively little interest available for the body builders' department; but now the chassis is becoming less in need of continual improvement, and, in consequence, the importance of the carriage portion of the car has grown considerably.

In open cars, the striking features are general adoption of high side doors for the front seats, and the prevalence of the flush-side, or torpedo style of body. These side doors make such a distinct improvement, both in comfort and in appearance, that it seems surprising that all bodies were not thus fitted long ago. To afford a maximum of comfort, the doors must be as high as the arm rests of the front seats, and the result is that with a very short body or a carelessly designed two-seater, the effect may not be pleasant to the eye. With this exception, however, the front doors may be taken to be a very material improvement.

The flush-sided body is immensely popular, and, as might be expected, there is much rivalry between makers as to which was the originator of the type. Captain Masui, of the Germain Company and the Hewer Body Company, Coventry, seem between them to have been the responsible parties, but it is interesting to note, as showing the quick development of the type, that no example can be traced previously to the summer of 1908.

There are many varieties to be seen—some of which bear but little resemblance to the original type. To be most effective the body must be joined on to the bonnet by a sloping line, so that the top of the car may present an unbroken outline from the radiator to the hood at the rear. Hence, it will be recognized that this body is seen to best effect when the front of the car is on Renault lines, or, if otherwise, when the bonnet and radiator are higher than the average. The former case is well exemplified by the Arrol-Johnston, the latter by the Hobson car

A special feature in favor of the flush-sided body is that it can be made specially light, for the framework can consist of a properly braced wooden skeleton with sheet metal panelling In passing it may be stated that aluminum is becoming less popular as a material for panelling, its place being taken by sheet steel.

There also seems to be, this year, an increase in the proportion of covered cars, not only in the case of town carriages, but in touring vehicles also. Popular opinion favors the convertible type, such as the landaulet or the cabriolet rather than the limousine. The cabriolet, in particular, is becoming fashionable. somewhat in the same way as the torpedo in the open body section. A year ago it was the exception to meet with a body of the cabriolet type, but at the present exhibitions there are a dozen staged by various makers. It is unquestionably more expensive to make than either the limousine or the laudaulet, but its great advantage as a completely convertible carriage is likely to make it come into general favor with users of high priced cars. More than this, it fills a special field midway between the enclosed and open bodies, in large establishments, having a distinct usefulness for afternoon strictly of its own.

Other noticeable advances are the general use of electric lighting for cars of every type, and also the provision, in many cases, of a black leather hood in place of the cape cart hood of canvas almost invariably used before.

Luggage carriers at the rear of the covered cars are now usually fitted, instead of the grid on top of the body. When a rear petrol tank is fitted the filling orifice is arranged at the side in such a way that it is accessible without removing the luggage.

Latham with a Pupil in Antoinette Two-Seated Monoplane, Which He Calls "The Taxicab"

YOUNGER FARMAN MAKES CROSS-COUNTRY RECORD

PARIS, Dec. 10—Maurice Farman, younger brother of the aviator Henry, now holds the world's record for long-distance cross-country flying. Starting from his shed at Buc, about twelve miles from Paris, he made an uninterrupted flight as far as the suburbs of Chartres, 44 miles away, in the record time of 59 minutes. His average height was 280 feet.

Maurice Farman has had his flight in view for over a month, but owing to bad weather has not been able to put it into execution earlier. After heavy storms a complete calm prevailed yesterday, the biplane was brought out, quickly prepared, and at 3 o'clock in the afternoon soared away for the city on the Beauce plain. Owing to the uneven nature of the country, Farman did not steer a perfect straight course, but at the outset flew westward, instead of southwest, in order to get directly over the main road from Versailles to Rambouillet, which lies in level country. After crossing the forest of Rambouillet, sacred to the presidents of France, the Cathedral of Chartres could be seen nearly thirty miles away. The country was level with the exception of a portion just outside Chartres, where a deep valley had to be crossed. The main road and the railway served to guide the aviator, who took up a course between the two, and was clearly visible to the occupants of the trains.

It is very probable that Farman will continue his journey as far as Bordeaux, nearly 300 miles from Paris, taking it in several stages. There is a fascination about a flight from Paris to Bordeaux, for it is over this road that the first long-distance cycle races were held and later some important automobile races.

Maurice Farman's biplane is a machine of his own design built for him at the Mallet factory. In general features it resembles the aeroplane employed by his brother Henry, though its details are distinctive, and are entirely the outcome of Maurice Farman's personal research. The motor is an eight-cylinder air-cooled Renault, with the cylinders in V. In order to obtain a slow-speed propeller without the use of special reducing gear, the camshaft is strengthened considerably and receives the propeller on its extension. The propeller is a two-bladed type built by Chauviėe, having a diameter of 8 feet 3 inches, and turning at 700 revolutions a minute. This is the first occasion on which the Renault motor has been used for an aerial flight of any importance. Farman declares himself thoroughly satisfied with his motor, but he is responsible for much of its success, by reason of the detail modifications he has made and his careful tuning-up.

Maurice Farman, the youngest of the three brothers, is a pioneer in the automobile world. Before the self-propelled vehicle came into existence he was a successful cyclist, forming a team with his brother Henry, which could never be beaten. He entered the automobile industry as soon as it sprang up, driving high-powered cars in most of the early races, generally for Panhard-Levassor. He is now at the head of the Palais d'Automobile, together with M. Neubauer, his establishment being by far the largest automobile garage in Paris. Maurice Farman was a balloonist before becoming an aeroplanist, at one time holding the French record for long-distance travel. All his aerial experiments have been carried out in the spare time obtainable from his business, this explaining the slower rate of progress compared with his brother Henry.

TWO HOURS' PRACTICE MAKES AN AVIATOR

DETROIT, Dec. 20—"Driving an aeroplane is a matter of two hours of practice," said Wilbur Wright during his visit here to attend the organization of the Aero Club of Detroit. "I can take a man up and in two hours he will know enough to run the machine. You ask why it is that men did not operate aeroplanes before. I will tell you. Men did not have the art of balance, they did not know how. That is all. We brought out the aeroplane and gave to the plane a balance which made things possible that were not possible before. I do not know that you were ever caught on a cake of ice in midstream. The ice, if so, rocked with you. When it tipped one way you naturally went across to the other side to bring it to a balance and then you went to the center to hold that balance. It is a good way that way with an aeroplane."

"But they say that you have not really shown the possibilities of the aeroplane and that you have held back in your demonstrations; in other words, that you have never shown the real possibilities of the aeroplane in flight?"

"That is not altogether true, for we have made some flights which should have shown the possibilities of the machine. However, greater things are coming than any that have been seen."

"It was too bad that you should have had trouble at New York when you might have sailed around the city." Wright answered:

"That was bad, but it happened on the ground, and had my engine have blown out a head in the air things might have been different. I am glad, rather glad, that it happened where and when it did, but I should have liked to have made that flight."

In speaking of the jump made from the bicycle to the aeroplane, escaping the automobile, Mr. Wright, whose brother smiled at the thoughts, said: "We did not altogether jump from the bicycle to the automobile. A friend of ours had an automobile in Columbus and we did a lot of work helping him to make the thing run. Then we planned on flying and our interest in the troublesome automobile vanished. Our time was given to the aeroplane and to experiments."

When the subject of Tillinghast and his reported flight from Boston to New York and back with two other men was broached to him, Mr. Wright said: "I did not read that story at all. I was called up by a New York paper with regard to it and had to tell them that. However, I do not really believe that that flight was made. It is, of course, true that lots of people are working on aeroplanes throughout the United States, and perhaps they have struck it as we did; but from Boston to New York and return with the motor going wrong in the air and being repaired without alighting, never."

Approached in regard to a location in Detroit for an aeroplane factory, both Wrights refused to talk outside of stating that they had already seen several locations.

The Wright brothers conducted a small bicycle company away back in 1893 and 1894 at Columbus, O. "It's a far flight from then until now," laughed Wilbur Wright, "for when we made bicycles to run on the ground we hardly planned to some day ride in the air, but we are doing so now. That was one great day, the days of the bicycle, but this is another, and we have just skipped over the automobile day, spending our time, while others made fortunes in automobiles, in developing the third stage, the aeroplane."

When the subject of his participating in flights during the coming year was brought up to him, Orville Wright said: "We shall undoubtedly delegate most of that to others and attend to business. The demands upon us for business will compel us to retire from the field of contest. However, there is altogether too much enjoyment in a real flight to ever keep us out of the air. Our flights will be made in private, however. It is not really our intention to take part in public contests."

Both of the Messrs. Wright laughed over the efforts of the photographers to get into touch with them while they were at work at Kittyhawk, N. C., experimenting with gliders. "There was one photographer down there (it was Jimmy Hare of Collier's) who laid low day after day for us and got something. Others have followed the same tactics since. We are now rather accustomed to being photographed and do not mind it so much. But some men with cameras are an awful nuisance."

AUSTRIA'S FIRST STEPS IN AVIATION

Berlin, Dec. 11—Austria's first home-made aeroplane has stood its primary test well on the aviation ground near Vienna, where it achieved a flight of nearly five kilometers, guided by the constructor, Etrich.

Berlin's example in opening an aero section in the Post museum might well be copied by other large cities, for it is a decided step in the right direction. The postal authorities have placed an order for models of four aeroplanes and two airships with a local firm, and permission has been requested from the war office to carry out a replica of the Gross as well as the Zeppelin and Parseval already ordered. The aeroplanes are copies of the Wright, Blériot, Latham and Grade flyers, and will be exact in every detail, even the same kind of wood being used as in the originals. All the aeroplanes are to be one meter in length and one-and-a-half over all, while the Zeppelin is a seven-meter copy of Zeppelin III, and the Parseval on the same scale proportionate to the original. Each part is to be numbered and full information given on a table over each apparatus.

PROVISIONAL CALENDAR OF 1910 EVENTS

Paris, Dec. 16.—An attempt is being made by the aeronautical associations of Europe to draw up a calendar of events for 1910 in order to prevent clashing. The first list has been drawn up by the Aero Club of France, and will be submitted to the Mixed Commission in order to be modified by them if any clashing is likely to take place. The following is the provisional list:

February 6 to 13, Heliopolis meet, Egypt. Prizes, $42,400.
April 1 and 2, Biarritz meet. Prizes, $40,000.
April 3 to 10, Cannes meet. Prizes, $1,600.
April 15 to 25, Nice meet. Prizes, $48,000.
May 7 to 9, Croix d'Hins, Bordeaux, meet. Prizes, $8,000.
May 14 to 22, Lyons meet. Prizes, $30,000.
June 5 to 12, Vichy meet. Prizes, $6,000.
July 3 to 10, Elimination race for Gordon Bennett contest.
Sept. 4 to 11, Croix d'Hins, Bordeaux, meet. Prizes, $40,000.
Sept. 23 to 30, flight from Havre to Trouville and Deauville, across mouth of River Seine. Prizes, $40,000.

In addition to these events, with a total prize list of $256,000, there are several others not yet included on the programme, among them being the second Rheims meeting and the Automobile Club of France's flight from Paris to Brussels. Prizes which are eligible for competition any time during the year are not included in the programme.

SEEK PERMIT FOR LOS ANGELES MEET

Action on the application of the Aero Club of Los Angeles for a license for an aeronautic meet in that city will be taken at a meeting of the board of directors of the Aero Club of America December 22. The proposed meet is supported by both the Los Angeles Club and the Merchants' Society, and as the principal desideratum in the granting of a license is the financial responsibility of the promoters, it is highly probable that Los Angeles will get the meet.

The meeting is intended to begin January 3 and last ten days, and $80,000 prize money has been raised. Louis Paulhan, the French aviator, has been engaged, and sailed from France Tuesday. Glenn Curtiss will also appear, and it is said that there may be no less than six Curtiss machines present. Their pilots, besides Mr. Curtiss, will be C. F. Willard, C. K. Hamilton, C. B. Harmon, A. P. Warner and M. de Riemsdyk, a Netherlandish aviator who has been flying at Hammondsport, N. Y., recently.

ALEXANDER WINTON BUYS AN ANTOINETTE

Cleveland, Dec. 17—During his recent European trip Alexander Winton, the president of the Winton Motor Carriage Company, ordered a 50-horsepower Antoinette monoplane, which is to be delivered in this country next May. This machine is of the type with which Latham holds the present world's record for altitude. The standard Antoinette machine measures 36 feet across the wings and 34 feet from propeller to rudder. It has 280 square feet of supporting surface and weighs 1190 pounds

ROCHESTER, N. Y., AERO CLUB FORMED

Rochester, N. Y., Dec. 17—The Aero Club of Rochester was formally organized here last night with a membership of sixty-five. President Taft, Governor Hughes and the Mayor of Rochester are honorary members, ex-officio. Incorporation papers have been prepared, and will be filed at once. The new club expects to hold a big aviation meet next Fall.

WILL HAVE AERONAUTIC MOVING PICTURES

Baltimore, Dec. 19—Moving picture proprietors have become interested in the movement of the Aero Club of Baltimore to have the next international meet on a site somewhere between Baltimore and Washington. These gentlemen got together and made a subscription of $1400 toward the $50,000 fund.

ROADS BUILDING NEWS FROM ALL OVER THE COUNTRY

MASSACHUSETTS' LOSS IS CALIFORNIA'S GAIN

BOSTON, Dec. 20—The cause of good roads in Massachusetts loses one of its ablest advocates in the resignation, announced to-day of Austin B. Fletcher, secretary of the Massachusetts Highway Commission since its organization sixteen years ago. But Massachusetts' loss is to be another State's gain, for Mr. Fletcher is leaving here to take charge of road building on a very large scale in Southern California. He will have full charge of the construction of 400 miles of high-class roads, which is half as much mileage as there is in this State, and to begin the work he has available an appropriation of $1,500,000. Good roads have been advocated in Southern California for some time.

After the appropriation was made, it was determined to obtain the best possible authority to have charge of the work. Mr. Fletcher has a national reputation as an authority on road construction, and he was offered the position together with a most attractive salary. A few weeks ago, he went to California and after investigating the conditions, decided to accept the offer. He will leave Boston about the first of the year.

When the Massachusetts Highway Commission was organized sixteen years ago, Mr. Fletcher became its secretary. The Commission was then a comparatively small affair and was engaged in the construction of samples of improved road for the education of local communities. This work gradually broadened until the Commission has now under its jurisdiction about 800 miles of highway stretching from Massachusetts Bay to the Berkshires, and from the southern to the northern boundaries.

In all this road work, Mr. Fletcher has been a most valuable assistant of the commissioners. A year ago last summer he was one of the delegate from this country to the International Road Congress in Paris. He has often spoken at road conventions in the United States and has written much on the general subject of good roads.

In addition to his connection with the road department of the commission Mr. Fletcher has been prominent in the development of the administration of the automobile law, a duty which has been in charge of the commission since the passage of the first automobile law in 1903. He has been largely in charge of the systems of registration of cars and licensing of operators devised to meet the different requirements imposed from time to time as the law has been changed.

It was largely under his direction that the most recent plan for registering automobiles on a horsepower basis was arranged. He also had direction of the two road censuses taken this summer, which were the most comprehensive ever undertaken in the United States. Mr. Fletcher has also had an important part in the other department of the Highway Commission"s activity, which is the supervision of the telephone and telegraph companies operating in Massachusetts.

OHIO OBJECTS TO FEES BASED ON HORSEPOWER

COLUMBUS, O., Dec. 20—The announcement that Chairman Ritter of the House of Representatives Finance Committee will present a bill in the next session of the General Assembly providing for an incrase in the registration fees for automobiles, based on their horsepower, has aroused a storm of opposition. Automobile owners believe that the present fees are sufficient.

One of the chief arguments against the Ritter bill is the likelihood of its being declared unconstitutional, as the Ohio constitution makes no provision for State licensing. The present fee is classed as a fee for registration only, but it is argued that as it costs no more to register a 60-horsepower car than an electric runabout, a sliding-scale fee would be distinctly a license.

LIVE PLANS FOR LANCASTER COUNTY

LANCASTER, PA., Dec. 20—As the farmer and the automobilists are steadily getting closer together in road matters, the actions of every progressive automobilist and automobile club are of great interest to our readers. One of the most efficient organized bodies of workers for highway improvements of all the automobile clubs in the United States is the club of the historic old town of Lancaster, Pa. The efforts of this club during the past several years have brought much benefit to the farmers scattered throughout entire Lancaster county. Roads have been improved where previously lethargic road officials permitted them to be neglected. Signboards over Lancaster county have been erected, and the law enforced compelling supervisors to remove loose stones from the roadways. Stubborn and inefficient turnpike companies have been brought to terms and been made to improve the roads over which they exacted toll tribute, and generally better roads have been brought about by the activities of the club.

As the club's good-roads efforts during the past year have been very conspicuous, the management is able to announce that Supervisor John F. Weaver, one of the most practical roadmakers in the country, has accepted an invitation for a practical talk on "Road Making From the Farmers' Standpoint." West Lampeter township, from which he hails, was the first township to accept the club's offer of a King drag last Spring, and was the first township to officially inaugurate this system of dirt road maintenance.

Another guest will be Joseph H. Weeks, president of the Delaware County Automobile Club, who will talk on the newly formed Pennsylvania Good Roads Association, and its efforts to get the Lancaster turnpike repaired between the Gap and Coatesville. A number of Chester county automobile men, Harrisburg Motor Club men and some Philadelphia Automobile Club men have signified their intention of being present.

KENTUCKY MOTORISTS INTERESTED IN INDIANA ROADS

LOUISVILLE, KY., Dec. 20—Constitutional obstacles to good roads in Kentucky having been removed, that State, at least the motorists of that State, are greatly interested in the efforts for good roads being made in Southern Indiana. The merchants of New Albany, together with the farmers of Floyd County, are taking steps toward the betterment of the roads in that county.

Roads through this section of the Hoosier State lead to the Kentucky and Indiana bridge over which motorists travel to enter Kentucky. Floyd County particularly is far behind other counties in Indiana. The only toll roads in the State now remaining are in this county, all the others being free.

There was a movement on foot some time ago to have the county take over the Paoli and Corydon turnpikes and make them free, but as there is a prospect of the pikes being sold to traction companies for the building of electric lines between New Albany and French Lick, and between New Albany and Corydon, the scheme has been temporarily abandoned.

It has developed that some of the farmers in Floyd and other counties are depending upon a proposed act of Congress to secure good roads, and as this is a visionary scheme, the farmers are urging the County Commissioners to pay more attention to road building and repairs.

An election will be held on December 18 for Road Supervisors in New Albany and other townships in Floyd County and in the Third District. If capable men are selected to fill these positions it is expected that the good-roads movement in Southern Indiana will receive an impetus worthy of the approval of the automobilists.

BOSTON, Dec. 20—On January 1 the new Massachusetts automobile law goes into effect. The law was passed last June, and the first of July four sections took effect. These relate to the equipment of cars, brakes, lights, etc., rules of the road, speed limits, and special speed regulations. On the first of this month certain other sections permitting the Massachusetts Highway Commission that is charged with the administration of the law to prepare blanks and forms for the registration of cars and the reissue of licenses became effective, and under these sections the commission has been issuing registration certificates on a sliding horsepower scale from $5 to $25 and new licenses to be used after the first of January.

Ten Days for Non-Residents—The main body of the law, however, goes into effect on the first of the year, and a summary of the more important changes may be useful. The rights and privileges of non-residents have been somewhat enlarged by the new law. Under it a non-resident or his chauffeur may operate in Massachusetts for ten days instead of seven without securing a state registration or license, and if a non-resident desires to operate his car here only during the months of July, August and September he may have it registered at half rates. As heretofore a non-resident convicted of violating the automobile law must secure a state certificate and license. A new distinction is made under the law. Persons previously designated as private operators are under the new statute operators, and chauffeurs include everybody who operates for hire, but manufacturers, agents, dealers and salesmen.

Half-Rate Registration—Under the sections relating to registration provision is made for half-rate registration after the first of October in any year and for rebates or increased payment when registering a new car of lesser or greater horsepower than that previously registered. Motor cycles will not have to carry numbers as in the past, but will have small seals affixed to the machines and the registration of a motor cycle carries with it the right to operate without payment of an additional fee. The number of registration plates allowed manufacturers and dealers for their fee of $25 is limited to five with an additional fee of $5 for each additional set of plates. A new requirement relating to number plates is that they must be horizontal and not less than 8 or more than 36 inches from the ground, and the rear plate must be illuminated at night so that it is visible at a distance of 60 feet.

Age Limit Is Sixteen Years—There will be no more driving of motor cars by children for the law sets a limit of 16 years on applicants for operators' licenses and 18 years on applicants for chauffeur's licenses, and a licensed operator accompanied by an unlicensed person at the wheel is made liable for any violation of the law by the person driving.

One of the most striking changes in the law is the cancellation of all the licenses that have been issued in the past six years to private operators and the placing of the license matter upon the same annual basis as registration certificates. There have been issued since 1903 something like 35,000 operator's licenses and until now they have been perpetual. Their renewal costs fifty cents each.

Penalties More Drastic—Material alterations are made in the penalties to be imposed for infraction of the new law, and the penalties are more drastic than formerly. Minimum penalties of $10 for a first offense, $25 for a second and $50 for a third are established, the maximum penalties remaining at $25, $50 and $100. The maximum fine for reckless driving, operating while under the influence of intoxicating liquors or so that the lives or safety of the public might be endangered, operating for the purpose of making a record or on a bet, wager or in a race, going away without stopping after an accident and using a motor vehicle without authority, is increased from $100 to $200, and for a second conviction for any of these offenses the penalty is imprisonment from one to two years. Any officer authorized to make arrests may arrest without warrant and keep in custody for not more than 24 hours, unless Sunday intervenes, any person operating without a license or who violates the automobile law. For violations of the speed rules the offender is permitted to put up $100 cash in lieu of a bail bond. The municipal police are required to report to the Highway Commission all accidents which cause, or seem likely to result in death.

Scale of Fees—The new scale of registration and license fees is as follows: Motor cycles, including right to operate, $2; commercial motor vehicles, $5; automobiles less than 20 h. p., $5; 20 h.p. and less than 30 h.p., $10; 30 h.p. and less than 40 h.p., $15; 40 h.p. and less than 50 h.p., $20; 50 h.p. and above, $25; manufacturers and dealers $25 for five cars and $5 for each additional car; manufacturers and dealers in motor cycles for ten machines, $10; non-resident registration in July, August and September and all registrations after October 1st, half rates; substitution of registration of an automobile for that of a vehicle previously registered, $2, and payment for increased horsepower: substitution of registration of a motor cycle for that of a motor cycle previously registered, $1; original operator's or chauffeur's license, $2; renewal, 50 cents; examination of operators and chauffeurs, $2; additional copies of certificate of registration or license, 50 cents; additional number plates, 75 cents.

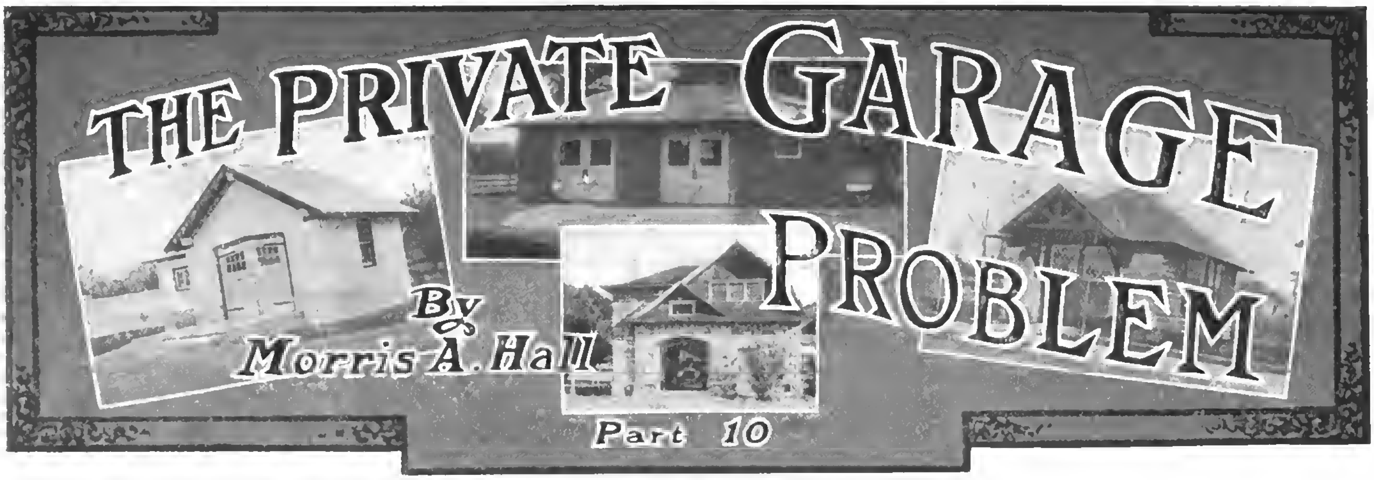
Under the new law not only the fees received for registration and licensing, but all fines imposed by the courts for infraction of the automobile law will go to the State treasury and must be used for the maintenance of the state highways.

One absolutely certain result of this diversion of the money received will be to improve the roads with the fees paid by their users for that specific purpose, which is but logical and right.

LEGAL BREVITIES OF INTEREST TO AUTOISTS

In Washington, D. C., a new police regulation prohibiting owners of automobiles from allowing their machines to give out smoke and fumes in the streets has been drafted, because Judge Mullowny ruled that the old regulation was invalid since it discriminated in favor of certain streets. The matter arose over the arrest of a local automobilist charged with violating the smoke regulation. His counsel argued that the regulation was discriminatory and unlawful in that it applied to only certain of the downtown streets. The case was dismissed and a new regulation covering the emission of smoke and fumes from automobiles throughout the city has been drafted.

A wealthy Camden, N. J., builder, Patrick J. Farley, **was** severely punished last week for repeatedly violating that section of the New Jersey automobile law which prohibits the licensing of drivers under 16 years of age. To save the hire of a chauffeur, it is said, Farley allowed his 14-year-old son, Clair, to drive his big six-cylinder car even after numerous warnings, and last Thursday Motor Vehicle Commissioner Smith not only revoked his 1909 registration and license, but gave orders that no credentials be issued to him for 1910.



A Group of Small and Medium-Sized Garages, of Various Forms of Construction, Which Show Intelligent Design

EQUIPMENT plays a very important part in the small garage; first, because it influences the size and planning of the whole building, and second, because of its influence upon the cost of upkeep. Thus, paradoxical as it may sound, if he could afford a complete equipment so as to do all of his own repairing and adjusting, every man, no matter how poor, could afford to own and run an automobile. That is to say, if he were in a position to keep repair and upkeep charges down to an absolute minimum, the expense of running would be trifling. The fuel economy of the modern small car has by thought and improvement in design been reduced to a very small quantity, and it is no trick at all now-a-days to make and average 25 miles per gallon of gasoline.

All this brings out the relative and far-reaching importance of proper equipment, which will, for this reason, be the subject of this week's paper. Many small devices which are useful, to say nothing about economical, will be described and illustrated. Some of these small helps are such that any handy man can make them.

Great Importance of a Turntable—Many a man provides in his design space for maneuvering the car around, either inside or outside, or both, when the same result might be attained in a much simpler manner, and doubtless with a far less expense, by the use of a turntable. This may be as small as the length of the wheelbase, plus a very small margin to allow for the width of the car and some clearance. Actually the smallest diameter which may be used is the hypothenuse of a triangle, of which the tread forms one side and the wheelbase the other. When this has been figured for any given car, a small amount should be added as above for clearance. Figured out on this basis, a 10-ft. turntable will give nearly 6-in. clearance for a 100-in. wheelbase car.

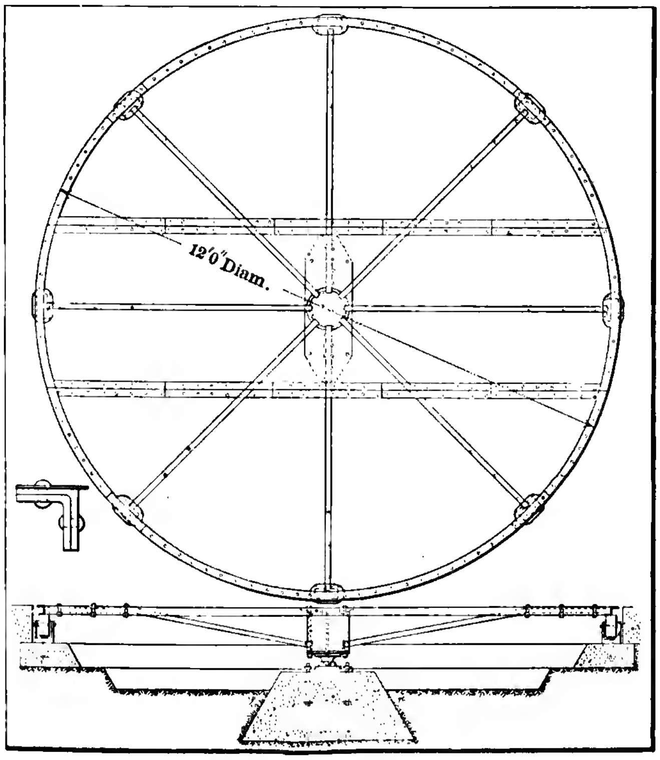
With the turntable, the car need not be maneuvered at all, it can be driven right in onto the centrally located and circular turntable, which is then revolved to bring the car to the position desired, or to point it in the direction in which it is desired to leave. Of course, it is not a substitute for a pit, but having a turntable in the center of the floor does not cut into the available floor space as does a pit, so that instead of a subtracting factor it becomes an additive quantity, in that floor space is saved or gained instead of lost.

To the little fellow, building his first garage, and that, too, a very small one, the item of size is a very important one, and any hint that will help to reduce this size, and of course with it the total cost, is eagerly grasped. To this man the turntable is a godsend, for it may take up the whole central part of the floor, the expense of which may then be practically neglected, since it is included in the cost of the turntable. While the latter are not given away by any means, the price, considering that the whole center of the floor is included, is not so very high.

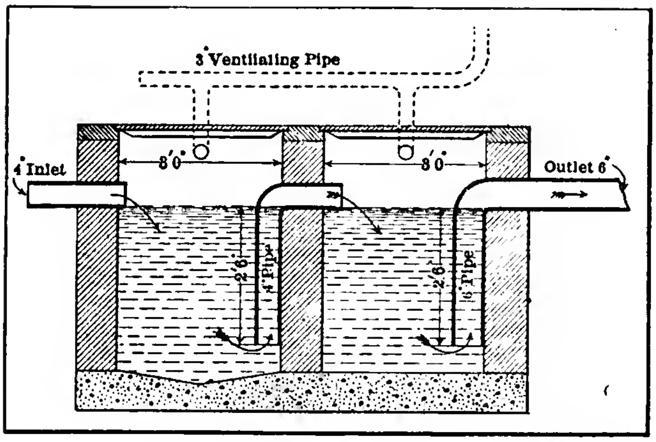
In the case of the larger garage, too, the saving effected is such a large one as to be worth considering, say for a two-car garage. In this case, the extra space for maneuvering the two cars may amount to as much as 50 per cent. additional area, that is the equivalent of the space taken up by one car. Bearing in mind that this additive quantity is not added alone to the floor, but to all four sides, the ceiling if any, the four sides of the roof, to the foundations, to the fireproofing, to the painting, to the depreciation and upkeep, and some idea of the importance of proportioning the ground area closely to that actually required by the cars owned may be obtained.

For the very large garage, on the other hand, the garage for three or more cars, the expense is of less weight, but the turntable will be found in these buildings for the convenience of shifting cars around. From all of which it would appear as if it was somewhat of a necessity, a place for it having been found in the small, the medium-sized and the very large garage.

Elsewhere on this page will be found a drawing showing a cross-section through one of the turntables now on the market, this being constructed from structural iron, in such a manner as to possess not alone strength, but a minimum of weight. While the size shown is 12 ft. in diameter, smaller and larger sizes are made to suit any sized car. However, the car which would call for a larger size than this, would be an unusual one, since this will take a car with 132-in. wheel-



Sectional Drawings of Medium-Sized Turntable



Courtesy of "Motor"

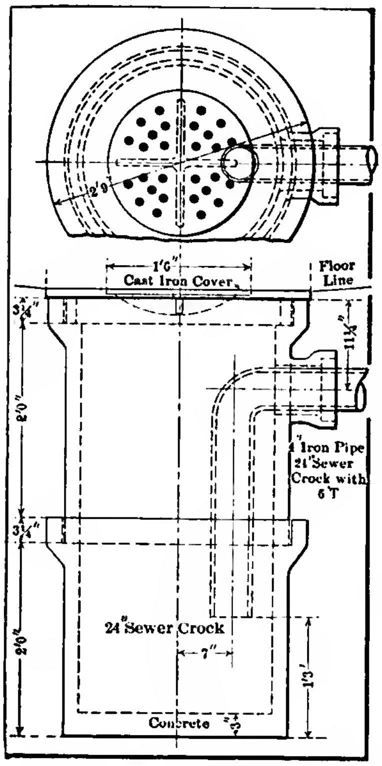
Two-Compartment Oil Trap Built of Concrete

base. Of the cars listed last year at show time in THE AUTOMOBILE special show numbers, numbering about 1,000 in all, just eight exceeded this figure.

In detail, a box girder forms the central part or hub and carries the central pivot upon which it is supported in part and upon which it turns. From this central member eight structural iron arms radiate to the rim, which is a heavy section channel open side out, bent to the desired radius. The lower surface of the latter runs or rolls upon a series of eight rollers set into the foundations and equidistantly spaced. Across the middle are set two stiffeners, which aid in keeping the shape and level of the whole structure when supporting heavy loads. The top or floor surface is of light sheet steel riveted to the members below, while the lower side is left open.

To install one of these in a garage, all that is necessary is the central foundation of cement and the circular ring, built up to such a level as to bring the rollers into correct contact with the underside of the rim channel.

Proper Drains of Great Importance—In the construction period one thing that must be taken seriously is the matter of drainage. It is practically impossible to avoid spilling both oil and gasoline on the floor. With the continuous washing going on the water will wash both into the drain and thence into the sewer. Neither one will mix with the water, but will float upon its surface ready and willing, as it were to ignite at the first sign of heat or flame. Such heat or flame, setting fire to this oil and gasoline in the drain pipes or sewers, may do incalculable damage, not necessarily to the garage from which it came. For this latter reason, and as a matter of common fairness, every owner should see to it that his drains do not carry off any fuel or oil.

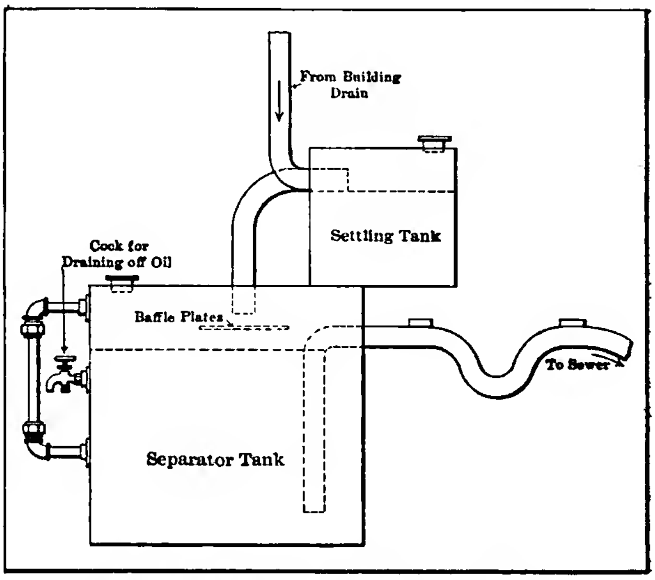


Sewer Trap Tile and Iron Pipe

From another standpoint, this is waste, for the oil and gasoline may both be recovered, and money saved in that way. Of course, this saving is small for the small garage, but in the larger places it is considerable and worth some thought. In the very large public garages it becomes a very considerable item, moreover the waste from such a place is great enough, were it not properly attended to, to endanger the safety of many large business houses using the same sewer. So much is this the case that nearly all large municipalities recognize it and have stringent regulations relative to it.

Many Ways of Solving Gasoline Waste Problem—This has evolved some approved forms of drain, while there are many others of private design which are equally good. On this page are shown three of these, one being the form recommended by the City of Milwaukee. This is actually the most simple and by far the least expensive of the three given.

It consists of two 24-in. sewer tiles, one with a 6-in. tee and the other plain. The plain one is set down into the ground and the bottom filled with concrete to a depth of about 3 in. Into the tee is inserted a bent-iron pipe of 4 in. nominal size, this being bent at a right angle, and the inner end reaching down to within one foot of the bottom. The outer end of the iron pipe leads to the sewer, and as far as its usefulness is concerned, the opening around it, that is between the inside of the tee and the outside of the iron pipe, may be cemented also. To cover the top, a cast-iron cover is made which fits down into the lip of the



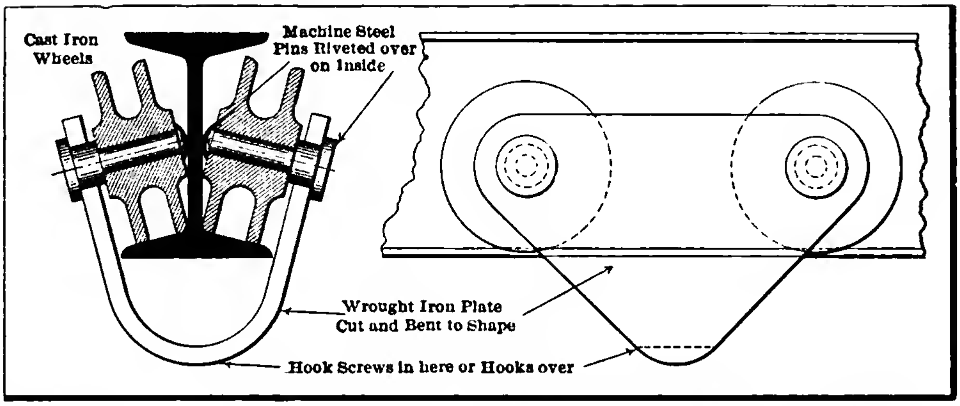
More Elaborate Scheme of Separator to Save Oil

tile, has a removable center with many holes bored into it, and is of itself removable to allow full access to the inside of the drain.

The action is as follows: Water carrying oil and gasoline flows through the perforated cover into the drain, which must fill up to a depth of over 3 ft. 5 in. before any thing will flow off to the sewer. Before this depth will have been reached, in fact at all depths, the oil and gasoline will float to the top. The lesser specific gravity thus prevents either one from going to the bottom of the drain, which is the only place from which the outward flow can begin. Thus, the gasoline and oil must always stay in the drain. The former will evaporate through the perforated cover, while the oil will have to be removed.

Practically the same description of action applies to the other small one shown, which is, however, built of concrete in two sections with bent pipes uniting the first and second, as well as leading from the second to the sewer. The double compartment simply serves as an additional precaution, both chambers working exactly alike. Removable covers allow of access to both, while perforations allow the gasoline fumes to escape as before. This design is so simple and so easy to make that it might easily be incorporated into any private garage building.

More Elaborate Design Saves the Costly Fuel—In the third cut is shown a more elaborate design of a trap which not only does all that the others do, but saves the fuel and oil as well. This form has two tanks, the latter one acting as the separator tank, and carrying a drain cock at the side and near the top, by means of which the floating oil and fuel are drained off at regular intervals. After draining off, another form of apparatus is used to separate the two, but the difference in specific gravity is such as to make this easy of solution, simple settling basins effecting the desired result without any attention.



Suggestion in the Way of Provision for Hoist, and Traveler for Same, Using I-Beam

Speaking of gasoline saving, the whole fuel question is worthy of attention. Thus everyone should have an outside tank for keeping the fuel, but not all can afford the complete apparatus as now put on the market. To attain the same results with a lessened expenditure, the sketch below shows the construction to resort to. There is but one thing necessary other than the tank itself, and that is a source of air pressure, and, of course, connecting pipes to transfer it to the tank outside, and to carry the fuel back to the garage.

As shown, a bicycle or other foot pump A is provided within the garage, this being connected with one end of a pipe to the tank, marked air line B. This leads into the top of the buried tank C, and the pressure of the air within the tank forces the fuel through the other pipe, marked gasoline line D, back to the supply pipe at E. By locating the filling cap F outside, the supply may be renewed at will and without entering the garage.

To use the fuel, all that is necessary to do is to open the cock at E and the one down at the floor. Then pump at the foot pump until the liquid flows at E. By turning off both cocks the pressure may be retained in the tank for some time, so that but a few strokes of the pump are necessary at any one time.

Moderate First Cost Biggest Advantage—Aside from the cost of an air-tight tank, a practical necessity anyhow, the other costs of this piece of apparatus are negligible, consisting only of the two lines of small-sized pipe, soldered into the tank, the two cocks and the foot pump. This would total up very small, so small as to bring the outfit within the means of everyone.

At the top of this page is shown a suggestion to the amateur garage builder, and one that will save him much labor. This is a suggestion in the way of providing for hoisting apparatus while building. If an I-beam, or a pair of channels set back to back, or even an old tee-rail, is set across the building when the latter is going up, it will never be in the way and will always be there for the future. This should be set across the garage in such a way as to be along the center axis of the car, and directly above the center line. In placing it thus as will be shown later, when the block and tackle or other hoisting apparatus is added and it is desired to take out an engine, for instance, the car may set in any old position, while if the beam is set across the length of the car the latter will have to be moved back and forth until the center of the engine weight comes directly under the center of the beam above.

This beam need not cost much of anything, in fact, in many cases, a discarded tee-head rail may be obtained for nothing, and the carting charges will be the sum total of the cost. With the beam in place, when the owner makes up his mind to add the hoist, he has but to put on some form of a traveler to which the hoist may be attached. The sketch suggests one. This is made of a pair of cheap cast wheels, of almost any metal, cast iron being satisfactory. These run on the sloping part of the I-beam, channels, or tee rail, all of which have approximately the same slope, and consequently need some form of uniting piece, which will take the slope into account as well as providing a place for the hoist to hook or screw on, these being the usual methods.

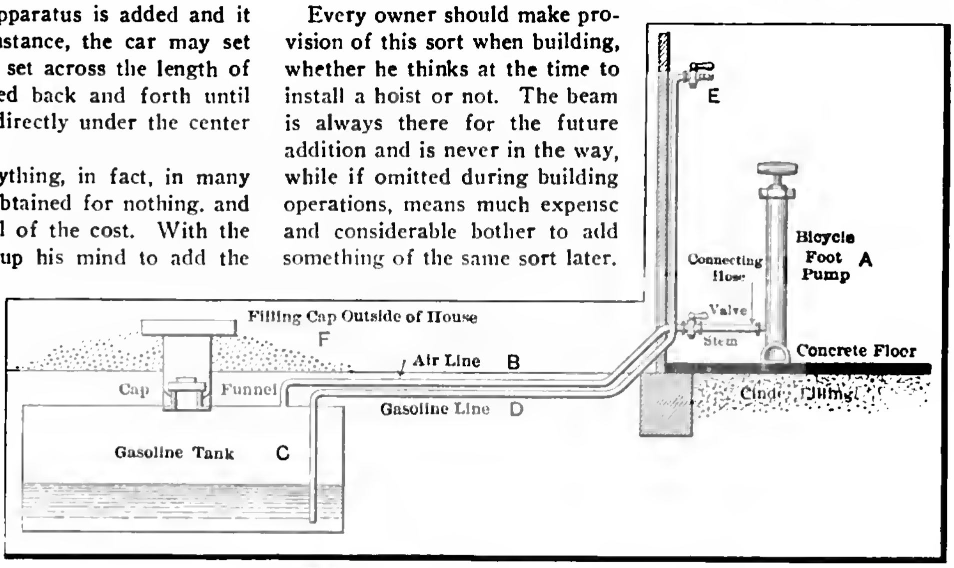
In the sketch this is shown as a wrought-iron plate cut to shape and bent around nearly double so as to present a comparatively narrow base for the hook or screw. In side elevation, the finished and folded plate presents a triangular shape.

Pins of a shape to hold the wheels to the plate are used at the four corners, two on each side, where the wheels are pivoted. The pins are of machine steel, made of good diameter to present a large bearing surface, and with a large head. The inner end may be riveted over to hold the wheel in place on that side. Wheels can just as well be solid, but are shown with a central circular groove so as to reduce weight.

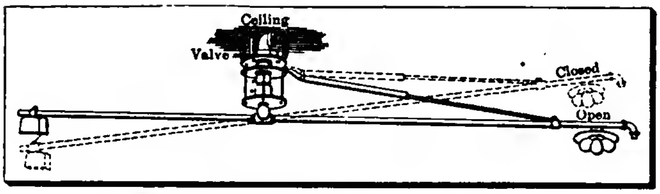
For the hoist, a duplex or triplex chain hoist will answer the purpose very well, and will lift far in excess of the weight of the entire car. For the sake of economy, however, a block and tackle using rope could be utilized to just as good purpose, with the single proviso of requiring a fastening at the traveler more substantial than rope.

By making the distance between the wheels on the side long, the little carriage will run along the beam very easily, and may be slid along to the point at which it is desired to use the outfit, in the usual case at the front end of the car. This form of apparatus does away with jacks and their slow and awkward use, in that it is much easier and far better to slip the hook under the offending part, give a couple of pulls to the rope and there you are. In such a case as removing a rear axle, wheel, or tire, this method allows of hoisting the entire rear end of the car as a unit, so that one or both wheels may be worked upon at one operation. The chain blocks mentioned are self locking, and the block and fall is also supposed to be, but unless many turns of rope are used, practically is not. This is simply a matter of tying the loose end to some convenient post, or a nearby hook.

Every owner should make provision of this sort when building, whether he thinks at the time to install a hoist or not. The beam is always there for the future addition and is never in the way, while if omitted during building operations, means much expense and considerable bother to add something of the same sort later.



Suggestion for Home-Made Gasoline Supply System with Tank Buried Outside



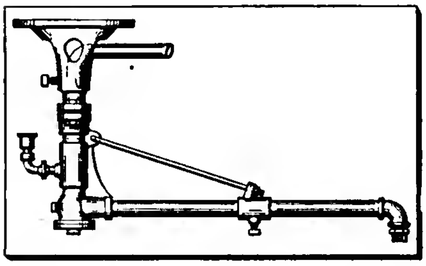
Overhead Washer with Weighted Arm and Cutoff

Another Home-Made Substitute for a Jack—While this is more than a substitute for a jack, handling loads that a jack could not be used upon, as well as working in a different manner, still it would supplant a jack. Another handy substitute for the latter is shown at the bottom of this page, and consists of a simple wooden lever of the first class, that is, with the pivot between the weight to be lifted and the force to lift it.

As shown, it is made of wood, but this need not be adhered to, as metal is equally good and stronger, but, on the other hand, heavier. A so-called sandwich beam would be very good for this purpose, but is objectionable on the score of expense. This consists of a thin plate of metal between two comparatively thin pieces of wood. The wood may be used thinner than otherwise on account of the sheet metal.

This one has a single central piece of wood, preferably of a tough wood, with a smaller rubbing or base piece hinged or hung on one end. To lift anything with it, the low end is hooked under the article, and then by resting the rubbing picce on the floor and pressing down on the long handle, the article is lifted. The dimensions given are only suggestions, and the outfit may be made to any desired figures to fit the individual case.

This is similar to the lift used for changing tires on a racing car, with the exception that the latter has two branches connectcd, so as to form a rectangle in the plan view. This is stuck under either the back or front axle, and by pulling down on the extended rear arms the whole front or rear end of the car, as the case may be, is lifted free of the ground. To make one of the latter from the drawing shown, simply connect the two long arms and the two rubbing pieces, so as to be at the same distance apart. If desired, the two hooked ends may also be connected and at the same distance apart as the others, but this is not necessary to the successful use of the device.



Overhead Washer Not Weighted

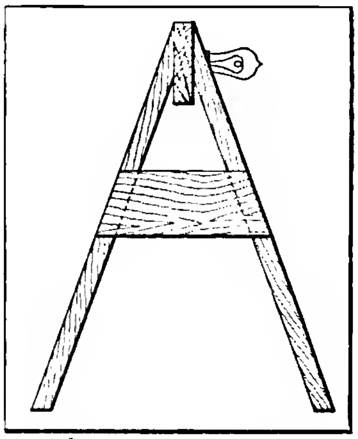
Proper Lighting Very Important—One of the little things which the amateur repairman cannot do without is light and plenty of it. The arrangement of the garage and windows in the same is not always such as to afford this, or it may be that the position of the man when working at the car is such as to shut off the light from the biggest and best window. In cases like this, and when working at night artificial light is a necessity.

For garage use electric light should be used if at all possible, for all other means of lighting introduce an element of danger in that there is and must be an open flame. With gasoline and highly inflammable oils always present this is the height of folly. In laying out the lighting system it is impracticable to try and suit every need, so all lamps should be hung with very long cords. This will allow of moving them around the garage to suit the work being done.

A good thing to have for this purpose is a light stand, one of metal being now placed upon the market, which has many commendatble features. The cross-bar upon which the lamp is hung is adjustable for height and direction, while the stand as a whole may be moved around at will. Many prefer to make their own light stands, thus saving the price of the metal ones. For these a suggestion is given. It is this: to the saw horse, without which a garage would be incomplete, attach a lamp socket in such a way as to allow of the insertion of the lamp on one side and of the socket for the light plug on the other. In nine cases out of ten when working on dissembled parts you will have them supported on saw horses.

Then all you need to do, to have light, is to screw the lamp plug into the one side of the fixture on the horse and the lamp into the other. The lamp should be removable, as it is very liable to be broken otherwise, since horses are treated roughly, while the extension and plug should be removable so as not to tie up any one light.

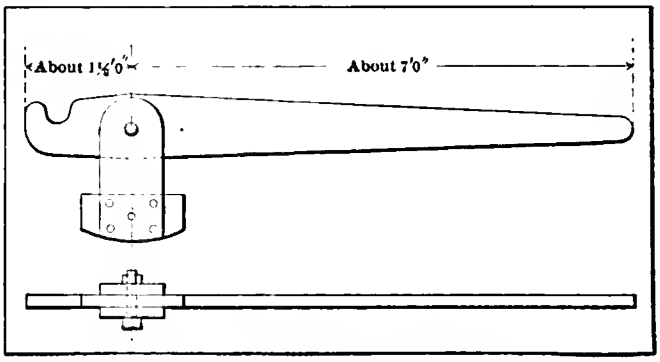
Facilities For Washing Needful and Economical—While nearly everyone will grant that adequate washing facilities are needful, or desirable, few would figure out that they are also economical. This is nevertheless true, for with improved and handy means for washing, the car will be washed more regularly, more promptly and more thoroughly. This applies not alone to the painted parts of the body, but to many of the mechanical parts as well. To cite an excellent example (not a mechanical part, however), the wheels can not be washed too much, particularly in warm weather. Heat opens the joints in the wheels, while plenty of water will cause the wood to swell, thus closing the cracks. This applies to the miter as well as the felloe, to say nothing of the tenons, spokes into felloe.



Suggestion for Garage Light

Granting, then, the need and usefulness of a form of washing apparatus, the qucstion arises which? The overhead washer, two of which are pictured on this page, presents some ideas which cannot be obtained in any other way, and are desirable. This form is always up out of the way, when not wanted, and aided by the hinged joint, may be pulled down for use. The one shown first is weighted so as to balance itself in any position in which it is placed.

In the second one the construction is such as to suggest the making of a washer-using water pipe, obtainable at any plumbing shop. The only problem would be the swivel joint at the pivot point, but the plumber could doubtless furnish a full universal swivel which could be used for this purpose. In that case, making one of these is simply a question of knack with a stilson wrench and other pipe-fitting tools. The corner would be a simple elbow and the angle brace a pair of tees, with the tee end plugged, and the plugs drilled for the wire cable. This, in turn, could be made with turnbuckle in the middle, so as not only to tighten it up at first, but to allow of later tightening, as opportunity presented or as it was found to be needed.



Sketch of Home-Made Substitute for Jack

ONE MAN'S EXPERIENCE ON THE ROAD

By James S. Madison

EVERY new owner and every prospective owner of a motor vehicle ought to realize that there is a strong probability of having an accident on the road sooner or later. It can be mathematically demonstrated that out of 1,000 cars, each making a mileage of 5,000 in a season, a certain, definite number (which is entirely too large) will meet with one or more accidents that will be more or less disastrous, depending upon the special circumstances in each case.

Many owners, before their first ride, have firmly resolved that there will be no accidents, or if one should occur, that it will be the other fellow's fault. This, of course, is right and proper; yet in spite of good intentions and good resolutions, many avoidable accidents, not due to the other fellow, do happen every day.

Further, every owner and every prospective owner should realize that while there is only a probability of accident, there is a certainty that the car will some time stop on the road, or certain contingencies will arise which will render it necessary to stop the car to prevent injury being done the engine, chassis, body, or tires. It is inevitable, inescapable, that something will go wrong sometime, causing a longer or shorter delay, depending upon the seriousness of the cause, the ability of the driver to locate it, and his skill in remedying it when found.

This article is written with the expectation that it will be something of a guide to new owners in aiding them to prevent certain kinds of accidents, and to somewhat shorten the delays which are sure to come to them on the road. The writer has owned a gasoline car for nineteen months—578 days. Of this time the car has been on the road 480 actual days, winter and summer.

At no period (with the one exception of fourteen days required for re-varnishing) has it been laid up for repairs more than several hours at any one time. The reason it was not on the road on the remaining 84 days was due to disinclination of the driver or the unpleasant condition of weather or the roads, and not because the car was out of commission.

While this is not an exceptional record, it is a satisfactory one and is largely due to two factors: First, the sturdiness of the car itself; second, the driver's early experiences taught him to be more or less cautious, so that by far the greater portion of the driving has been done without taking risks, and further because he was willing to give the car a daily inspection, with a very thorough one at least once a week.

First Collision—The owner had driven the car (with the aid of a chauffeur) about 30 miles on his first run. The greater portion of it was in the country where the driving was so easy as to give a false feeling of confidence. On returning to town, it was necessary to go through a crowded street. The point where the congestion of traffic was greatest was up a short grade leading to a bridge narrower than the street.

Everything had gone serenely up to this point. The owner found himself in a procession of vehicles, hemmed in on one side by another procession going in the opposite direction, and on the other by the railing of the bridge. He was going at about six miles per hour with the highest gear engaged, spark retarded, throttle closed as far as possible, foot on service brake. Suddenly the tail-board of the wagon ahead seemed uncomfortably near. He made an effort to stop the car by pushing hard on the service brake.

This was not sufficient, and before it was possible to get on the emergency brake (side-lever), the impact came, resulting in the destruction of two gas lamps. This was caused by two errors on the part of the driver. It was an error of judgment to attempt to take the car through the crowded streets on his first ride. Then, he should have disengaged the clutch. The damage was not great, but the occurrence was annoying. Since then he makes it an invariable rule to throw out the clutch when in doubt. If a beginner will learn to throw out the clutch whenever there is any question in his mind as to what is going to happen, he will save many an unpleasant experience.

Second Collision—The car was passing another on a country road. On inquiring of the other driver the distance to a certain town he told me I was going in the wrong direction. I slowed up, turned around, and as he had stopped along the left-hand side of the road, I ran along at a 15-18-mile clip until I came within a short distance of him, when I threw out the clutch and ran alongside in the middle of the road in order to get some further information.

Just as the car stopped, it was hit behind by another car going in the same direction, which had come up in the rear unknown to me. In this case, my only neglect was not to have raised my arm as a signal that I was about to stop. The mistake the other driver made was to have run so close to me without being prepared to make a sudden stop. The damage was not serious to either car, but this was due to good luck rather than good management. Had the conditions been only slightly different, the results might easily have been disastrous.

Hurry Call for a Pair of Horses—The car had been going along nicely for about an hour, when it was noticed that at longer or shorter intervals the engine lost power suddenly for a fraction of a minute at one time, or for a longer period at another. After limping along for a short space, the car would just as suddenly regain its normal speed. It acted very much as if there had been a sudden gentle and repeated application of the brakes. The brake and transmission bands were examined to discover if any of them were dragging.

Nothing was found. On starting again, the first turn of the crank brought the necessary explosion and the car ran along very well until half way up an 18 per cent grade, when it stopped without warning or symptoms. We could not start the engine again and there was no spark at the timer or coil (non-vibrating). The battery cells on being tested showed 18 amperes. The battery and other connections, primary and secondary wires, were examined without discovering anything. The first motorist who came along courteously offered assistance.

After spending at least half an hour, he decided the coil was burnt out. Being seventeen miles from the nearest garage, and not eager to accept the first diagnosis, since, if correct, it would necessitate a pretty severe operation, we waited for the next tourist. He was also obliging enough to give us about twenty minutes of his time. He concluded it was a burnt-out coil. Since the afternoon was young and the June air balmy, it was decided to hold up several more autoists.

Four others came along at intervals and were interviewed, but I was unwise enough to tell each one of them that the preceding ones had decided that the trouble was with the coil. They all agreed that this was it. There was nothing to do but to go across the fields after a farmer, who arrived with two horses about an hour later and towed us to the nearest village, where we spent the night.

Before turning in, a telegram was sent to the garage man describing the difficulty and asking him to bring a new coil early in the morning. He arrived about nine o'clock and his first statement was to the effect that he had been in the business for ten years and had never seen or heard of a coil of that particular make being burnt out or breaking down from other causes; and further, that before he looked at the coil he would go over the whole engine.

Without asking any questions, he examined the timer and found, as I had, that there was no spark. Next he tested the batteries and declared them all right, and then announced that there was a broken connection somewhere. He found it in about three minutes, but a novice might have looked for it a whole day without discovering it, because it was most effectively concealed in the switchboard which extended through the dash. The portion nearest the driver consisted of a hard red rubber circular plate containing two round holes for the plug to make connection with battery A or battery B as might be desired.

This plate was fastened to the dash by three screws. To the other side of the plate, which was not visible, there was fastened, also by screws, a hard rubber cylinder about 1 inch in diameter and 1 1-2 inches long, perforated lengthwise by two brass tubes, 1 1-2 inches long, for the introduction of the round switch plug. The top of the rubber cylinder (the end nearest the plate) was covered with a circular brass plate, to which the two brass tubes were attached.

Fastened to this circular plate and running along the side of the cylinder was a strip of brass 1 3-4 inches long and 1-2 inch wide. It had been secured to the brass plate by solder and to the rubber cylinder by a screw. To the lower end of this strip was attached the wire which led from the switch to the coil. The whole trouble was caused by the soldered joint between the strip of brass and the circular piece of brass working loose.

In spite of the fact that the strip was secured by a screw, the vibration of the car (or something else) had caused it to separate sufficiently from the plate to create an almost invisible crack across which the current did not pass. So since the connection to the coil was broken, there was no current passing to it or through it.

While I was greatly chagrinned to find out how simple the fault really was, the lesson that I learned was that I must study the whole car more thoroughly, so that I need never be obliged to depend upon the opinion of the chance passer-by. This I did within three days, taking apart certain portions that were ordinarily out of sight. The information gained was worth more than the trouble involved. I have not been held up since, nor do I expect to be, without being able to determine the cause.

On the occasion above referred to there were seven automobilists who could not distinguish between a broken connection and a broken-down coil. There must be many others.

Irregular Explosions—On one occasion, after running forty miles, the engine began to miss. There was an easily-perceptible interruption of the rhythm of the explosions, though the car was kept going until several sharp cracking explosions were heard, evidently in the muffler. Upon stopping and looking for the cause, it was discovered to be a loose connection between two cells of the battery. One of the small brass thumb screws had worked loose and dropped off, leaving the wire attached to the zinc terminal to move about with the motion of the car, thus causing temporary and repeated breaks in the primary circuit.

Another case of missed explosions occurred the next day. The symptoms were the same and naturally I expected to find the same cause. But after going over all the battery, coil, and timer connections, I found everything right with a good spark at the timer. I therefore knew that the difficulty lay somewhere in the secondary circuit—the coil and its connections leading to the spark plugs. With my previous experience in mind, I concluded to let the coil alone and inspect the spark plugs. I soon discovered a very minute crack in one of the porcelains through which the current escaped forming a short circuit and thus preventing firing of the charge in the cylinder.

Perhaps the most common cause of missed explosions is weak batteries. The following experience has happened a number of times and is typical. The car was going up a hill when a single miss occurred. Just before reaching the top, about a quarter of a mile further on, another one was noticed. The distance from this point home was about five miles of level road. There were no more misses. The next day they occurred again. The engine missed fire eight times, the next day the number increased, and on the fourth day, on the last 1 1-2 mile of a run, they came so often as to render it somewhat difficult to get home. I knew all along what the trouble was—weak batteries—but I wanted to run them down. When they were tested, three of the eight cells showed 0 amperes, and none of them showed above 2.

There are other causes for missed explosions, but the three just referred to will cover the greater portion of all that occur.

Engine Stopped Suddenly—The car had been running about an hour when without any preliminary warning or suggestion of trouble the engine stopped firing. I knew at once that it was due either to no gasoline in the tank, or that the fault lay in the ignition system. A glance into the tank showed a good supply of fuel. On cranking the engine there was no explosion.

Next I found there was no spark at the timer. I then began to examine the battery for a broken connection. I found a broken wire and it was a matter of two minutes to cut away the rubber insulation from each end for about an inch, bend the protruding wires in the form of a U, hook them together, twist them with a pair of pliers, and wrap the joint thus made with electric tape. This ended the difficulty.

Trouble with the Carbureter—For five days the car ran sluggishly on hills. The engine acted as if it had lost about half its power. It stopped several times, in each case on a hill, and I could only get it to go after fussing about it for fifteen to twenty minutes. I thought the trouble might be due to some unknown chemical action in the interior of the battery cells, which prevented a full current being delivered when a heavy demand was made upon it—in going up hills, for instance.

I was led to adopt this view of the matter largely because the engine could be started after it had remained idle for some time, thus apparently giving the battery time to recuperate, if the trouble were there. I put in eight new cells, but on the first hill I tried the same thing occurred. I then began experimenting with the spark and throttle levers—the car standing still, the engine running. With the throttle almost closed and the spark advanced, the results were satisfactory.

Just as soon as I opened the throttle wider, however, the engine began to slow down and finally stopped. This was clear evidence that the gasoline was not flowing properly. The carbureter was then removed and carefully inspected, and the cause of all the trouble soon found. A grain of sand about half the size of an ordinary pinhead was lodged in the tube closed by the needle valve. The grain was just small enough to permit sufficient gasoline to pass to keep the car going on level stretches, and large enough to prevent a sufficient quantity from passing when the engine needed a larger supply on the hills.

That grain of sand cost me $3, and it got into the tank through the carelessness of a garage boy who, when he filled the tank, placed the screw-cap bottom downwards on the top of the tank, where there is always an accumulation of sand and dirt, and then replaced it without wiping it off. Since then, whenever the screw-cap is removed from the tank, it is placed bottom upwards on the adjoining seat.

Loss of Power—When the engine was cranked in the morning it started off more slowly than usual, and uncertainly. After the car was started I found it necessary to advance the spark and open the throttle wide in order to get a speed of 10 miles per hour. This did not last long, as the engine stopped, and on cranking, refused to go. My first thought was that the compression was faulty, but this, on trial, was found to be excellent.

Once more I turned to the battery box, which also housed the coil. The only thing I could find disturbed was a piece of ordinary black oilcloth that had fallen from the top of the box across two brass thumb screws of the coil. The shining surface of the cloth was partially short-circuiting the coil, thus preventing a portion of the current from reaching its proper destination. An acquaintance had a similar experience, except that the disturbing cause was a bouquet of flowers which fell across the two coil terminals.

Loss of Compression—I have had but one case of lost compression. On cranking the engine, the handle moved so easily as to show at once that there was no compression in one cylinder. I first examined the inlet valve springs, and then the valves themselves. Next the gaskets, then the spark plugs. Everything was right. On inspecting the exhaust valves, one was found to be loose, and upon tightening it with a wrench the trouble vanished.

Difficulty in Starting—One day twenty minutes were spent in getting the engine started. There was plenty of spark and gasoline, but the explosions would not come. Finally, after giving the starting handle a strenuous pull, the engine started. The car was run thirty miles without a single miss. I then stopped for luncheon, and upon attempting to start again, the same difficulty was encountered. For two days this state of affairs existed. I went over the entire ignition system, batteries, coil, switch, spark plugs, timer, and all wires; the carbureter was removed and thoroughly cleaned; all the valves, gaskets, joints, intake tube, etc., were carefully inspected, without any satisfactory result.

After studying the matter it occurred to me that the mechanism controlling the timing of the spark might have shifted. I soon discovered that the position of the timer on the cam-shaft had been changed, owing to the loosening of a set screw, about 1-8 inch, so that the spark was considerably retarded. Upon adjusting the timer, the engine started off on the first turn.

Ditched at Last—Going over the sandy roads of New Jersey, not far from Lakewood, I attempted to make a turn. The roadbed, while sandy, was hard and somewhat narrow. In order to make the turn I ran off to one side upon what seemed to be equally hard ground. I was mistaken, for as soon as the right wheel struck it, the sand gave way and the wheel sank about six inches. I attempted to get out by using my own power, but this only made matters worse, so I had to start in on a new line of tactics.

Both right wheels sank deeper until there was only a half inch clearance. I then dug a small furrow in front of each wheel, placed a board from a nearby fence as far under each wheel as I could get it, and started the engine. Upon throwing in the clutch carefully the driving wheels spun round, but the car did not budge an inch. Afraid of injuring the tires, I gave it up and sent a small boy to the nearest garage, about a quarter of a mile away, for help. In a short time I was back on the road by the aid of the garage car and a rope.

Two Sets of Tires—The car has had two sets of tires of the q.d. type. The first set was defective, and, in addition, too small for the weight of the car; consequently, they wore rapidly and gave a mileage of only 2,400. The second set was larger by a half inch in diameter and a half inch in cross section. At this time they have given 3,400 miles and appear to be good for two or three thousand more. In all this distance travelled, 5,800 miles, there has been no tire trouble of any description on the road, with the exception of one puncture, a result which may easily be attributed to the careful inspection they receive at short and definite intervals.

Whenever the car is brought in from a trip, I run my hand over the surface of each tire in order to discover any cuts or dig-outs, nails, tacks, etc. Whenever a cut that goes through the rubber to the fabric is found, it is vulcanized immediately, if possible, or in any event, not later than the next day. If a driver will acquire the habit of running his hand over the tires as suggested, he will be surprised at the number of tacks, nails, pins, broken wires, etc., he will find, each of which will usually result in a puncture, sooner or later, if not removed.

THE AUTOMOBILE CALENDAR

Shows and Meetings.

Dec. 25-Jan. 1....Columbus, O., Automobile Show, Columbus Automobile Club.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 4............New York City, Automobile Club of America. Annual Meeting, Society of Automobile Engineers.

Jan. 5............New York City, Waldorf-Astoria Hotel, Annual Meeting Motor and Accessories Manufacturers, Inc.

Jan. 7............New York City, Manhattan Hotel, General Meeting Manufacturers' Contest Association.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Jan. 13...........New York City, Engineers' Society Building, Adjourned Meeting, Society of Automobile Engineers.

Jan. 17-22........Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows' Building.

Jan. 17-22........Kansas City, Mo., Annual Automobile Show of the Motor Car Trade Association of Kansas City. P. S. Sutermeister, Secretary, Midland Building.

Jan. 24-29........Detroit, Wayne Hotel Gardens, Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Jan. 24-31........Washington, D. C., Convention Hall, Automobile and Aeronautical Show, Automobile Dealers of Washington. B. R. Johnson, Manager, 1313 New York Avenue, N. W.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19........Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dai H. Lewis, Manager, 760 Main Street.

Feb. 19-26........Newark, N. J., Essex Troop Armory, Automobile Show, New Jersey Exhibition Company.

Feb. 19-26........Salt Lake City Auditorium, Automobile Show, Utah Automobile Dealers' Association. W. D. Rishel, Manager, 1-5 East First South Street.

Feb. 21-26........Cincinnati, Music Hall, Automobile Show, Automobile Club of Cincinnati. Jesse Lippencott, Chairman Exhibits Committee, Gibson House.

Feb. 22-27........Milwaukee, Wis., Auditorium, Second Annual Automobile Show, Milwaukee Automobile Club.

Feb. 24-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 24-Mar. 3....Toronto, St. Lawrence Arena, Canadian Automobile Show, Ontario Motor League. E. M. Wilcox, Secretary.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

March 12-19......Syracuse, N. Y., State Armory, Automobile Show, Syracuse Automobile Dealers' Association.

March 21-30......Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show, Buffalo, Launch Club. D. H. Lewis, Manager, 760 Main Street.

Mar. 26-Apr. 2....Pittsburg, Pa., Duquesne Garden, Fourth Annual Show, Automobile Dealers of Pittsburg. Frank D. Sauppe, Chairman.

Races, Hill Climbs, Etc.

Dec. 22-29........Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

Feb. 4-6..........New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.

PROJECTED TIRE CHANGE

Editor THE AUTOMOBILE:

[2,124]—Will you kindly give me a little information on the following subject, through "Letters Interesting, Answered and Discussed?" I am contemplating the purchase of an OO 20-horsepower White steamer, but think the whels are too small, as they use 32-inch by 4-inch tires on the 1910 model. Could I have demountable rims put on and by so doing use larger tires, say 34 by 4? Also, how much power would be lost by this change, that is, if the gearing was not changed. X. X. O. B.
Portland, Mich.

In the Nov. 25 issue of THE AUTOMOBILE, on page 937, we published a table of the sizes of rims which the various styles and diameters of tires call for. From this table it is apparent that your 32 by 4 cylinder tires have rims which are 23 11/16 in. in diameter. Now, on these you may put some one of the following demountables:

34 by 3 1/2	Fisk	demountable	Rim	Size	23 3/16
34 by 4 1/2	Firestone	"	"	"	23 31/32
	Continental	"	"	"	23 59/64
34 by 5	Continental	"	"	"	22 59/64
36 by 4	Fisk	"	"	"	24
36 by 4 1/2	Fisk	"	"	"	22 13/16

None of the 34 by 4 demountable sizes seem to be close enough to your rims to allow of their use. When the rim is too small, a steel band can be shrunk on, and when the rim is too large, the excess may be turned off, in both cases providing the difference is not too great. In the six cases given you will have to: (1) turn off a piece 1/4 in. thick all around; (2) turn off 9/64 in. all around; (3) turn off 15/128 in. all around; (4) add a band 49/128 in. thick; (5) turn off 5/32 in. all around; (6) add a band 7/16 in. thick. That is up to you.

As for the projected change from 32 in. diameter of wheels to 34 in. diameter wheels, the only change which this will make is to increase the speed of the car, as the engine in question will stand "the racket." The increase would be 6 1/4 per cent. at all speeds; that is, the speed of the car with 34 in. wheels would exceed the speed of the car with 32 in. wheels at any one given engine speed by 6 1/4 per cent. Similarly, the change to 36 in. wheels will increase the speed 12 1/2 per cent. over the 32 wheels and 5 3/4 over the 34 wheels.

If the power of the engine were so close to the actual requirements as to lose by this change, the loss would be the exact proportion given above as a gain.

MISTAKEN IGNITION IDEA

Editor THE AUTOMOBILE:

[2,125]—With Maxwell, Moline, Cadillac and half a dozen other well-known manufacturers changing from high-tension to low-tension ignition, you do not say a word about it in the columns of "The Automobile." Why don't you tell your readers something about this wonderful change of heart?

We thought the high-tension magneto almost universal in this country as well as Europe, and surely would like to know why so many manufacturers are changing on their 1910 cars. Please let us know why this change is made. J. B. SMITHE.
Washington, D. C.

As it is ordinarily understood, high tension means the use at the cylinders of jump spark plugs, which are furnished with a high tension current. On the other hand, the ordinary idea of low tension is the use of make and break plugs furnished with a low tension current. If this is your understanding of the two systems, you are absolutely wrong in your statement that many manufacturers are changing from high to low tension ignition.

In fact, the only changes which have been made in this direction in the past two years have all been in the opposite direction; that is, from low to high. So far has this tendency carried that to-day it is a matter of extensive searching to find more than a half dozen makers all told who use the low tension, while all the rest of the 350 or more manufacturers use high tension. More than this, several of the cars included in this statement have also fitted the high tension as an auxiliary, so that the number using low tension exclusively would be less than a half dozen.

On the other hand, you may have been splitting hairs, in that you meant to distinguish between a true high tension magneto delivering a high tension current direct to the plugs and a low tension magneto delivering a low tension current to a coil, where it is stepped up to a high enough tension to jump the customary gap. If this was your idea, in that also you are absolutely mistaken, as the tendency seems to be toward the self-contained and self-complete magneto producing a high tension current direct to the plugs.

STOPS RADIATOR LEAKS

Editor THE AUTOMOBILE:

[2,126]—I have an aluminum radiator on my automobile, which is leaking slightly, probably half a gallon in half a day. Do you know of anything that could be put in the water so as to stop this leaking? Shop men think that it would be hard to solder. I douht if it leaks in more than four or five cells, and it may be confined to one.
Bainbridge, Ohio. A READER.

Aluminum can be welded—that is, soldered—but this work is not done by every one, and if you decide to have it fixed in that way be sure to go to a specialist in the line of aluminum. Otherwise you are liable to pay for a good job and get a poor one.

As for filling it from the inside, this can be done, but is a makeshift job at best. In a letter published in the Dec. 2 issue of THE AUTOMOBILE you will find that a writer says of a 25 per cent solution of glycerine in water, used to prevent the water freezing up in cold weather, that it forms a jelly which fills up all small leaks.

This being the correct time of year to resort to anti-freezing solutions, you might try this, but when warm weather comes around again you will be confronted by the leakage problem. That being the case, why not have it properly attended to now?

CRANKSHAFT TROUBLE

Editor THE AUTOMOBILE:

[2,127]—I have read your column of "Letters Interesting, Answered and Discussed" for some time, taking great pleasure in so doing. Now, I wish to ask a question referring to a two-cylinder opposed motor of standard make, water-cooled.

This engine is hung on a subframe, with the crankshaft extending out from the crankcase. The transmission is assembled on this extension of the shaft, which is in one piece and as a bearing at each end. This engine has broken three or four crankshafts. In the last two we took care to see that the bearings were all lined up perfectly. When through, the engine ran true without binding at any bearing. The engine usually runs about three or four months in each case before breaking. Every one of the shafts broke in the same place, the crank part of the shaft. On the last one it looked as though the metal might have crystallized. Can you give me some pointer as to where to look for the trouble. A SUBSCRIBER.
New York City.

It would be hard to diagnose the trouble from your description, as, for instance, what is the crank part of a crankshaft? However, we think from the scant description that you have a case in which the load is applied outside of the bearings; that is, the loading is eccentric.

This should never be; there should be a bearing on each side of the load, not alone from a mathematical consideration of the fact that this reduces the bending moment to one-fourth and the shear to one-half of what it would be with the same load overhung, but from strictly common-sense reasons.

Although you do not say exactly, we surmise that there is no bearing beyond the transmission. If this is the case you should have a new shaft made, with a prolongation beyond the transmission. Then you should make a bearing for this prolonged end, making it adjustable if possible. You will then have a bearing on each end of the crankshaft proper, and a bearing at each end of the part used as a main shaft for the transmission; that is, considering the one engine bearing in each case, once as an engine bearing and once as a transmission bearing.

If the engine and transmission are set across the frame, as we surmise, you can easily attach this extra bearing to the frame on that side, using care in the length of the new shaft, so as to have it long enough to reach to the frame. When this is done your trouble will entirely disappear; that is, if the size of the shaft, considering the material of which it is made and the work it has to do, is sufficient. If this is not the case it will continue to break, whatever you do.

Crystallization, of which you speak, might occur once, or at the outside, twice, but it is improbable that it would occur four or five times in the same place.

ANSWERED AND DISCUSSED

SOLVES W. T. K.'S TROUBLE

Editor THE AUTOMOBILE:

[2,128]—In "The Automobile" for Nov. 18, I find that W. T. K., Nichols, Conn., inquires as to the effect of 1/8-inch space between valve stem and valve lifter upon the power of the motor. Your information on this point does not coincide with my experience with this very trouble. I have a little "one lunger" Olds, which was in very poor condition in respect to valves when I took it in trade. I could get no speed out of it. After figuring on the thing, after having it at several repair shops, and several times, too, with no better result, I put a new cam on the time shaft or rod. Even then, I was going slower than other machines of the same make and type.

I then noticed the play between the valve stem and lifter, and after thinking it over, decided the higher the valve was lifted in the explosion chamber, the quicker the cylinder would exhaust after the combustion, and naturally there would not be as much obstruction or load for the flywheel to work against. The intake valve, I reasoned, would take in a bigger charge the higher it was lifted. To take out both valves is quite a job, so I took layers of tin and shoved them in between the valve lifter and stem, leaving about the space of one piece of tin. To hold these in place, I next cut a piece of tin about two or two and a half inches square, cutting out the corners so as to leave it in the shape of a cross as per enclosed sketch. Then I cut along the dotted lines, and shoved it under the stem. Filling the space above it with as many thicknesses of tin as were suitable, I turned up the four sides, pressing the ends under the coils of the spring where possible. To do this I had to do one end of the cross at a time, as follows: Turn up the first side, place the tin washers in position, turn the whole thing to the right 90 degrees, turn up the second side, turn again to the right, turn up the third side, then turn to the right again and turn the last side. Before the last side is turned up, all of the layers of tin desired must be inserted inside of the little basket formed by the folded up cross. When I took the car out after doing this, well, she ran in such a way as to give some pleasure to me, and I judge that I had gained from 25 to 30 per cent. in power and speed.

As to W. T. K.'s machine pounding when hill climbing, I think he has the spark too far advanced. My car will not pound on the level at a certain speed, but when I climb up grade and the speed is materially reduced, and I leave the spark unchanged, the pounding begins. This is due, no doubt, to too early explosion. If I have erred in analyzing the matter, I am always willing and glad to be corrected. F. W. K.

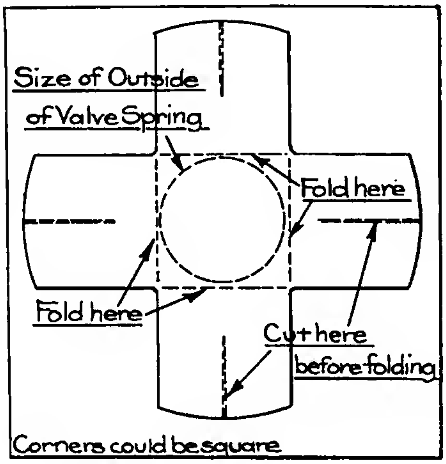
Los Angeles, Cal.

As your power and speed were not measured, we are forced to take your estimate of the very large increase as a very rough guess. In our letter to which you refer we stated in part as follows:

"The way in which it will influence the power is this: when the adjustment is used to reduce the space and with it the noise, the timing of the valves will be altered slightly, and this slight alteration *may be such as to change the power.* For instance, the engine might have a rather late exhaust closing, which the adjustment would make still later. This, then, would cause the motor to heat and thus lose power. Similarly, the adjustment for the inlet valves might cause them to close either too early, making the charge incomplete, or too late, so that some of the charge was lost, also making it incomplete."

What you did was to alter the timing, just as we said decreasing the space would do. Your situation was such, however, that this alteration of the timing improved matters; that is, by opening the exhaust earlier you cleaned out the cylinder quicker, which aided in the increase in power. Also, opening the inlet earlier allowed you to take in a larger charge, which helped the power.

Cases have been known—the writer knows of several—in which this change reduced the power developed. The engines, however, were modern engines with fairly good timing. The changes in the clearance were such as to make both valves open too early, so that the exhaust opened too quick, losing the effectiveness of part of the



Cross-Shaped Tin Used by F. W. K.

power stroke, while the inlet opened so early as to allow much of the exhaust gas to flow into the inlet pipes and thus foul the incoming mixture. The effect of this on the power can be imagined.

Or, if your imagination is not good, try it on your engine, that is, turn your camshaft driving gears back one or two teeth from their present position, and note the effect. As a matter of fact, correct timing has as much or more to do with the power and speed which an engine will develop, as has the correct size of valve and valve ports, together with the proper lift of the valve. If the timing is correct, you can help power and speed by increasing lift and area of valve opening, and similarly, if the valve port area and lift are well chosen, the resultant power or speed, or both may be greatly increased by carefully improving on the previous timing relations. All this on the assumption that the engine (as in your case) is an old one, dating back before the present valve timing knowledge was prevalent, which as a matter of fact would take you back but five years.

MYSTERIOUS SKIPPING

Editor THE AUTOMOBILE:

[2,129]—Will you please give me, through the columns of your paper, a suggestion for the following trouble: I have a Buick, Model 10, 1908 pattern, which has run perfectly until recently. Now the engine skips both under load and empty. I have newly charged storage battery, new dry cells, wiring seems good, all connections are tight, valves have just been ground in, cylinders recently cleaned of carbon, compression is good, and alike in all cylinders, intake manifold has no leaks, have tried new spark plugs, have cleaned the timer thoroughly. The timer shows no wear, and looks to be in perfect order. The timing is the same as when the car was received from the factory. This engine is fitted with a Kingston carbureter of the ball type, which has just been overhauled at the factory. Gasoline flows freely to the carbureter, and I have drained the tank and refilled it with fresh gasoline, carefully strained through chamois. The spark seems very good when the plugs are tested in the open air. I might say finally that the motor runs the same on each cylinder, as proven by holding down any three of the vibrators. BONARD DAIN.

Lawrenceburg, Ind.

You have covered all of the possible sources of trouble of this kind, so that it seems as if you must have taken some of it for granted. Thus, you say that the wiring *seems good.* Are you absolutely sure that it *is* good? The wires might be broken somewhere within the insulation, so that the break was not apparent. You know, the exterior of ignition cables is usually examined, but as a matter of cold, hard fact, the exterior does not do anything at all, the interior being the working portion.

You do not seem to have mentioned the inlet valve guides in the cylinders. Do these fit tight, so that you could be sure no air leaked in through that source? If you cannot, that is a frequent source of trouble.

Your last statement that the motor runs the same on any one cylinder, as proven by holding down any three vibrators, would seem to show that the trouble was back of that point. This would mean that it was either in the coil itself or back of the coil. The latter would include the two batteries and the wiring from each to the coil.

Borrow a coil, known to be all right, from some friend, substitute it for yours, and see if the same trouble exists then. If it does, that test exonerates the coil and reduces the other items to four, the different batteries and their respective wiring systems to the coil.

Moisture is frequently absorbed into the interior of a coil, practically ruining it for the time being. Knowing this to be the cause of an incipient short circuit, the coil can be dried out before a slow fire, or in what is called a slow oven, making it then as good as new.

SOLUTION OF TROUBLE

Editor THE AUTOMOBILE:

[2,130]—I want to compliment you on the contents of "The Automobile." Every issue seems to be better than the rest. I received a copy of another motor car paper the other day, and must say that there was as much comparison as between the cheapest of the cheap magazines and the Review of Reviews.

Kindly inform No.......... who has trouble in starting his two-cylinder which has a puddle carbureter, that he described my trouble for the last two years, but now have it cured and guaranteed to stay cured as far as I am concerned—sold the machine—go thou and do likewise!

Ashtabula, O. HOMER P. SMITH.

Individuality Imparted to Automobiles

By Thos. J. Fay

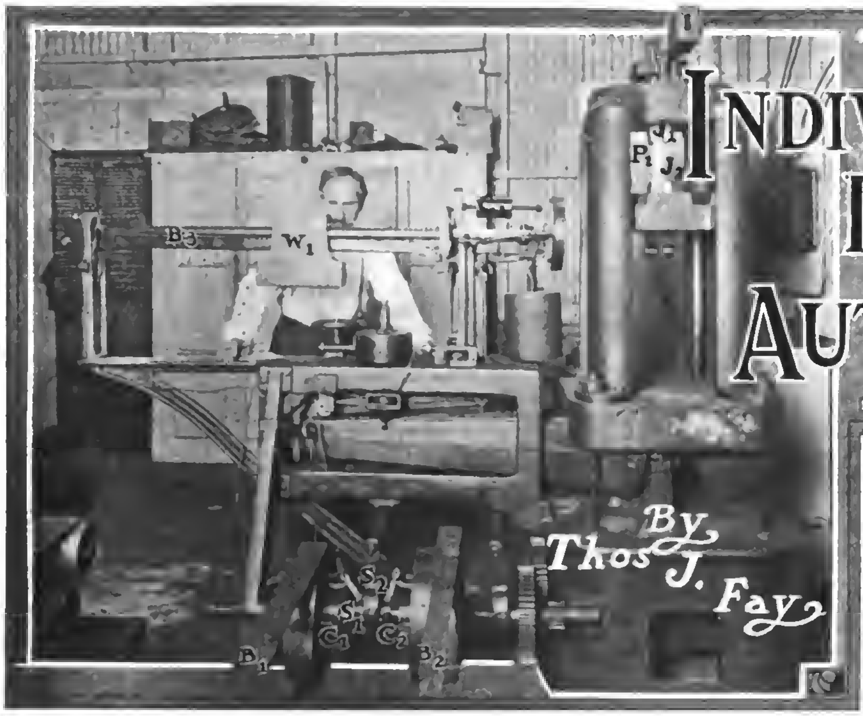


Fig. 1—Olsen testing machine for use in determining physical properties of materials used in Rambler cars for best results

STRUCTURAL materials look very much alike to the casual observer, and referring to steel in particular, it is even difficult for the most skilled metallurgists to discriminate as between the several conditions in which the material may reside. In view of this mal-situation, considering the importance of quality in a kinetic machine, as an automobile, it is scarcely to be expected that quality will be conspicuous in the absence of precision of method, and method itself is reduced to mere desire when the facilities available fall below a certain level.

If it is desirable to select the testing equipment for a given plant, in the light of the work to be done, it becomes necessary in any profitable discussion to take some complete plant as an illustration of the points to be made. True, there are certain features that may be common to all, and in the hands of men of great skill it is even possible to foresee that deviations may be improvised to accomplish specific purposes, even though the facilities may not be up to a fitting requirement. In the long run, however, the best results will obtain if the facilities are contrived in the light of exact knowledge of the service to be rendered; and in the plant of Thomas B. Jeffery & Company, Kenosha, Wis., which it is the purpose here to use as a concrete illustration of the points to be made, the entire system of testing in vogue is being worked out to accomplish just the results that Thomas B. Jeffery purposes delivering in Rambler automobiles.

New Laboratory Much More Commodious—Before launching into the details of the process, it may be well to say that prior to the erection of the new laboratory which is now being whipped into shape the various tests were made in the several departments, to a considerable extent under the direction of departmental heads, but as the process is now being evolved, all testing of every character will be done in the general laboratory under the direction of Thomas B. Jeffery, thus enabling him to direct the staff of assistants to a greater extent than ever before, and owing to the specific character of the facilities and the gathering of all the processes under one roof, it is a reasonable expectation that the increased output of the plant, which is growing at a rapid rate, will be handled far more promptly.

Consistency Is a Jewel in Testing Work—If it is conceded that it is necessary to test motors at all, it must be allowed that it is desirable to test every motor made. If it is an advantage to run one motor for a time sufficient to eliminate undue fixed losses, it is equally a gain to run all motors made long enough to bring them, respectively, up to the standard set by testing one motor. Individuality in an automobile is only assured provided every unit in each car is given individual attention on the part of the skilled men who are capable of ascertaining as to the maximum attainable results when each unit in one car is tested in a laboratory.

The difference as between a laboratory and a test room lies in the extent of equipment available for the specific work; if the equipment is in presence sufficient to investigate one motor at a time, it is a laboratory process pure and simple, whereas, if this equipment is duplicated as many times as may be necessary to test the entire output of a plant, day after day, the laboratory becomes a test room, as it were; and comes a test room, as it were, in every sense of the word, and

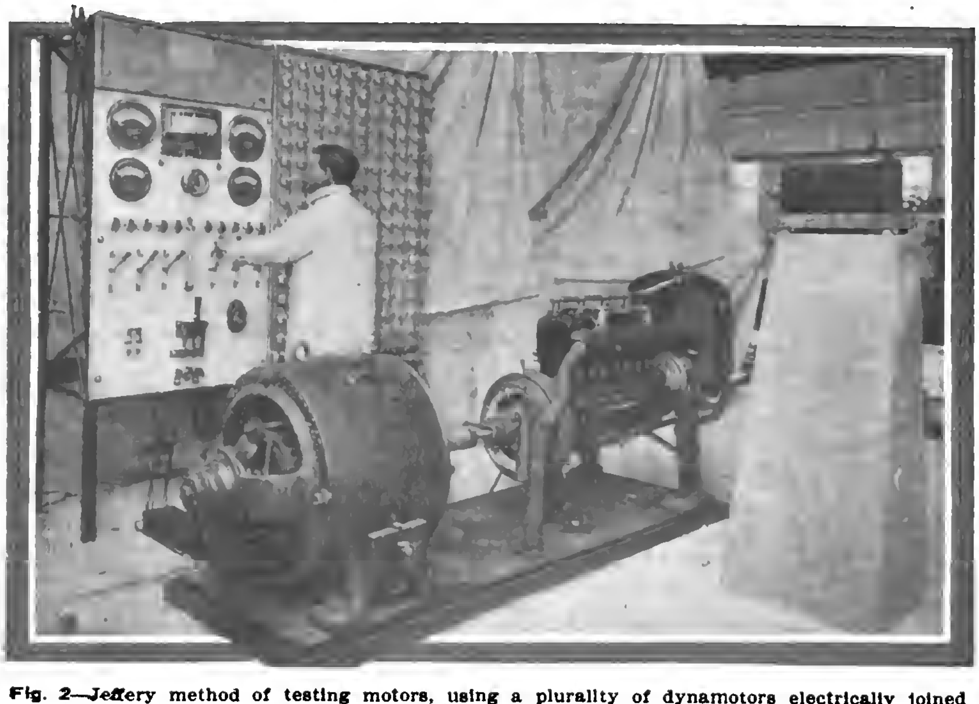


Fig. 2—Jeffery method of testing motors, using a plurality of dynamotors electrically joined and in compensation for economy's sake

if the equipment is just that required for a laboratory, it is then that tests may be made on a laboratory basis.

Sharp Lines Must Be Drawn Betimes—In a laboratory on a large scale (which is what the Jeffery plant comprises), it is necessary to distinguish as between the class of investigations which have to be made in order to keep abreast of the times, and the proving-out process by which the manufactured product is given its final O. K. This phase of the problem is cared for by properly classifying the work somewhat as follows:

CLASSIFICATION OF TESTS TO BE MADE.

(A) Investigations of materials as offered to determine as to the advantage of considering them for future use.

(B) Investigations of materials purchased for use, to determine as to their competence in view of the terms of the orders issued for their delivery by the vendor.

(C) Investigations of parts and operations on parts in process in the shop, to ascertain as to the character of the work being done in the shop.

(D) Investigations of assemblies, as motors, transmissions, live rear axles, steering equipment, etc., to check up quality, ability, and efficiency.

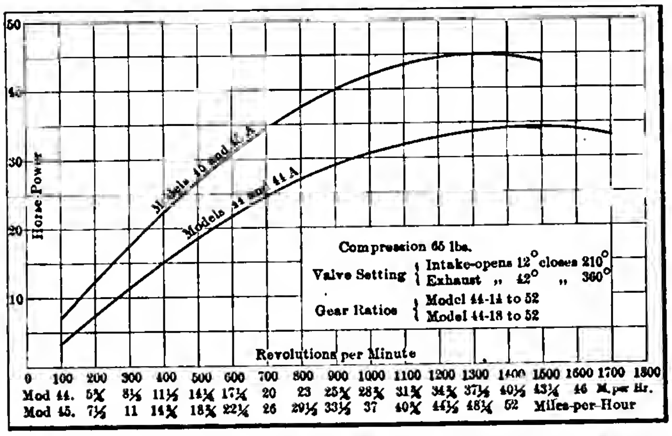


Fig. 4—Torque Curve of models 44 and 45 motors, presenting power for speed at different speeds

(E) Investigations of processes, to improving quality, increasing production, and assuring greater interchangeability.

(F) Final tests of units, as motors and the finished automobiles.

In Class A the nature of the investigations is on a strictly laboratory basis, in which, with a view to future improvement, it is the desire to determine as to the accuracy of claims of vendors, for materials which are not regularly on the market but which promise more than is obtainable in the regular way. This class of work demands the service of a skilled investigator who is capable of discriminating as between the several products in a commercial, as well as a physical, sense, on the ground that while a thing may have more than a little merit, even so, if it cannot be had with certainty, it is scarcely worth considering.

Class B products have to be investigated in order to ascertain if they are up to purchasing specifications, not so much because the price agreed upon should fix the measure of value of the products delivered, but in order to maintain the standard of value of the automobiles to be made from that material.

Class C takes into account the inspection of parts being manufactured, and requires that every operation be scrutinized in order that there will be no incentive to use a part that falls below the standard set, which would be true were it found after much work had been done that some operation was not performed properly. The cost of operation inspection is less than the cost of replacing parts spoiled, and this class of work is performed by men who are skilled in one branch of testing only.

Class D is in the nature of a laboratory undertaking, limiting the testing to "first units" prior to the manufacturing process involving quantity, and in this undertaking it is necessary to

Fig. 3—Hydraulic testing equipment and method of its use in testing for strength and tightness

employ the best skill of the laboratory as accessory to the calm, deliberative judgment of the executive head. Tests such as these demand consideration from every angle, and Thomas B. Jeffery takes personal charge during periods such as this.

Class E ranks as an extra, is most in vogue during the year previous to the putting out of a new unit, reflecting the intention of the company to be positively up to date in the matter of the selection of materials to use in new models.

Class F takes rank as the final test, and in this effort individuality is imparted to the respective automobiles put out.

The Character of the Testing Equipment Employed—An Olsen testing machine as depicted in Fig. 1 is used for making Class A and B tests, and the capacity of the machine being 100,000 pounds total effort is sufficient for every purpose. In this process, after the test proofs P1 are machined to proper size, they are inserted in the jaws, J1, when power is applied by means of the belts, B1 and B2, to the counter-shaft, S1, which is given right or left-hand rotation by means of the shifting lever, S2, engaging the clutching members, C1 and C2, thus engaging the right or left-hand rotation at will. The total effort required to part the proof, P1, is registered on the beam, B3, and the sliding weight, W1, is adjusted in such a way as to keep the beam level at all times. A compensating adjustment is available at C1, by means of which the beam is properly balanced before the test is started, and facilities are afforded for charting the characteristic of the metal undergoing test, in order to record the data required for the purpose of ascertaining the modulus of electricity, elastic limit, and elongation.

In the regular course, in view of the many characteristics which may be imparted to steel by heat treating, it is of the

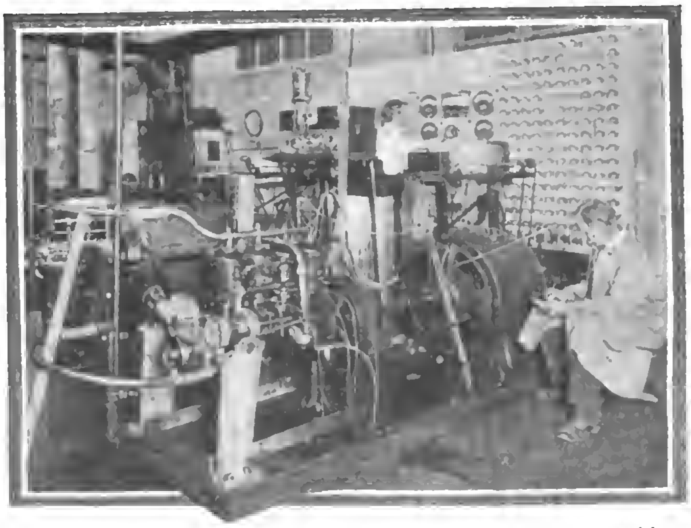


Fig. 5—Method of testing motors using a dynamo-electric machine and a bank of lamps

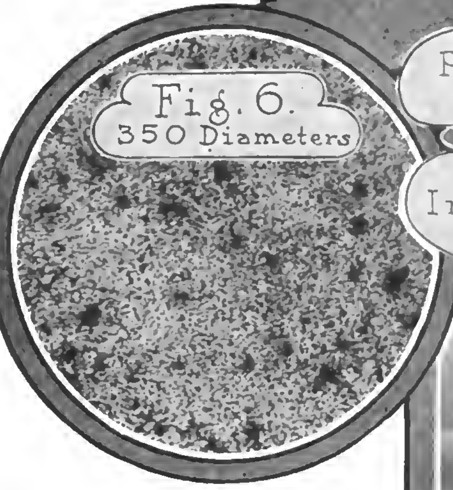
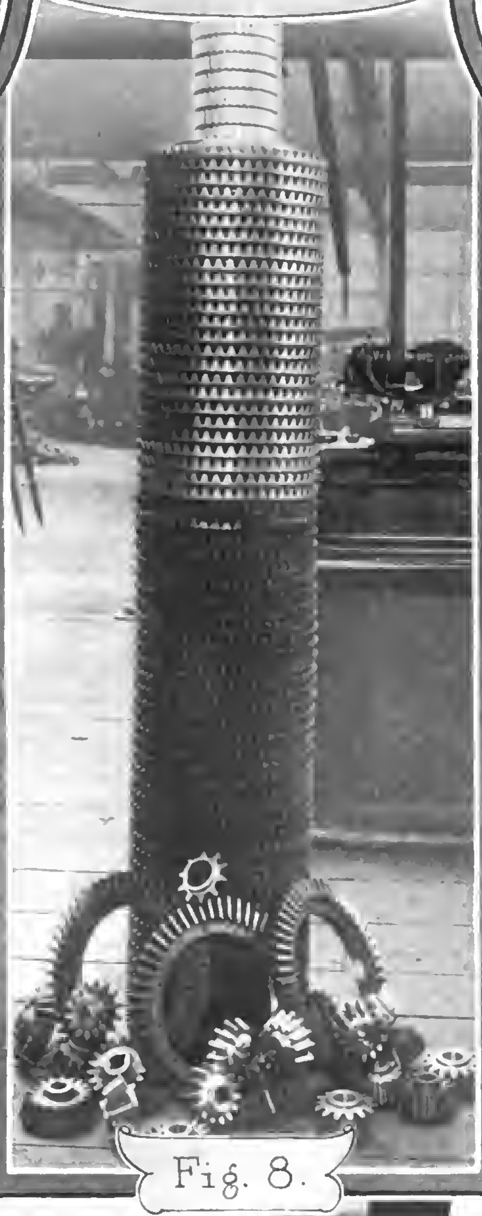


Fig 6.
Properly Heat Treated Steel Magnified.

Fig 7.
Improperly Heat Treated Steel Magnified



greatest importance to properly record the tests, and in addition to charting, tabular records are taken and filed for reference. Just to indicate the extent to which this phase of the problem has to be dealt with, reference will be made to a brand of steel, noting its several qualities under the different conditions it will assume in the heat-treating process in response to changes in temperature, time, and methods of quenching. (See table.)

Material Encourages Further Effort—With a physical test such as this, assuming it is made during research, the next effort would be in the chemical laboratory, and the chemist after checking up results would make his declaration of constituents in tabular form, as the table shows.

The test proof, after fracture, would be examined with a critical eye, and a record would be made showing that the fracture is crystalline or silky, as the case may be, and if it is "cupped" this fact would be noted also; a further investigation of the material would probably be made to ascertain its dynamic character (kinetic ability) which might be done on a "Souther" type of testing machine as shown in Fig. 9; or, a Fremont test would show that even with a notched bar, under impact, a blow of 433 foot-pounds would have no visible effect. This is a marked result which was obtained for this grade of steel in the oil-tempered state, whereas the same steel in the state designated as tempered and annealed went under a blow of 144 foot-pounds in the Fremont test, and to indicate the effect of notching it is only necessary to point out that another sample of the same steel in the tempered and annealed state stood up to 361 foot-pounds. In order, however, to appreciate the significance of the comparison, it will be necessary to understand that ordinary grades of steel fall below these values by a considerable amount, as, for illustration, a rather good grade of nickel steel, of which a record is available, went at 36 foot-pounds in the Fremont test.

Microscope Lends Facility to Process—Even metallurgists have trouble in appreciating the differences in the conditions of the respective grades of steel as affected by heat treatment, and recourse is had to microscopic methods to bring up the structure and enable the investigator to determine with greater certainty as to the carbon condition and other molecular characteristics. The reader, in order that he may be in a better position to ap-

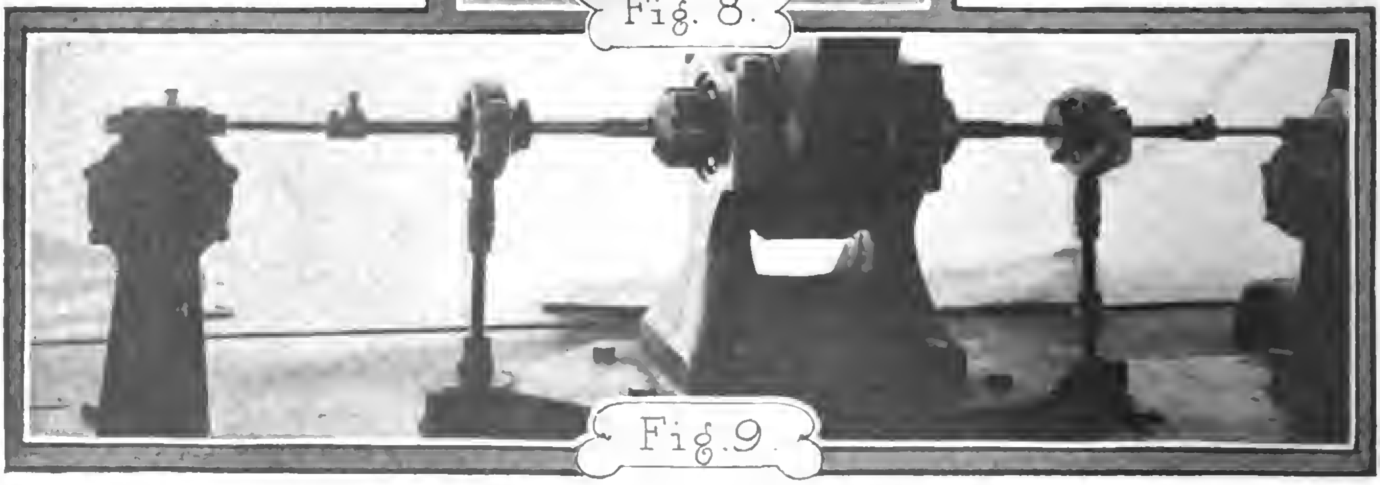


Fig. 8—Bevel gear cementing **Fig. 9—Determining kinetic properties of steel**

preciate the situation, is here offered micro-photographs of the steel that is being used as an illustration of the laboratory process, in which Fig. 6 represents a special and desirable condition brought about by heating, quenching, and tempering under well-regulated conditions; whereas Fig. 7 shows a specimen of the same steel which was injuriously treated. In the above examples the microscope was adjusted to 350 diameters, and for the purpose of determining the general character of the material this is about right. Modern microscopes enable the investigator to view the material even up to 1500 (or more) diameters, although it is not believed to be of great practical advantage to do so, as a rule.

VALUES OF THE MATERIAL UNDER CONSIDERATION.

Condition.	Tensile strength pounds per square inch.	Elastic limit in pounds per square inch.	Elongation per cent in 2 inches.	Reduction of area in per cent.
Normal	120,000	110,000	25	69
Tempered and annealed	160,000	145,000	12	49
Oil tempered	280,000	262,000	3	22

CHEMICAL COMPOSITION.

Chromium	1.60	Phosphorus	.011
Nickel	4.40	Manganese	.40
Carbon	.28	Arsenic	.006
Silicon	.20	Copper	.007
Sulphur	.010		

Diverse Forms of Furnaces Available—In the plant, owing to the wide use of drop-forgings and other parts from special grades of steel, it has been found necessary to employ a wide variety of equipment for the processes of heat-treating. Fig. 12 will serve as a suggestion of the methods used, in which, as the illustration indicates, it is very much up to the intelligence of the man; and the years of practice in the Jeffery plant have resulted in a corps of trained men, each one of whom is devoted to some one class of the work, so that if the company has for any reason to dispense with the services of some one man, it is an easy matter for Thomas B. Jeffery to step in, fill the breach, and coach an understudy.

Fig. 10 offers a better idea of the extent of the facilities, this being a view taken in one corner of the large heat-treating plant, where the parts are:

(A) Case-hardened
(B) Annealed
(C) Quenched in oil, water, or otherwise
(D) Tempered
(E) Special treatments.

The particular furnaces shown are for cementing (case-hardening), and, as will be observed, after the parts are packed in bone (which is a matter of employing a suitable box, proper grades of bone or other cementing materials, and much care in the process of packing) they are then run into the furnace, and heat is applied for a sufficiently long time to grow the required depth of carbon. The time required is dependent upon several conditions, as shape and weight of parts, grade of steel used, temperature of the furnace, quality of the bone or other cementing material, and such matters. A means is at hand for regulating the temperature, but what is more to the point, pyrometers are available by means of which the temperature is made known to the men who do the work.

Certain Parts Draw Skill to the Maximum—Bevel gears, as depicted in Fig. 8, after they are shaped, must be hardened, and as is well known, they are very prone to warp in the process of hardening. In order to avoid this, since the gears have to be rejected if they warp, they are drop-forged, annealed after each operation, turned up to size, then annealed again, and, after being given every possible attention, are shaped (the teeth are fashioned) in which process the teeth are first "gashed" and finally "sized" in a Gleason planer.

The steel is of a cementing character, and in the process of cementation the utmost care is exercised to avoid over-heating, wide variations, or other changes, such as will tend to accentuate warping during quenching. When the gears are hardened, they are then subjected to a grinding process to bring the bolting (flange) faces true; and the final inspection measurements, by means of instruments of precision made in the Jeffery plant, soon tell the inspector what to do with the gears; if they come true, they are advanced to stock; if they do not, they must be placed in a bin of rejected parts until they can be examined by Thomas B. Jeffery, who reserves for himself the task of determining why the parts fail to respond properly to the process.

Fig. 10—Battery of cementing furnaces, one of which is receiving work, depicting method of handling

Testing Is Intermingled with Machining—From what has been said it is self-evident that enforced co-operation is essential to the success of the venture; each part, as it is being made, must be inspected a number of times, may have to be annealed more than once, and it is of the greatest importance to follow up the work and ascertain if the treatments are being made with precision. In order that the work may be properly done within a reasonable figure of cost, it is necessary to provide ample means of transportation in the shop, and Fig. 11 is offered to show what is done to satisfy this end of the situation, it being the case that "industrial railway equipment," as shown, is provided at every point, which equipment is supplemented by an overhead system as in common use in abbatoirs, for the purpose of transferring completed motors to the laboratory and thence to the assembling department after they are tested.

Power Plant Given Greatest Care—From the hydrostatic test of each cylinder, as presented in Fig. 3 (which settles as to the strength and tightness of the cylinders) to the motor assembled, are all routine matters under the control of the regular force, but once a motor is lifted off the assembling stand by means of the traveler, it is in the hands of the responsible head of the testing laboratory, and from that time on it is regarded in the light of an individual power plant rather than as one of many motors, and individuality is injected into its makeup.

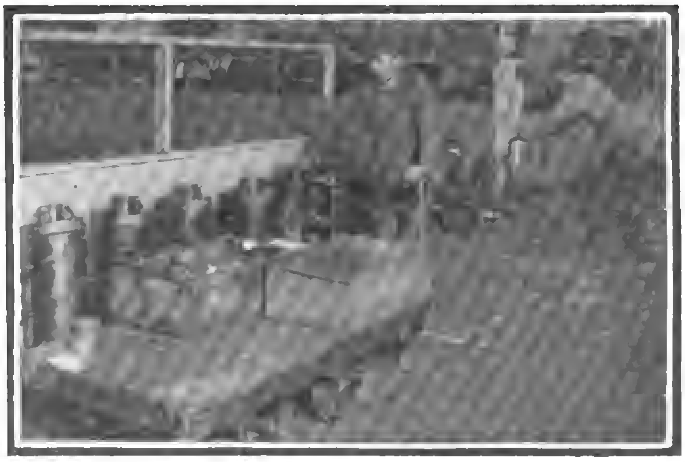


Fig. 11—Industrial railway system used in the plant for forwarding materials, showing use of tote pans

Fig. 12—Portion of heat treating department, with furnaces, quenching baths, and other facilities in actual service

Prior to the completion of the present laboratory, the method of testing motors was not very different from that which obtains in general practice, in which an electric generator is driven by motor to be tested, substantially as shown in Fig. 5. In this work, the motor drives the generator, and the output of the generator is delivered to the lamp-bank with instruments in the circuit, by means of which the voltage, current, and wattage of the generator may be determined, from which the power delivered by the motor may be calculated.

Present Method a Great Advance—In the new laboratory, rather than to labor under the disadvantages which attend the older methods of testing one motor at a time, which as a rule results in some of the motors being slighted, a considerable number of motors are placed on stands as shown in Fig. 12, in which the motor to be tested in each case is placed in the cradle, which is so designed that the motor arms fit readily. Each dynamotor is capable of absorbing power as a dynamotor, or, by suitable manipulation, it may be induced to deliver power to drive the motor undergoing test. The dynamotors are shunt-wound, separately excited, and so connected to the control board that the tester is enabled to regulate the whole situation in a definite way. If there are, say, 30 motors undergoing test at one time, one-half of them will be delivering electrical energy to the other half, it being the case that one-half of the dynamotors will be operating as generators, supplying electrical energy to the other half as electrical motors.

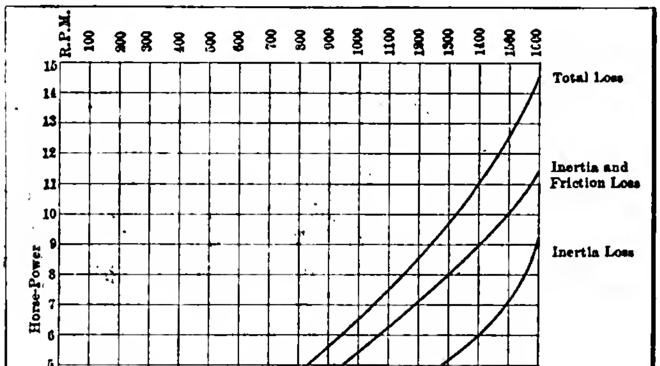


Fig. 13—Curve plotted to represent pumping losses in gasoline motors and subdivisions

If an odd number of motors are being tested, it is obvious that there will be a slightly unbalanced condition, and this difficulty is coped with in an advantageous way; the unbalanced increment is regulated to deliver electrical energy which is transmitted to storage batteries, and they are thus charged. The storage batteries are ultimately employed in the ignition system of the automobiles delivered from the plant, and since they are delivered in the green state by the makers, they are in the best possible condition from a practical point of view.

At regulated periods during the day, the tester shifts the motors that are being driven to a driving relation, and the motors that were driving are thrown to the driven relation long enough to determine the amount of energy required to drive them before they are removed from the stands. In thus ascertaining the power required to drive each motor when it is running at its maximum speed, it is possible to determine as to its mechanical condition, and if the bearings are not in good working order this fact will be rendered at once apparent.

Each Motor Is Put to the Test—As the tester discovers by means of electrical instruments and other equipment that a motor is approaching its proper form, it is selected out and made the subject for special (individual) investigation in which the "Purdy" manograph plays an important part when the occasion requires. Before attaching the manograph, however, the bearings are properly run in, it being the case during testing that lubricant is supplied by adding a certain proportion of lubricating oil to the gasoline. Then the temperature of the cooling water is adjusted to a standard, 180 degrees with a raise of six degrees (Fahrenheit) being about right for the best results.

With the motor in good order, cooling at the right point, and lubrication on a standard basis, it remains to plot a curve of speed and torque, which may read speed and horsepower, as shown in Figure 4, which is of model 44 and 45. In this chart, as an inspection will disclose, the ordinates read speed in revolutions per minute of the crankshafts, and abscissa read horsepower. As a convenience and for purposes of comparison, the curve may show equivalents, as miles per hour of the car on the road; as for illustration, taking data afforded at 1,500 revolutions per minute of the crankshaft of the Model 44 motor, the power shown is 34-horsepower and the gear ratio being as 14:52, the car should make 43 3-4 miles per hour on the road; by means of other curves, it will be possible to determine as to the competence of the relations, and if the gear ratio is not right, or if the motor is not up to power, these facts will be disclosed.

Analysis of the Motor Made—It has always been easy enough to discover if a motor were below power, but it is quite another matter to analyze the same and locate the particular difficulty which is at the bottom of the trouble. Fig. 13 is a chart giving the results of just such an investigation, dividing in such a way as to bring out the points to be made, rather with the expectation that they may be brought into greater harmony, possibly, by reducing some of them, and, in some instances, by trading off; that is to say, actually increasing some of the losses, hoping, perchance, that others will fall off at a greater ratio, and, on the whole, make a gain. The losses, as presented in the chart, are subdivided as follows:

(A) Total loss;
(B) Inertia and friction losses;
(C) Inertia loss;
(D) Friction loss:
(E) Valve loss.

In this chart the ordinates read miles-per-hour of the car, which for that matter might be reduced to revolutions per minute of the motor, as is shown at the top, and abscissa read horsepower losses. It is interesting to note that:

(A) The total loss increases at an alarming rate at the higher speeds, which condition is to a large extent due to the influence of inertia (C), and valve losses (E).

(B) Inertia and friction losses curve up at a less rapid rate with increasing speed, due to the fact that the friction losses do not increase at such a rapid rate as the speed increases.

(C) Inertia, which is the bane of motors, increases as the square of the speed, and it is this class of losses that are most difficult to determine, either in designing or in testing motors.

(D) Friction loss, as the curve indicates, is in direct proportion to speed.

(E) Valve losses increase very rapidly at the higher speeds, and must be a serious factor in poorly designed products.

This particular chart is not offered as absolute evidence of characteristic losses of the several genera in motors in general, it being the case that time and many tests will best establish the characteristic. It is by way of a considerable advance in motor building, however, that this form of analysis is offered.

From what is now known, as a result of investigations, conducted under the new conditions, a positive gain, of considerable magnitude, will be experienced in the motors which will have the benefit of the laboratory method of testing the regular Rambler output in future.

Popping Not Due to Weak Mixture—Among the discoveries made in the laboratory, for illustration, is the fact that popping back into the carbureter is not possible when the manifold is properly designed. In order to prove this, a sparkplug was placed in the carbureter manifold and was connected up to the sparking system in such a way that the mixture in the same was ignited just as the inlet valve opened, or slightly before. The mixture was then made rich, and verged down to weak, with the result that popping did not take place at all when the regular Rambler intake manifold was used.

When a special, large area, manifold was substituted, popping invariably transpired, which went to prove that when the rate of speed of the mixture in the manifold fell below the rate of flame-travel in the body of the mixture, the flame traveled back to the carbureter, thus inducing the phenomenon called popping. This same test proved that there is something to be considered involving the length of the manifold; if it is too short, considering inertia, and certain other conditions, overlaping, in setting the valves, may lead to complications and popping in the carbureter.

As a result of the investigations which were made under the new conditions it was possible to alter the curve of torque of the motors, over broad ranges, differing widely from the curves as shown in Fig. 4, and it will be proper here to state that these curves are not, now, fully representative of the results attained, it being the case that the motors, in giving them what is termed individuality, are so tuned up that they will fit well, under the conditions determined by service to be rendered, taking into account the gear ratio, weight of the car, general character of the geographical locality in which they will be required to operate, etc.

The evidence, thus far offered, while it is but a small part of the Rambler practice, is sufficient to show that under proper supervision in a shop properly equipped for the purpose, laboratory methods can be applied to every motor turned out. In order, however, to be able to determine if the cars as a whole are up to a fitting standard, it is necessary to try them out on specific grades under fixed road conditions, and for this purpose the company has, on its own grounds, a grade, designed for the purpose, evidence of which is offered in Fig. 14. Besides this grade, which as the illustration shows, offers the facility of 20, 30 and 40 per cent. inclinations, the circular track to the rear of the plant on the company's own ground makes it possible to put the finishing touches on Rambler cars, and individuality is clinched.

Fig. 14—Special grade constructed to try out Rambler automobiles before delivery affording great advantage

TECHNICAL FEATURES OF THE NATIONAL CAR

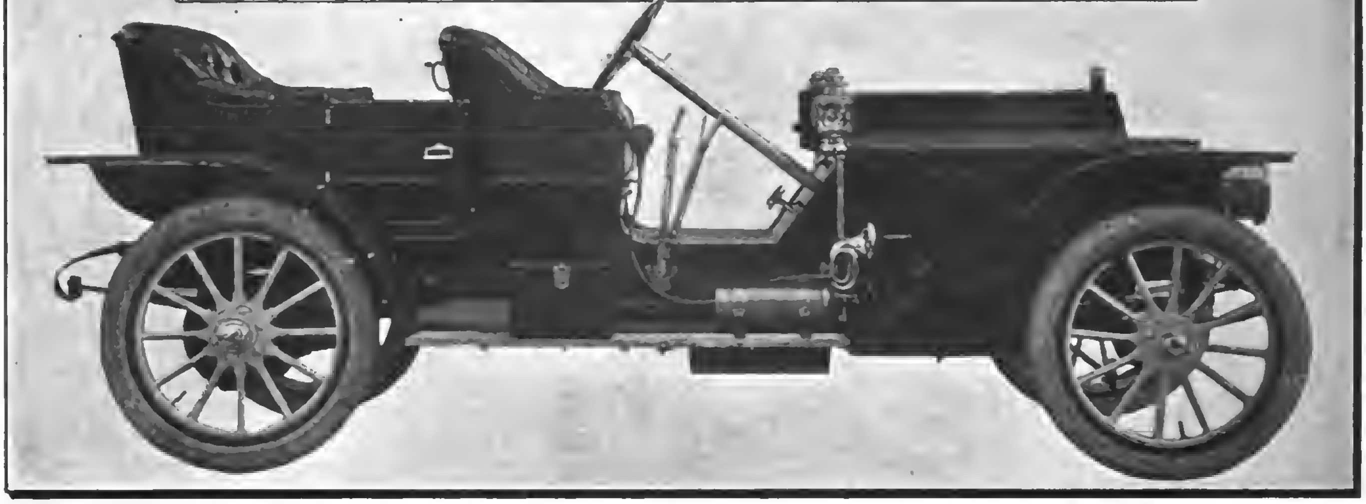


Fig. 1—Four-passenger toy tonneau with roomy driver's seat, ample foot room, large steering wheel, and excellence of control

REFERRING to Model 40, the general appearance of which is well set off in the title illustration, it will be the purpose here to delve into the details of design and construction, without clouding the issue by referring to the general and commercial characteristics of the car. All figures, excepting the title half-tone (Fig. 1), were reproduced directly from working drawings, and the actual product was examined closely by the author at the works of the National Motor Vehicle Company at Indianapolis, Ind., thus checking the drawings with the finished product, it being the idea to present verified facts in technical work of this character.

Referring to Fig. 2 of the chassis, M1 is the motor, C1 is the clutch, C2 is the coupling, T1 is the transmission, U1 is the universal joint, just back of the transmission, secured to the propeller shaft, is within the tube T2, which extends back to the live rear axle housing H1, with the cover off, disclosing the bevel pinion P1, meshing with the bevel gear G1, which gear is flanged and bolted to the differential housing H2, and within the differential gears are nested.

The two differential shafts D1 and D2 take the differential gears and, following out D1, it passes to the left rear wheel, engaging in concentric relation Timken roller bearings B1 and B2, thence passing out to the jaw drive J1, thus disclosing the manner in which the live rear axle is designed as a floating type.

The brake drum B3 is of large diameter, has an outside constricting band, B4, and an inside expanding band B5. The outside band is manipulated by the shaft S1, while the inside member is controlled by the shaft S2. Turnbuckles T3 and T4 provide for adjustment and an equalizing member E1 assures that pressure will be constant on all shoes. Turnbuckles T5 and T6 are placed to afford additional means of adjusting the brakes so that the right tension may be induced.

Steering Equipment Is of the Straight-Line Design—Referring to the cross-rod C3, it passes to the rear of the front axle, being straight, and yoked to the arms A1 and A2 by strong drop-forged yokes Y1 and Y2, with large bearing surfaces. The drag rod D3 is straight, has a spring buffer in the terminal piece T7, while the front end of the rod engages by means of a ball and socket of liberal proportions B6 to a boomerang-like arm B7, which in turn is secured to the front knuckle K1 on the right side of the car. For the rest in view of the clearness of the drawing, the design is obvious and this part of the subject will therefore be stopped off, with the single exception that attention is called to the shape and strength of the side-bars of the chassis frame, also to the neat manner in which the cross-bars are joined.

Important Details of Live Rear Axle—Referring to Fig. 3, of the live rear axle and propeller shaft up to the point of joining to the transmission gear through the universal joint J1, the

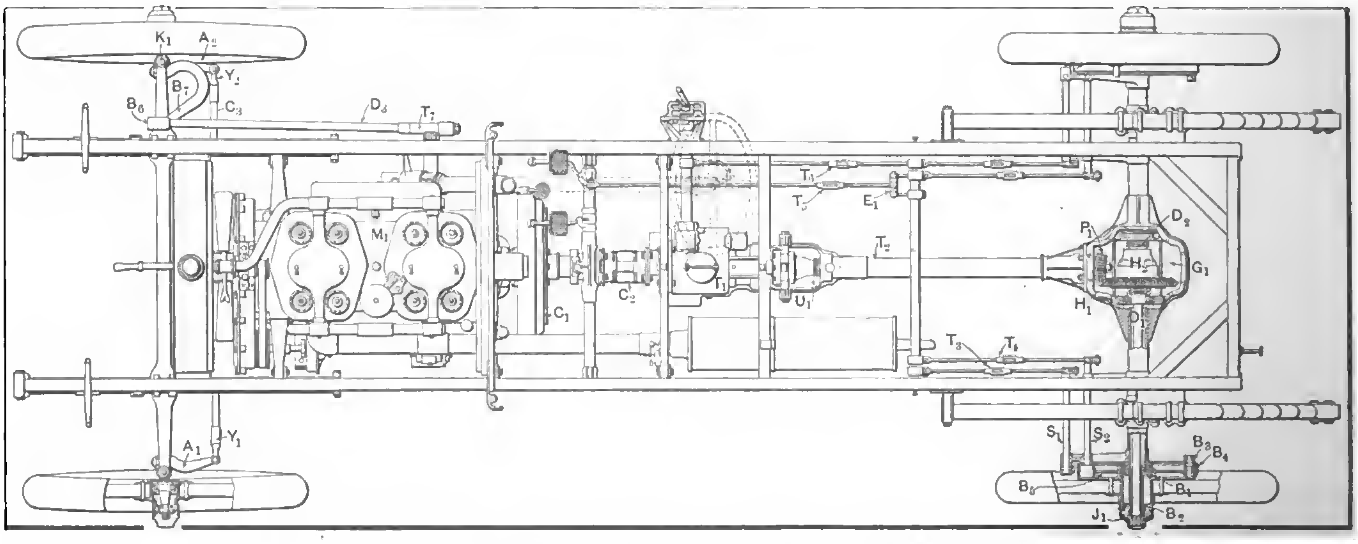


Fig. 2—Plan of Model 40 chassis with units in correct relation, showing nice features in design

propeller shaft P1 turns in Timken roller bearings B1 and B2, is of liberal diameter, being of a selected grade of steel, and is inclosed in a stout tube, T1, which telescopes with terminal forgings F1 and F2. The forging F2 is threaded for the tube T1, thus allowing for proper adjustment of the taper roller bearings B1 and B2, in which the washer W1 serves as an abutment.

Within the shell of the live rear axle, as it looks with the cover off in Fig. 3, the bearing housings H1 and H2 are provided with caps, as shown, and adjustment is made by means of the nuts N1 and N2, with lock-nuts N3 and N4 to prevent them from backing off. The spring perches, one of which is shown at P2, are free to rotate on the shaft-tube, so that the springs, which are two inches wide, do not have to take torsional load, in being handled by the tube T1 exclusively.

Most Noteworthy Details of the Motor—Experience has taught that, no matter how good a motor may be or of what the materials may consist, lubrication is at once assurance and insurance; assurance that the motor will not become an immediate source of trouble on the road if it will run at all, and insurance of a minimum of depreciation.

The table of motor torque shows the ability of the same, the dimensions of which are as follows: Bore, 5 inches; stroke, 5 11-16 inches; it being of the four-cylinder type, with water cooling, working four-cycle in the conventional way, the most important point being that the valves are relatively large and the compression is adjusted to match.

The method of testing is that of the electro-dynamometer and, as the test record states, calibration for internal losses was cared for, hence the final readings for horsepower are to be relied upon. The horsepower readings at the several speeds are such as to indicate that the "pumping losses" are well within bounds, which is indicated when the power is noted to be 47.68-horsepower at 900 revolutions, and by doubling the speed the power, instead of falling off at an alarming rate, is steady at 80 horsepower. As the test further indicates, the limit of power is not reached even at 1,800 revolutions per minute, although in practice it is scarcely to be expected that the motor will be required to work at this higher speed, unless in racing on tracks of quality, as the Speedway at Indianapolis, advantage might be taken of this higher speed.

How the Lubricating Problem Is Coped With—By referring to Fig. 4, which is a section of the crankcase, longitudinal at A and cross-sectioned at B, it will be observed that the lubricating oil is held in a basin, B1, which in section looks as in B2. In the same sectional view the filter F1 is placed, and the arrows show that the oil flows in, it being cleaned at this point. The crankcase is scooped out, or, better yet, it is contrived with a false bottom, B3, with well-holes, W1 and W2, leading into a passageway, P1, connecting the two, and at the mid-position of this passageway a third well-hole, W3, is placed, the purpose being to equalize the flow of oil, preventing it from piling up when the car is negotiating a grade, and in this way the cylinders are prevented from becoming fouled.

Referring to the cross-section B, Fig. 4 again, the oil-pump P2

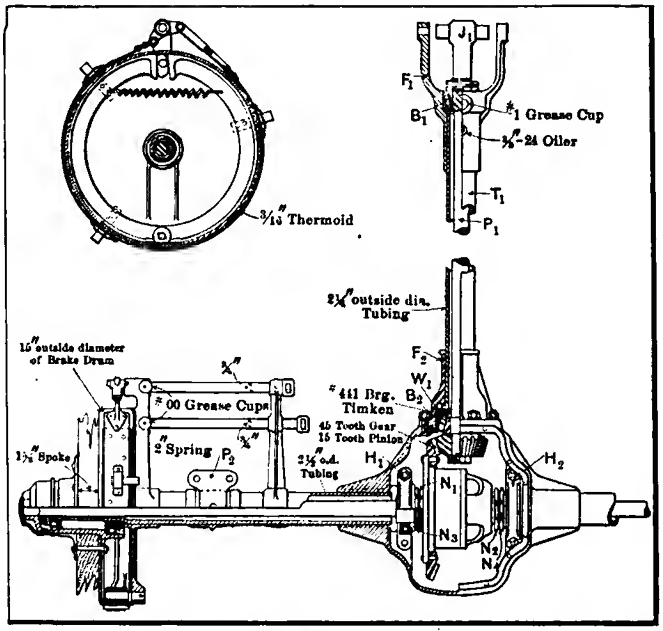


Fig. 3—Live rear axle, showing torsion tube, propeller shaft, bevel drive and floating system

is located in the bottom part, is driven by the vertical shaft S1 and Oldham coupling, O1, prevents the shaft from being cramped and allows the gear-pump entire freedom, so that the members are free in the housing.

A telltale pipe, P3, leads up to the telltale T1, which enables the operator to note if the pump is working and if oil is present in sufficient quantity to serve the purpose. The return pipe P4 takes the oil away from the telltale so fast that the glass does not cloud up. From the return telltale pipe P4 the oil leads through the passageway P5 and thence on to the respective points to be lubricated, as L1, L2, L3, and L4, for the main bearings of the crankshaft, as shown in the view A, Fig. 4. The crankpins are lubricated by a splash as at P6, and oil passes out to the herring-bone half-time gears, as at G1, while other remaining surfaces receive such profuse lubrication that the whole system works in harmony. In addition to the special means of lubricating, as here presented, grease cups are placed at all points of vantage, the idea being to keep out the silt of the road, and maintain noiselessness for the greatest possible length of time, as measured in years. It is generally well understood that noise will creep into a car in a short time if the joints wear, and they will if they are permitted to go dry. Grease cups then, in addition to the regular lubricating system, assure life and absence of noise.

The bearings at every point are long, the projected area is liberal, and the working pressure is such that there should be no trouble, even were the lubricating problem less carefully cared for. It is a noteworthy point that the oil cannot sneak out, nor

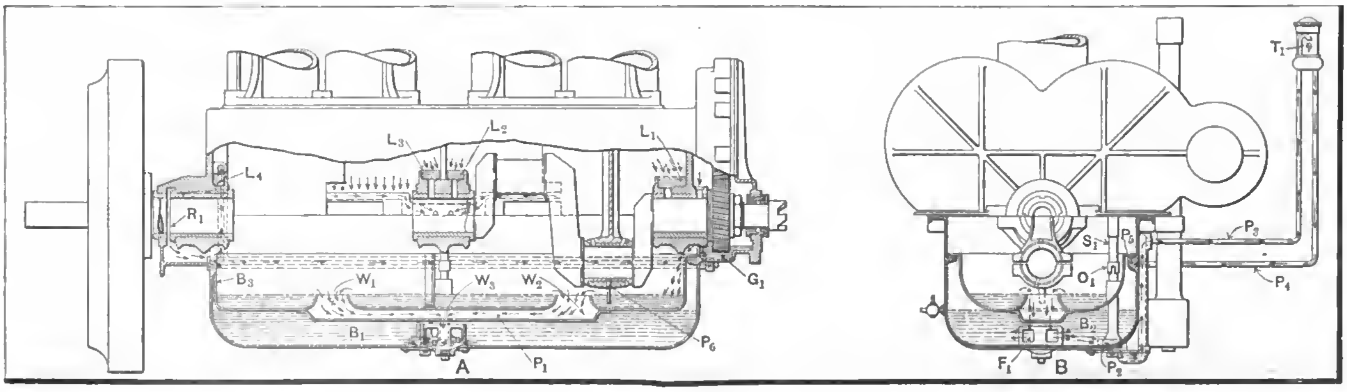


Fig. 4—Sections of crankcase offering evidence of a well-designed lubricating system

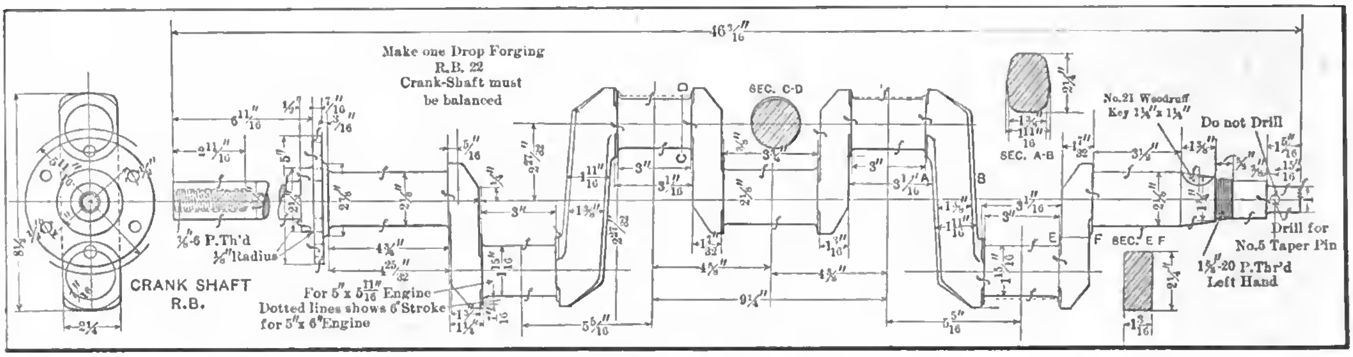


Fig. 5—Crankshaft, with flange for flywheel, substantial cheaks, liberal bearings and good material

can silt of the road migrate in; this point will be sufficiently illustrated by glancing at R1 of the bearing next the flywheel; the arrows indicate how the oil returns back to the point from whence it came.

TEST OF MODEL 40 MOTOR.

R.P.M.	Amp.	Volts.	Watts.	Eff.	H.P.
1,800	162	295	47,800	.800	80.00
1,600	152	285	43,350	.813	71.50
1,500	151	275	41,600	.827	67.35
1,450	185	220	40,700	.823	66.35
1,400	183	215	39,350	.825	64.00
1,300	115	315	36,225	.77	62.72
1,200	125	290	36,250	.79	61.16
1,100	130	260	33,800	.797	56.62
1,000	140	222	31,080	.803	51.60
900	148	200	29,600	.828	47.68
800	145	184	26,680	.843	42.20
700	148	154	22,792	.852	35.64

A Substantial Crankshaft Presides—The dimensions of the crankshaft are given in Fig. 5, showing symmetry in design, a flanged flywheel, rigid throws, and a condition of excellent balance. The material is crankshaft steel of a selected grade, it being heat-treated to accentuate kinetic qualities. The setting for the crankshaft is best shown in the section of the motor as given in Fig. 6, and in the same section will be found divers features of design which have proven out, among which the timer T1 is up above the cylinders, where it can be gotten at.

The valves V1, being 2⅞ inches in diameter, have inserted guides G1 and means of adjustment J1, which stay put. The camshaft C1 is of special hardened steel and the cams, one of which is shown at C2, are cut integral, care being taken to have them accurately ground to size. The arms, which reach to the sidebars of the chassis, are bolted onto the aluminum housing of the motor, and rigidity is thus joined with a certainty of the quality of material, on which dependence must be placed for the hanging of the motor. At the front end the starting crank S1 is held in disengagement by the spring S2, and the engaging jaws J2 and J3 are supported in good form by an extension, E1, of the motor case, with an outboard bearing, at which point a grease cup is located.

The water jacket around the combustion chamber W1 is commodious, and especial attention is called to the absence of a plug in the cylinder head H1, but a column is there and a priming cock, P1, is provided for, a hole being drilled in the column for the purpose. The pistons P2 are light, made of a fine grade of gray iron, and are strongly ribbed. The piston pin P3 is prevented from floating out by the capscrew S3 and four piston rings, R1, R2, R3, and R4, assure tightness.

The fan F1 is of substantial design, runs in annular ball bearings B2 and B3, and is rigidly supported by the pedestal P4 to the motor case. The water piping P5 is of liberal diameter, well made, and joined to the cylinders by fittings F2, which are at once neat and lasting.

Cone Clutch of Great Simplicity—Fig. 7 is a section of the cone clutch with a leather facing, L1, and flat springs are placed under the leather around the periphery for the purpose of pressing the leather into proper engagement. The clutch is flanged, F1, and a long bearing, B1, serves to maintain concentric relations. The square spring S1 presses the clutch into engagement, and adjustment is secured by pressing the thrust block of the ball type up against the other end of the spring. Thrust is equalized by means of the ball thrust-block T1, and the universal joint back of the clutch J1 occupies a dual capacity, in that it compensates for flexure and takes up endwise motion.

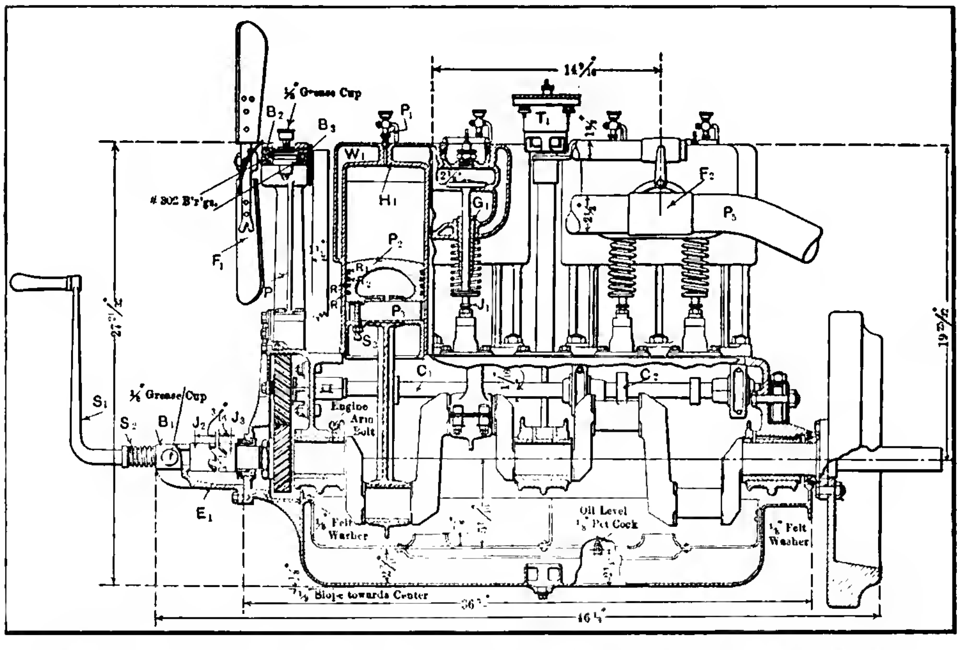


Fig. 6—Motor in section to present evidences of power at all speeds, using large valves, etc.

Of the many remaining features, they will have to be shown rather than discussed, and Fig. 8, which is a side elevation of the chassis, will suffice for the purpose. The transmission, for illustration, is a three-speed and reverse selective, with the lay shaft below as shown at T1, in which annular type ball bearings are at every point. The drive is straight line, and dust preventers D1, together with grease cups at every point of vantage, makes for long life and noiselessness.

The rear springs are three-quarter elliptical scroll type, with numerous wide, thin, flat plates rather than a smaller thick plate, the idea being to absorb shock without inducing excess strain in the material of the springs. At the front end, in view of a substantially constant load, the springs are half elliptic, but the plates are wide, thin and retained. The radiator is situated back of the centre of the front axle, which augurs for easy riding, and the general appearance of the car is pleasing, partially on this account, and for numerous other reasons besides.

The I-section front axle is of the most approved shape, and with 36-inch diameter of tires, in view of lightness of the car as a whole, the cost of maintenance should prove as agreeable as the riding qualities are said to be.

Notable Features of the Accessories—The water pump, which is of the centrifugal type, of liberal capacity, and designed for long life, is located on the right side of the motor, above the top of the chassis frame, hence accessible, and is driven by an Oldham jointed on a stub-end, which projects out of the pump casing, on a line with a stub-end of the gearshaft, projecting out from the housing, which covers the train of gears, of which the half-time gear system is a part.

The pump is placed on a ledge of the crankcase, and it being flexibly connected to its drive, there is no question of lineing up to be coped with. The pump shaft, where it extends through to the back, is utilized to drive the magneto, but in order to maintain the scheme of flexibility, and overcome trouble in lining up the accessories, a double universal joint is intervened, so that the magneto is also above the chassis frame so far as accessibility is concerned, and being flexibly connected, it may be removed, and replaced, at a moment's notice.

The magneto, which is a Bosch, works in conjunction with a coil, and a storage battery which is the source of the auxiliary electrical energy used in the coil. The wiring is very neatly and securely placed, tubing being used to house the same, and the timer, being at the middle of the motor, is in a very satisfactory location from the point of view of accessibility, and haphazard wiring arrangements are eliminated.

Double Universal Joint in Transmission—Flexibility, while it is being discussed in connection with the placing of the accessories, may as well be mentioned in general, it being the case that a double universal joint, of very substantial characteristics, is located in the system, just in front of the transmission gear, the virtue of which is manifold. This dual universal joint in front of the transmission gear is in addition to the universal connection of the propeller-shaft tube. The mere use of a very substantial chassis frame, in this car, is not construed as sufficient, and the whole machinery equipment is so placed, considering flexure, that none of the elements will be pinched, under any circumstances, and noiseless performance, to a marked degree, is realized, partly due to the shapes used, and again, due to the close fitting which is allowable.

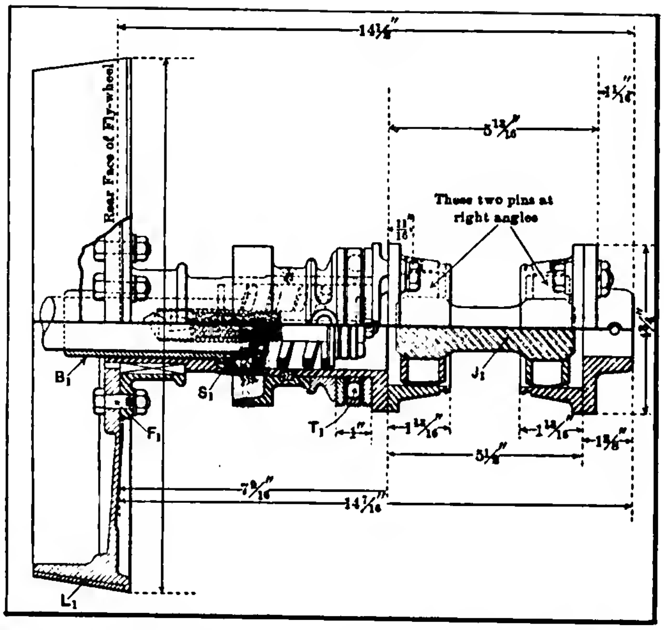


Fig. 7—Section of clutch, of the cone type, with square spring, leather facing, and ball thrust bearings

Radiator and Water Piping Well Placed—The radiator, of liberal capacity to wipe heat out of the cooling water, is placed just back of the front axle, thus adding materially to the general appearance of the car, and the water piping, which is neatly made, is flexibly joined, yet even so, this flexibility is not at the expense of quality, since the hose joints, as made, do not include long lengths of hose. The piping, where joints are made, is so closely jointed that almost no hose is exposed to the action of Winter's cooling solutions, which latter products are usually so made up as to destroy the hose. In testing out, every car is afforded enough individual attention to impart to it a certain precision of performance, it being the aim of the maker to earn a reputation for uniformity, in performance, of every car made. The chief tester, with good facilities, is enabled to try out every car, after the regular (routine) testing is completed, thus checking the regular tests, with a view to safety.

Perhaps the neatness of the mudguards, aprons, and trim in general is worth praising, as a rule; however, in a car of this quality, such details are, as a matter of course, right. Then, the shape, and finish of the mahogany dash is worthy of notice, and the equipment in general, as lamps, tools, etc., are on a sufficiently high plane to match up with the rest of the car.

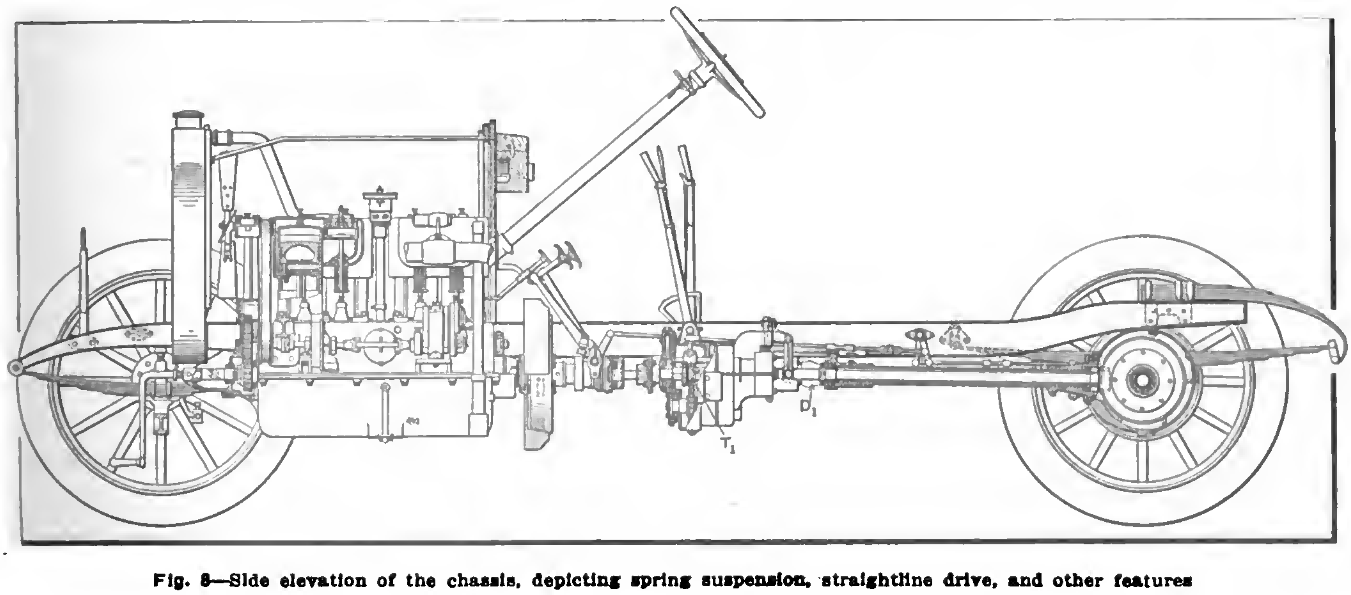
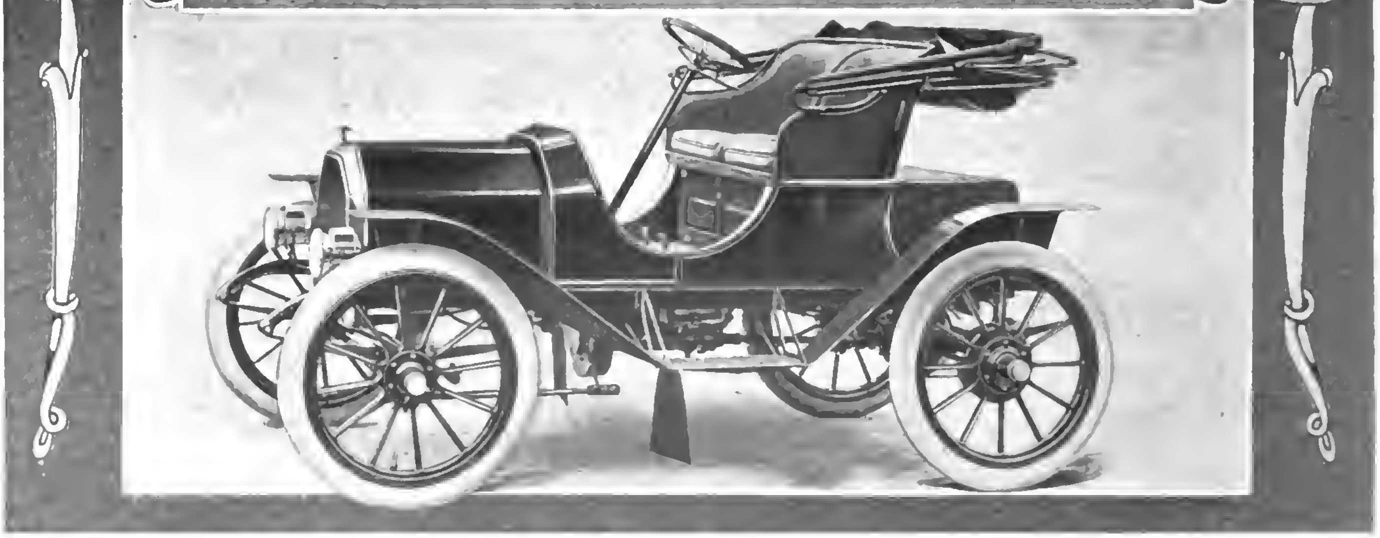


Fig. 8—Side elevation of the chassis, depicting spring suspension, straightline drive, and other features

1910 BAKER ELECTRICS ARE SHAFT DRIVEN



Baker Electric Runabout Has Wheel Steering, Bonnet in Front, and Closely Resembles Smart Gasoline Runabout.

IN CHANGING from chain to shaft drive, for use on electric cars, the Baker Motor Vehicle Company, Cleveland, has taken a most radical step, and one that will be commended by all who have followed the progress of the two drives on gasoline-driven cars. In that field, the shaft has supplanted the chain, for obvious reasons of cleanliness, simplicity, protection against dirt and consequently wear, absence of lost motion, and improved lubrication.

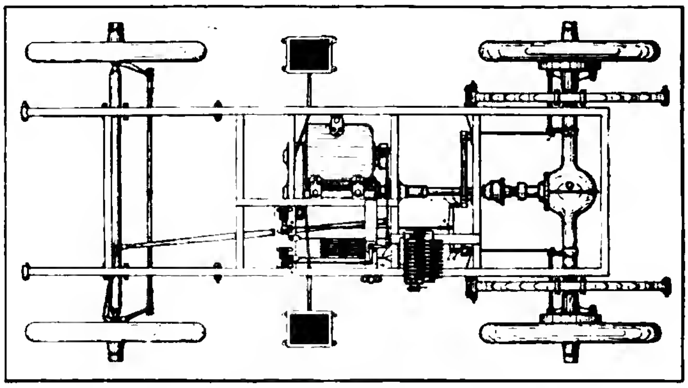
Arguing forward from this, the electric manufacturers have said, why does not the same line of reasoning apply to our class of vehicles? In adopting it for all vehicles, the Baker company has taken the stand that it does, at least, to their complete satisfaction. This step will cause much comment in the industry, for this concern has always been a leader, and if the other companies follow this lead, it means the extinction of the chain for all but commercial trucks.

Bevel Gear Tried First on Large Cars with Success—The company has used the bevel gear with perfect success on larger types of cars, but has only succeeded after many years of experimenting in perfecting an improved bevel-gear shaft drive, which is suitable for small cars, and which at the same time excels in efficiency all other forms of transmission.

It has been found by experience, the officers of the company say, that the chain drive loses its efficiency on account of its imperfect lubrication, accumulation of dust and stretching of the chain; they claim that the new bevel-gear shaft drive will maintain and even increase the efficiency of the car.

The bevel drive, rear axle is of the semi-floating type of the very latest design, approved by the best engineers. To secure lightness and greater strength, the entire rear-axle housing is drawn from sheet steel. All the bearings in this axe are of the ball-bearing type of the highest quality. The axle and drive shafts are made from vanadium alloy steel, carefully heat treated.

Special describes the differential, with which, all of the gears in the rear-axle housing, including the differentiating gears, are made from the highest-grade steel, specially obtained for this purpose. They have planed teeth and are hardened by a special process. The differentiating gears are mounted on a three-arm



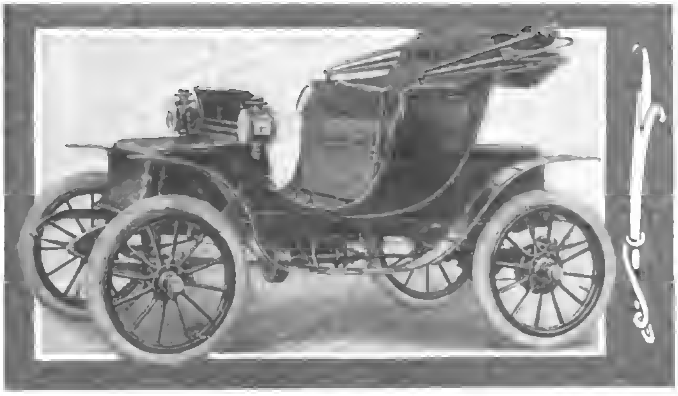
Chassis of All 1910 Baker Electric Cars Are Alike.

member and careful provision is made for a self-aligning movement of these gears. The fit for all bearings is provided by grinding to limit gauges, and maintained within limits of .00025 in.

Sheet steel is the material of the front hubs. This is drawn out from the flat sheets in presses to form it to the correct shape. The resulting hub is in one piece, and consequently, stronger. These hub pressings are accurately machined and are fitted with ball bearings of the best quality. The front axle spring seats are machined from a high-grade steel and the tube is of special semi-spring temper steel with dropforged yokes attached to the tubing by the electric welding process.

Renold Silent Chain Drive from Motor—A Renold silent chain (provided with an eccentric adjustment) enclosed in an oil and dust-proof case is used on the reduction gear, insuring silence, flexibility and high efficiency.

The transmission shaft is constructed with two universal joints of the latest approved design, allowing absolutely free action of the rear springs. One of these is located just in front of the rear axle, while the other is away forward, at the extreme front end of the driving shaft, and close to the motor. In this way, the full benefit is gained of the double universals.



Victoria Is Along Regular, Approved Electric Lines.

The front ends of the full elliptic rear springs are suspended from the frame by a novel shackle (patent applied for) which is an entirely new feature in spring suspension. This construction permits the omission of the radius rods and the torsion rod, assures perfect alignment under all conditions with a maximum of safety, and eliminates absolutely the rattle so objectionable with radius rods. All springs are of the special spring steel and are provided with reamed bronze bushings. All spring bolts are made from alloy steel, ground to size and are provided with special attachment for oiling.

Salient and Valuable Motor Features—The motor is of a special four-pole design, series wound, with unusually large commutator. It is larger than motors ordinarily used and possesses an electrical characteristic which makes it almost impossible to injure and insures continuous service with the highest possible efficiency, without requiring any attention whatever. This accounts in part for the long life of the batteries in Baker cars.

Three-point suspension is used in hanging the motor in place, one arm at the right side and two at the left holding it securely, yet so as to be readily and quickly removed. These supporting arms are bolted to the subframe built in for that purpose.

The latter, that is the frame, is of pressed steel, channel section, with the open side turned in. There are five cross members, one at the front end, and the usual rear stiffener. Then there is one at the line of centers of the front spring hangers of the rear springs. The other two are placed one on each side of the motor, with the subframe connecting the two.

What the Controller Shows—The patented controller is of the continuous torque drum type with six speeds forward and three in the reverse, all controlled by one lever. No special pedals or switches are used. This controller permits the various speed changes without arcing or fusing, and accomplishes a gradual increase of speed from step to step with a small increase of current consumption, and without any jerking motion, either in starting or increasing speed. It is also provided with a safety device which precludes the possibility of slipping into the reverse when shutting off power.

Another feature of the new models is the special lock (patent pending) for the controller. This device is extremely simple and is independent from any electrical connection, being purely mechanical and of absolute reliability.

Other Car and Equipment Details Worth Knowing—Wheelbase on the new models has been increased to 80 in. by moving

Baker Coupe for Cold Weather Is Inside Driven

the front axle forward farther than in the old models and extending the frame. This makes the cars ride more easily.

Bodies of the 1910 models are more roomy, more comfortable and unsurpassed for elegance, style and beauty of design. All cars are equipped with continuous fenders.

Standard battery equipment for victorias and coupés has been increased from twenty-four cells to twenty-eight cells 9 MV Exide, in series at all speeds.

All new-model cars are equipped with three brakes, two internal expanding brakes attached to the rear wheels which are lined with thermoid, insuring long life and absolute reliability, and an emergency brake attached to the motor. All brakes are operated by steel rods, the expanding brakes on the rear wheels being controlled by one pedal with an equalizing bar inserted, which secures equal pressure on both brakes.

Special care has been taken in wiring. The wire sizes are abundantly large to carry the heaviest possible loads without loss of power directly from the battery to the controller and from there to the motor. All mechanical connections are tight and securely locked. The entire wiring system is mechanically arranged and the wires are insulated to resist acid and weather, as well as mechanical strain, the best rubber being selected as none too good considering the work to be done.

ELECTRIC THAT MADE GOOD ON THE MUNSEY TOUR

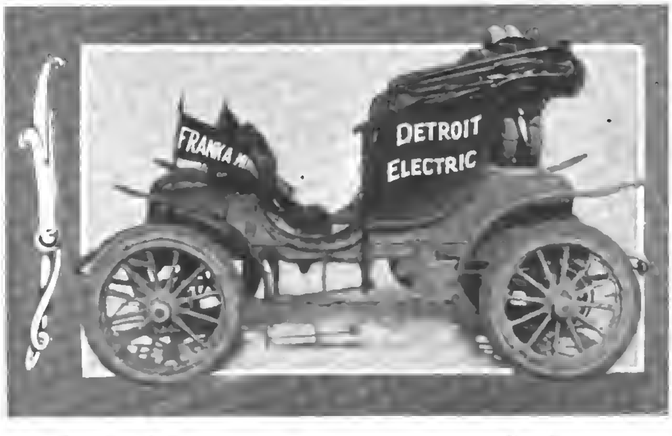
ORDINARILY, when reference is had to gasoline automobiles, it would scarcely be considered of moment to note the performance of any one example merely because the car may have mad a long run. Thre are so many people, however, who have the wrong impression about electrics that to fail to feature an electric which did come through the Munsey run on time would show lack of appreciation of the state of the art.

It will be remembered that the Munsey run, from Washington to Boston, angled along, taking the run of the roads, for a distance of 690 miles, the whole distance having been made within six days, which, considering the state of the roads, was regarded by the committee as a notable performance for "gasolines," for which the run was organized.

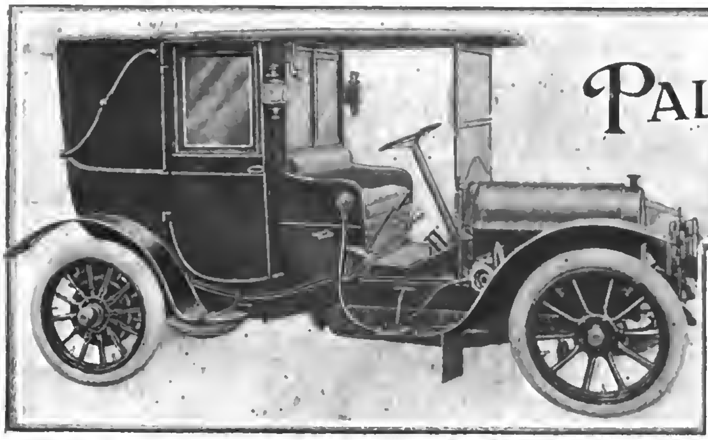
The Detroit Electric, as here illustrated, made this run; made it in good time, made it in good fettle, and made history in the doing, according to the best judgment of those who have some competence to judge.

It was a performance without an incident, from the car point of view, unless note is taken of two tire punctures and many surprised citizens who never did think that an electric would be able to stay in the run. To begin with, rain and general inclemency of weather rendered the going so difficult that the gasolines waddled about duck-fashion to a degree, and it is just this point that should be enlarged upon in discussing the sturdy Detroit electric.

The car illustrated is a regular stock Detroit, known as a victoria. The battery was just as this class of equipment is supplied to all Detroits, and in the run the performance was in the absence of any changes, either of battery or otherwise.



Detroit Electric Which Made Great Run in Munsey Tour.



Palmer Singer 1910 Models

Dropped Frame of Town Car Is Distinctive

CONCENTRATION, the aim of all American people, is the right word to apply to the method in which the Palmer-Singer Manufacturing Company, of 1620 Broadway, New York City, and Long Island City, is attacking the problem of automobile production for the coming season. By this means, and aided very materially by a model factory of large size, recently completed, the 1910 output will reach the figure of 4,000 cars.

Leaders in the line of cars will be the six-cylinder 60-horsepower car known as Model LXII, and the four-cylinder 30-horsepower machine called Model XXX, the latter being also produced, in slightly changed form, as a town car. All models are shaft-driven, have four speeds, with direct drive on third, multiple disc clutches. I-beam front axles, and many other noteworthy features. Space prevents a full description of the many good features of these three models, or even of the well-equipped factory, but the salient points of the six-sixty and the four-thirty will be mentioned in some detail.

Description of Big Six Engine—The motor is 4⅞-in. bore by 5½-in. stroke and develops its rated 60-horsepower at or below 1,200 revolutions per minute, reaching its maximum power at about 1,600 revolutions. The cylinders, pistons and rings are made of titanium iron, a very strong, dense and homogeneous metal, capable of taking a very smooth finish. These parts are given the final finish by grinding, which insures perfect accuracy. The long light pistons have four rings each, besides suitable grooves for distribution of oil upon the cylinder surface, and their tops are finished smooth to prevent the accumulation of carbon, and consequent misfiring and laboring.

Piston pins are hollow, with hardened and ground surfaces, and are secured in place by a set screw at each end, positively locked to prevent unscrewing. The nickel-steel drop-forged connecting rods are light and strong, due to careful distribution of metal, and of a length insuring but slight side pressure on the cylinder. Crank pin ends are lined with special metal bushings and the piston ends have bronze bushings.

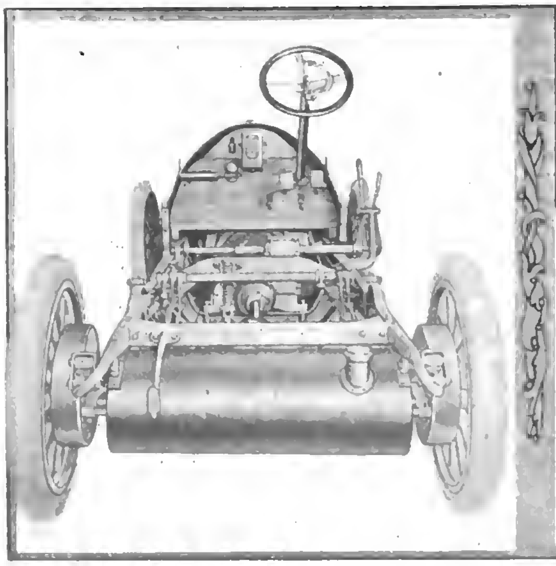
Inlet and exhaust valves, located on opposite sides of the motor, are 2⅜ in. in diameter in the clear opening and are made of a special heat-resisting grade of steel. Note that these valves are nearly half the diameter of the cylinder. The valve stems work through interchangeable bushings, easily renewed in case wear produces enough play around the inlet valve stems to allow air to leak in and affect the running at low speed.

Cams are accurately ground to a master cam and the camshaft gears are made with bronze rims and malleable iron spiders, a construction which greatly reduces the ringing noise to which these gears are liable. Noise is further reduced by enclosing the gears, which also protects them from dust and permits perfect lubrication. The exhaust camshaft carries small relief cams.

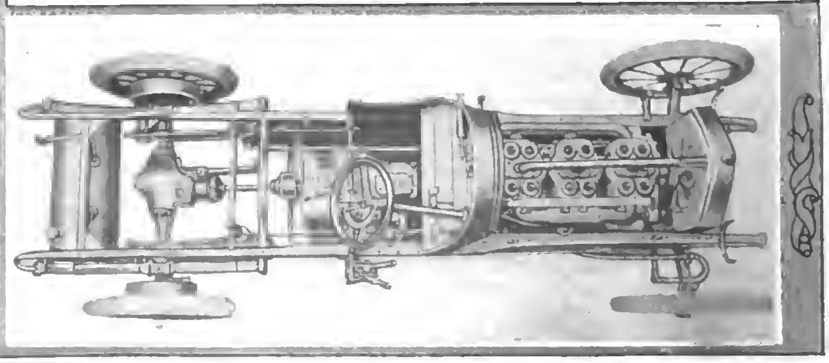
Suitable means are provided for bringing these cams into operation by shifting the entire shaft endwise. The relief cams then hold the exhaust valves open for part of the compression stroke, making the work of cranking the motor much lighter. Valve push rods work in hard bronze guides and have ample bearing surface for taking the side thrust of the cams.

Hardened and ground rollers at the lower end and adjusting screws with inlaid fiber striking blocks at the top, aid in maintaining proper adjustment of the valve mechanism and consequently produce quiet running and efficiency. The crankcase is made of aluminum, well ribbed and strong, and carries all crankshaft bearings in the upper half, the lower half acting only as a cover and oil reservoir.

Efficient Lubrication Very Important—The oil reservoir is cast integral below with the lower case and holds enough oil for 300 miles running. A gear pump draws oil from the reservoir and delivers it to a pipe extending the entire length of the upper case, from which copper tubes lead to the main bearings and to the camshaft gears. The crank pins receive their lubricant, through holes drilled in the crankshaft, from the excess oil supplied by the main bearings. The cylinders and camshaft bearings are lubricated by the oil splashed from the bottom of the case by the connecting rods. Every moving part is thus bathed in oil while the excess drains back into the reservoir, where it settles and is filtered before reaching the pump again. A float in the oil reservoir, with a tell-tale extension visible in a glass tube



From the Rear, Showing Dashboard Simplicity



Six-Sixty Chassis from Above Reveals Details of Construction in the upper half of the case, shows at a glance the amount of oil in the motor. This is useful in filling up and at other times.

Hammered steel from a drop forging made in one billet is the material of the crankshaft. Crank throws are sawed out, after which the shaft is heat-treated and machined. The final finish of the bearings is by grinding, giving a smooth and perfectly round journal. Provision is made at each end, where the shaft leaves the crankcase, to prevent the escape of oil.

Ignition Details—Only One System—Ignition is by Bosch magneto and batteries on all models, the latter being for starting only. The magneto is carried on a bracket at the right of the six-sixty motor and is driven by a pinion meshing with the camshaft gear. An Oldham coupling takes care of small errors of alignment and permits quick removal of the magneto. On all models, except the four-thirty and town car, a single coil, a dry battery of six cells and a high-tension distributor are provided for starting. The magneto and battery system each has its own set of plugs. The high-tension wires of both systems are enclosed in a metallic conduit on top of the cylinders, and the points of entry and exit are protected by insulation to prevent chafing.

Proper carburetion for a six-cylinder motor is one of the most difficult problems that an automobile engineer is called upon to solve. This company has devoted much time and expense to careful study of carburetion of six-cylinder motors, and believe that in the multiple jet type of carbureter the acme of simplicity, reliability and economy has been reached.

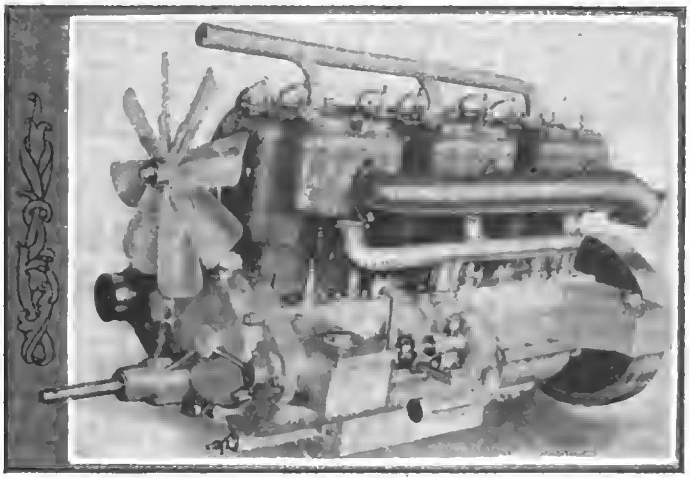
This company claims that it controls the patents on the multiple jet carbureter in this country and takes this opportunity of warning others from trespassing upon those rights. The carbureter contains the usual float and float chamber, from which fuel is led to three nozzles, each in its own Venturi air tube.

One of these nozzles is provided with an adjusting needle, the movement of which is limited to less than a full turn, and the air passage around this nozzle is always open. The other two air passages are closed at the top by check valves, which are controlled by a cam acting in unison with the throttle valve, so that the check valves open successively as the throttle is opened.

Cam adjustments are made at the factory and proper nozzle sizes fixed, leaving only the slight needle valve adjustment by which a purchaser may compensate for variations in altitude, fuel, or atmospheric conditions. Proper arrangements have been made to secure warm air for vaporizing the gasoline and preventing condensation in cold weather.

Features of Smaller Motor—Like its big brother, the smaller engine has cylinders cast in pairs, but contrary to it, the valves are grouped on one side. In size, the smaller engine, has a 4½-in. bore and a 4½-in. stroke. As to power, it delivers its rated 30 horsepower at about 1,250 revolutions per minute and reaches its maximum at about 1,650 revolutions. Much that has been said of the design of the six-sixty motor also applies to the four-thirty, so that only the minor differences need be mentioned.

The upper half of the aluminum crankcase carries the crankshaft bearings, which are special die-cast babbitt, as are also the crank pin bushings of the connecting rods. The hollow, hardened and ground piston pins are clamped tightly in the upper ends of the connecting rods and oscillate in bearings in the pistons.



Inlet Side of Palmer-Singer Six-Sixty Engine

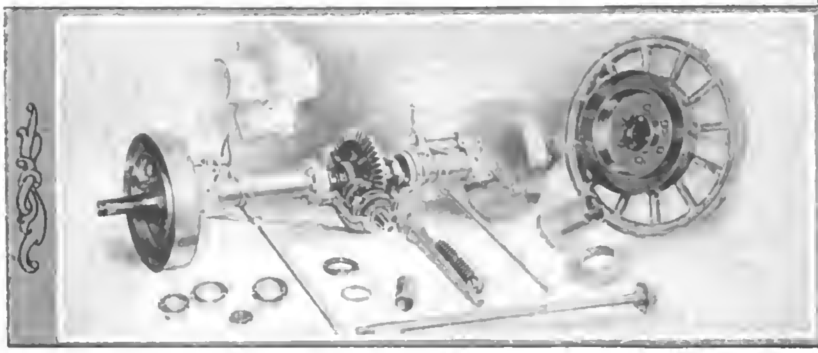
Valves and camshaft are placed on the right side of the motor, while on the left side are the water pump and Bosch high-tension magneto arranged in line and driven by a single gear, but with Oldham couplings between, so that either can be removed without disturbing the other. This motor cranks easily enough to permit starting from the magneto without difficulty.

How the Transmission and Clutch Are Made—All the gears have very wide faces and are made of special steel, case hardened to resist wear, and are mounted on very large shafts, reducing deflection and noise to a minimum. Imported annular ball bearings of the highest quality are used throughout. The transmission is of the selective type—that is, any gear may be meshed with its mate without passing through any other gear.

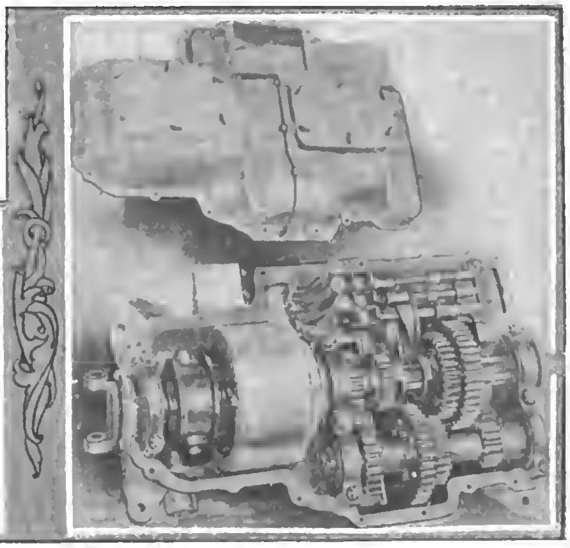
The multiple disc clutch runs in an oil bath in the front end of the gear box. The discs are made of the finest quality of sawblade steel, having great wearing qualities, and will not burn out. This clutch permits of gradual and smooth starting of the car without shock to the gears, transmission, or occupants.

All rear axles are of the full floating type, in which the wheels are mounted entirely upon the stationary axle tube. The driving axles, which engage the wheels by jaw clutches, are subjected to torsional strains only. The wheels have imported annular ball bearings, while four-point adjustable ball bearings are used to carry the bevel gears and take their thrust.

Wheels and Running Gear Well Cared For—Tread is standard on all models, but the wheelbases vary. On the six-sixty, 127 in. is the distance, which in the four-thirty is reduced to 115. Town cars should be roomy, if anything, so the town car has 120-in. wheelbase. All front wheels have 10 spokes, and all rears 12. Wheels are of second growth hickory.



Rear Axle Partly Dissembled, Showing Double Brake Drums



Four-Speed Transmission with Cover Removed

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A KENTUCKY EDITORIAL

In discussing the growth of the automobile industry and commending THE AUTOMOBILE's stand for a code of laws that will protect all users of the highway, an editorial in the Louisville *Evening Post* has this to say:

One of the interesting features of modern life has been the growth of the automobile. It opens a new era in transportation, but what has been done is little compared with what is coming. Let us conceive the condition of our streets and highways when there are three or four automobiles where now we have one. It is not a long look ahead, but we must "look ahead" in order to develop the conditions of traffic under these circumstances which will protect the roads, protect pedestrians, protect the public who ride in the automobiles, and protect those that can have little or nothing to do with them.

We are glad to see that the Automobile Club of Louisville is considering these conditions in a broad and liberal manner. At a recent meeting the club voted to send letters to every owner of an automobile in the State recommending the passage of a bill, to be introduced by Senator Newcomb, making it a felony for anyone to use an automobile for any purpose without the consent of the owner. This will do something to protect the owners of the machines, and protect the people usually injured by this reckless and irresponsible use of the roads.

In New York so numerous have been the fatalities and so brutal have been the actions of certain of the chauffeurs that the feeling against the automobile is probably stronger now than it was three years ago. One of the principal newspapers devoted to this interest, The Automobile, demands a code of laws that will protect all users of the highway and will bring to rigid account men responsible for the disregard of the regulations, whether the responsible man be the owner or the chauffeur.

We are to consider that we are using locomotives on macadam roads which are not patroled as steel roads are, which are not protected by danger signals, which have no train dispatchers, across which men, women and children constantly go and along which all kinds of vehicles take their way.

It is manifest that we must have a code of laws which will clearly define the conditions under which these roads can be used, the maximum speed at which the automobile may travel at differnt points along the road, the rights of others to a joint use of these highways, and the restrictions upon all parties as to this use.

One of the first conditions of progress in this direction is obedience to the laws we already have. The cry for more stringent, and, in many cases, unreasonable regulations, is due to failure of many of the chauffeurs to pay the slightest regard to city ordinances, road rules, or the statutes of the State whenever they think they are unobserved.

It is to the interest of all concerned that the users of automobiles be not considered as being in a class by themselves. They are a part of the traveling public. They create a growing part of the traffic which must seek these streets and highways. They cannot (and reasonable men among them do not) claim any special privileges. The roads were here before the automobiles came, and were built by the common contributions of the whole community. The automobiles are entitled to use these highways just as other vehicles are, but they must be subjected to restrictions designed to secure to all the people the greatest benefits from the highway consistent with their common use.

Once upon a time there were daily press comments both rabid and prejudiced; now there is an evident desire to approach the subject in a liberal and unbiased manner. The situation, in plain words, is that the automobilists must assist in purging their ranks of the criminal offenders who arouse these threatened epidemics of antagonistic legislation which cause law-abiding auto owners unlimited trouble in preventing the swinging of the pendulum to the other extreme.

ART IN AUTOMOBILE BODIES

Although hardly so elusive as the Paris fashions in hats, automobile bodies still show enough of the same infinite variety to keep the average man guessing, and. incidentally, to provide a liberal profit for their designers and constructors. But recently we fancied that we had reached the day when at last a body was nothing more than a body should be; that is to say, a comfortable accommodation for a certain number of passengers, simply and economically built, and possessed of that grace and good taste inseparable from a structure well adapted to its work. We seem to have been mistaken.

To the British Isles we now owe, besides the monocle and the green hat, that specimen of the body-builder's art variously known as the "torpedo" and the "gunboat," though by the irreverent often dubbed the "bathtub." Its originator must have been one of those comic-supplement artists who delight to show an automobile in the act of tossing a benevolent old gentleman into the branches of an apple tree. Whether or no this surmise be correct, one easily traces the baleful influence of comic-supplement tradition in its lines.

The object of this design appears to be the complete obliteration of every natural body feature, reducing the automobile to the semblance of a submarine, from which the heads of the occupants protrude unnaturally. Its boasted advantages include none which have not already been obtained on bodies of normal design. Doors to the front seats were seen long ago. Dust raising concerns principally the underbody. Wind resistance is a negligible factor at any ordinary speed. Let us hope that the reign of the "torpedo" will be brief; its demise will certainly be unregretted. Present designs may not be perfect, but improvement does not lie in the direction of the "torpedo."

CHALMERS-DETROIT AND HUDSON COMPANIES TO SEPARATE

DETROIT, Dec. 20—In this city, automobile history is made while you wait, so that the announcement of the ultimate separation of the Chalmers-Detroit and Hudson companies into two distinct concerns, following closely upon the Studebaker E-M-F announcement, made a great stir. Ever since Hugh Chalmers purchased an interest in the Chalmers-Detroit Motor Company it has been his ambition to become the controlling factor. The formation in Detroit some time ago of the Hudson Motor Company paved the way for changes that will make this condition of affairs possible. Identified with the latter concern were a considerable number of Chalmers-Detroit stockholders, including Mr. Chalmers, R. D. Chapin, Howard E. Coffin and F. O. Bezner.

After July 1 next the two companies will operate as separate concerns, being owned by entirely different persons. Messrs. Chapin, Coffin and Bezner have traded their Detroit-Chalmers holdings to Mr. Chalmers for his holdings in the Hudson Company and a comfortable cash bonus, and will busy themselves with the affairs of the latter corporation after the above date.

Under the reorganization, officials of the Chalmers-Detroit Company will be: President, Hugh Chalmers; vice-president, Lee Counselman; second vice-president and factory manager, J. J. Brady; secretary, H. W. Ford; treasurer, C. A. Pfeiffer; chief engineer, George W. Dunham, now chief engineer of the Hudson Company.

E. R. Thomas, of Buffalo, it is understood, retains his holding and will continue to serve as a director in the Chalmers-Detroit Company.

Under this change Messrs. Chapin, Coffin, and Bezner gain control of the Hudson Company, which will be officered as follows: Chairman of the board, J. L. Hudson; president, R. D. Chapin; vice-president, H. E. Coffin; secretary, F. O. Bezner; treasurer and general manager, R. B. Jackson; sales manager, E. C. Morse.

When interviewed by a representative of THE AUTOMOBILE, Mr. Chapin had this to say concerning the proposed changes: "We were facing a business problem, and we met it in a business-like way. We have felt for some time that the field of both the Chalmers-Detroit and Hudson Companies was so broad that both should be worked to the limit. We decided that a rearrangement of our executive forces was the best thing to bring about the results desired.

"In connection with my associates, I have the greatest faith in the future of the light car business. I believe that companies such as the Hudson and Chalmers-Detroit, making good cars at low and medium prices, and in position to produce in large quantities, will reap the largest measure of prosperity within the next few years. It is our belief in this bright future for the maker of the light car that has influenced all of us to rearrange our line-up so as to take the utmost advantage of the opportunities offered.

"There will be no change in the policy of the Hudson Company, in its production of cars at a very moderate rate of price, with the highest possible quality that we can put into them. The unusual success of the Hudson "Twenty" roadster argues well for the plans we have in view respecting the future of the company.

"All of us have the most sincere respect for Mr. Chalmers and his ability, and our agreement is entirely a friendly one. The two companies will aim to work in close harmony and to help one another in every possible way in the future."

Mr. Chalmers expressed himself in a similar strain, when seen by a reporter for THE AUTOMOBILE. He said in part, speaking on the subject of the change and its influence on the two companies:

"We reached the conclusion that both companies would develop faster, and all concerned in them prosper more rapidly if there was more concentration of effort along definite lines on the part of some of the officers.

"It is sometimes difficult in the actual management of two distinct corporations for the same set of men to give each concern the full amount of attention that each one should have, and we felt that the Chalmers-Detroit and Hudson Companies each was large enough now to demand the individual attention of its own set of officers. These contemplated changes will not take place abruptly. We shall work into them gradually and naturally, so that the regular operations of either company will not be interrupted.

"I want to say that my association with Messrs. Chapin, Coffin and Bezner has been long enough for me to have learned to know them very well, and to appreciate their knowledge of the automobile field and their ability to carry on successful operations in that field; but, above all, I have learned to have the highest possible estimate of their integrity and ability. We have always been the best of friends and our business relations have been most pleasant. This deal is entirely friendly and will not in any way interfere with our business or personal relations in the future. It is the spirit of our agreement that the two companies, although they will be entirely distinct and operating along slightly different lines, shall continue to work close together and in perfect harmony.

"The policy of the Chalmers-Detroit Motor Company will not be changed in any way. We shall continue to make the Chalmers-Detroit "Thirty" and "Forty." It has been the established policy of the company to offer the public the greatest possible values at the prices asked, and we shall continue to follow this policy."

STUDEBAKER AND E-M-F DIFFICULTIES STILL UNSETTLED

DETROIT, Dec. 20—The legal controversy being waged between the E-M-F and Studebaker companies, and which still continues to be the leading topic in local automobile circles because of the far-reaching effects of the case whichever way it may be decided, took an unexpected turn last week when Judge Henry F. Severens, of the United States Circuit Court at Cincinnati, granted a temporary restraining order against the E-M-F Company preventing it selling cars to any company other than the Studebaker Automobile Company, of South Bend, Ind.

Judge Swan, of the United States District Court in Detroit, some days previously refused to issue a peremptory restraining order requested by Studebaker officials, and the matter was to have come up in his court Monday of this week, he announcing his determination to decide the question on the merits of the case.

Then Attorneys John S. Miller, of Chicago, and Henry M. Duffield, of Detroit, on behalf of Messrs. Fish, Studebaker and Eames, of South Bend, busied themselves and secured the temporary restraining order from Judge Severens, which is returnable in Kalamazoo, Wednesday, of this week.

The first intimation E-M-F officials had of this move was when copies of the order were served on the majority stockholders, the three complainants constituting the minority holders. Meanwhile, the E-M-F Company had proceeded along the lines originally laid down by Judge Swan, and filed its answer to the application of the Studebaker Company for a restraining order. The annulment of the contract with the Studebaker Company is admitted, but it is declared this action was taken only after the Studebaker Company had violated its contract in refusing to take the number of cars agreed upon, and that such action was sanctioned by a majority of the board of directors.

It is alleged that the Studebaker Company is not a manufacturing company, has a capital of only $100,000, and that it followed the method of making contracts with dealers to sell the car on a percentage basis; that it took advantage of the popularity of the E-M-F car to force dealers to take the sale of other cars in which the Studebaker Company is interested at low, unfair and discriminating discounts, not sufficient to compensate such dealers, with the result that the demand for the car fell off.

Inasmuch as the demand for E-M-F cars was created before the selling agreement was entered into, it is claimed, the only losses the Studebaker Company would suffer would be in the profits on sales, which are insignificant compared with the damage sustained by the E-M-F Company by reason of the Studebaker Company failing to live up to the terms of the contract. It is maintained in the answer that through failure of the Studebaker Company to take the allotted number of cars in October, November and December the E-M-F Company was put to a large expense in storing cars, and that if it is enjoined from selling its product the factory will have to be shut down. Accompanying the answer is a statement showing that with improvements the E-M-F Company has an investment of $2,582,681 in its six plants, and that it has contracts for material with sixty firms, aggregating $5,000,000. The answer discloses the fact that contracts made by the company for parts and materials are based upon the cost plus a fixed percentage of profits, so that all these firms would be somewhat affected should the factory be closed.

Counsel for the E-M-F Company argued against any continuance of the case, which had been set by Judge Swan for a hearing Monday. However, Judge Swan granted the request of the minority stockholders, who were desirous of having the temporary restraining order disposed of first, and the local case went over for a week, after a stipulation to cease advertising.

In the interim between its réscinding of the selling agreement with the Studebaker Company and the issuance of a temporary restraining order the E-M-F Company had been doing a land office business with agents from all over the country, who flocked here the moment it became known that the E-M-F Company proposed operating independently. Hundreds visited Detroit seeking the agency for E-M-F cars, and President Walter Flanders has for a week or more been the busiest man in the industry. Should Judge Severens decide, on the showing made, to grant a permanent injunction the entire aspect of the case might be changed. In that event it is difficult to see how a long-drawn-out legal battle could be avoided. Indeed, those familiar with the matter now insist that is what it will amount to in any event, as both sides are determined—the E-M-F Company to maintain its identity, it asserts, and the Studebaker Company to continue the selling arrangement it declares is still valid.

A NEWS BUDGET FROM AUTOMOBILEDOM'S HUB

DETROIT, Dec. 20—Manager John Gillespie, of the Detroit Auto Dealers' Association show, to be held in the Wayne Hotel Gardens, January 24-29, isn't a fatalist. Hence the fact that local entries to date exceed those of the Madison Square Garden show by the cabalistic thirteen doesn't worry him. So far 67 different makes of cars have taken space, or to be more exact have been crowded in. The Madison Square show advertises 54 exhibits of completed cars. And that is one of the reasons Manager Gillespie and officials of the association wear a smile that even their troubles in accommodating all who desire to show can not efface. Approximately 30,000 square feet of space is available at the Wayne Hotel Gardens. If there was twice as much it could all be filled with cars alone. As it is every foot is taken, and accessories manufacturers are barred. This has caused considerable dissatisfaction, but there was no alternative. Some day some enterprising mortals may provide Detroit with a hall suitable to the requirements. Until it does the hub of the automobile industry will have to worry along with the best it has, and content itself to have the annual event known as "the biggest little show," although, as entries this year indicate, aside from the limited accommodations, it has long since outgrown that classification.

No New Concerns—The past week was a notable one in several respects so far as the local field was concerned, not the least interesting feature being the fact that a careful survey of the situation shows that not a single new automobile company came into existence in Detroit. Where they have been coming so close together that an adding machine was required to keep tab on the total this is a truly startling condition, due, no doubt, to the fact that several who will get into the game shortly were occupied with their Christmas shopping.

That Parts Shortage—How seriously the threatened parts shortage will affect automobile makers in Detroit depends largely upon whom you talk with. All the manufacturers are keeping a stiff upper lip, and appear to be unconcerned. It is well known, however, that in many instances difficulty is already being experienced in getting parts, with the prospects even less encouraging the first of the year. This condition applies particularly to those producers of motor cars who are known in the trade as "assemblers," and who are almost entirely dependent upon other concerns for their supplies. The older established concerns, who were under way before the shortage loomed above the horizon, appear in a position to take care of themselves, and little anxiety is being manifested.

"One consolation lies in the fact that if the shortage really becomes serious it will result in a lot of experimental cars being kept off the market," said one veteran dealer, discussing the situation. "The old concerns will be able to pull through all right, but some of the newer ones that have just opened up and are planning big things will get some experience that will come high before it is all over, or I miss my guess." Another exemplification of the ill wind adage?

WHY WORCESTER RUN WAS ABANDONED

WORCESTER, MASS., Dec. 18—The endurance of the Worcester Automobile Club, scheduled for yesterday, was called off because of an insufficient number of entries. The reason given is that dealers were not able to get cars at this time, and another reason assigned is that the Boston dealers did not care to go up against the rules of the contest, which required a severe technical examination at the testing plant of the Worcester Polytechnic Institute. Last year there were upward of a dozen entries in the 200-mile run, and while nearly all of them finished with perfect scores so far as the actual driving was concerned but one car was given a perfect score.

PERHAPS A SPEEDWAY FOR COBE RACE

CHICAGO, Dec. 21—In considering a course for the 1910 Cobe Cup and Indiana Trophy races, the directors of the Chicago Automobile Club are inclined to give the preference to a speedway backed by local automobilists.

Plans for the speedway in question have been considerably elaborated. The site proposed is within easy distance of Chicago, both by steam and electric roads. The capitalists behind the speedway are willing to build the track and stands without attaching any liability to the club. They will take the chance of getting returns on the investment, either by conducting the races themselves or leasing the track to the club for that purpose.

DAYTON AD MANAGER ON SITUATION

Dayton, O., Dec. 20—At a time when it is freely admitted that the automobile business is passing through a second formative period, any comment or advice coming from those in a position to offer something worth hearing, and exegetical of the situation, is worth repeating. Gridley Adams, advertising director of the Dayton Motor Car Company, Dayton, O., makers of the widely known Stoddard-Dayton cars, has delivered himself of an analysis of the situation which will carry weight.

Commenting on the reported productions of the larger firms, Mr. Adams goes somewhat astray, for he says: "The real condition of the automobile industry to-day is far from what is generally understood by the outside public. They read that one manufacturer is going to build 10,000 cars, another 25,000, and still another 40,000 cars for the season of 1910.

Gridley Adams

"No one factory is equipped to turn out more than 4,000 to 5,000 cars a year. If more cars go out bearing the name of any one manufacturer, they are the product of perhaps a dozen factories, though 'assembled,' may be, in one. Their various parts are not made by themselves, but necessarily bought from part-makers or accessory-makers all over the country. Therefore, under the present condition of a great over-demand, how much regard can be given as to how one part-maker's part will bear relation to the quality of another part-maker's part? That isn't harmonious construction, but positive disorder. The old adage of a chain being no stronger than its weakest link was never more applicable than to many automobiles manufactured under some of the present rush-day methods. How many automobiles made on this 'thrown-together' plan will last even one season through? Where is there any chance of interchangeability of parts—which factory built the particular part that went into your particular car, and which you now want replaced—will it fit when it comes?"

On the "made entirely in our own factory" idea his remarks are more happy. Getting onto this subject, his remarks are pointed rather closely to the car in which he is interested, but nevertheless are based on a sound foundation. He says:

"We are not thinking of quantity. We try to see how good a car we can make. We make our parts interchangeable. We take good care of Stoddard-Dayton owners, and do it willingly and promptly. Everything of importance in the make-up of our cars (excepting the tires, magnetos, lamps, and wheels) are made in our own factory. All gray-iron castings, including cylinders, and all aluminum and brass castings are made in our own factory. All pressed-steel frames, drop castings, springs, bonnets, fenders, tanks, mufflers, and all pressed-steel parts we make ourselves; also our radiators, bodies, engines, front and rear axles, transmissions—in fact, we make 93 per cent of all the essential parts—more than is made by any other manufacturer in the world. Under these circumstances we must be modest when it comes to quantity. We expect to make only about 2,500 cars this season. But they will all be made in our own plant, made carefully, every part fully inspected, every car thoroughly tested before it goes out into the automobile world bearing the name and guarantee of 'Stoddard-Dayton.' It is for this reason that we are sure—we know—the exact quality of everything—and its quality relation to every other part—that enters in the construction of Stoddard-Dayton cars. And our guarantee to every buyer of a Stoddard-Dayton car is based upon this absolute knowledge.

"We are way behind in our 1910 deliveries and we are rather proud of the fact. It's the best indorsement of quality and guarantee that an automobile buyer could ask for."

NEW BOOKS FOR AUTOMOBILISTS

Vehicles of the Air—Victor Lougheed, the author of "Some Trends of Modern Automobile Design," has, like many other automobile engineers, taken up the problem of mechanical flight. His work on this subject is represented by a massive volume of 479 pages, published by the Reilly and Britton Company, Chicago. The intention apparently has been to include between the covers complete and exhaustive treatments of every branch of art and science into which the experimenter might be led. To this end much matter has been retained which, at first glance, seems irrelevant. However, the great body of the contents is so much to the point that this fault is easy to forgive.

Of the greatest interest to all who approach the subject from the scientific point of view are the experiments and calculations of Professor J. J. Montgomery, of Santa Clara, Cal., on the laws of the effect of air currents on curved surfaces. These calculations seem for the first time to cover completely the mathematics of the question, and should prove invaluable in calculating the proper curvatures for aeroplane surfaces. Incidentally, Professor Montgomery proves that the curve should be parabolical in cross section longitudinally. This confirms the present practice of all the most prominent designs.

The practical man who is considering building a machine of his own will find abundant data. Working drawings, with dimensions, are given of the Santos-Dumont, Blériot Type XI and Antoinette monoplanes, and the Wright, Curtiss, Voisin and Cody biplanes, as well as of the Montgomery tandem monoplane glider. The information is so complete that a good mechanic could produce any of the machines almost exactly.

The patent question is treated very fully. The text of the Wright, Montgomery, Chanute, Mouillard and Lilienthal claims is given complete, with reproductions of the original drawings.

Mr. Lougheed is an enthusiast on the possibilities of aerial navigation. His idea of the future seems well expressed by the lines of Tennyson, which he quotes in his introduction:

> ". . . the heavens fill with commerce, argosies of magic sails,
> Pilots of the purple twilight, dropping down with costly bales."

He is an ardent believer in the aeroplane as against the dirigible balloon, although the book maintains a fair and impartial attitude. In Mr. Lougheed's words, "it (the dirigible) is accorded such attention as seems demanded by its present prominence rather than by its future prospects."

On the whole, the book is one that cannot be too highly recommended, both to students and to mechanics and inventors. It is illustrated by 130 drawings and 140 half-tones. In conclusion is given a very complete glossary of aeronautical terms and a list of all recorded heavier-than-air flights up to November 3, 1909, which are said to total 35,000 miles.

WILL WORK FOR LIGHTS ON ALL VEHICLES

Worcester, Mass., Dec. 18—The directors of the Massachusetts State Automobile Association had its meeting at the rooms of the Worcester Automobile Club yesterday afternoon, there being present Lewis R. Speare, Boston, president of the American Automobile Association; Atherton D. Converse, Winchendon, president of the association; A. E. Lerche, Springfield; W. H. Chase, Fitchburg club; James Fortescue, Bay State Automobile Association, Boston, and John P. Coghlin and Daniel F. Gay, Worcester Automobile Club. The principal business under discussion was plans for the legislative committee, and it was voted to work for a light bill on all vehicles, and also for legislation to iron out the many little kinks which exist in and around Boston.) The rules of the City of Boston relative to automobiles are unfamiliar to many automobilists in other sections of the State and frequent arrests are made on technicalities. It is the desire of the State Association to remedy these conditions. At least, that is the announced desire, and there seems to be no reason to doube their word.

American Five-Ton Truck Carrying Huge Load of Lumber

TRUCK SUCCESSFULLY CARRIES LUMBER

BUFFALO, N. Y., Dec. 20—One of the sights of this town is a huge motor truck more than covered—almost hidden—by a load of lumber. This vehicle, which one of the Buffalo lumber companies put into use not so very long ago, has made a reputation for itself. It is the product of the American Motor Truck Company, Lockport, N. Y., and is rated at five tons carrying capacity.

As shown in the picture, however, the load consists of over 7,000 feet of lumber, with a total weight of seven tons. The truck has been in this service for over three years, and the last report of the operators regarding the expense of operation and maintenance for twenty-two months, covering all items but driver's wages, was but $985. Of this total $285 was expended on tire repairs, leaving only $700 for gasoline, oil, waste and general repairs over a period of nearly two years. The truck is still rather frisky.

CORBIN ENGINEER FAVORS SHORT STROKE

Among the many big problems with which the automobile engineer is early confronted, and to which he must give attention, no one has excited more discussion than the matter of length of stroke. Beginning about a year ago abroad, following the success of cars in the English Four-inch race, American constructors began to give the matter their best attention.

Even to-day the subject has not been settled to the satisfaction of all concerned. Many makers have adopted the long stroke, while many others hold to the short stroke. The advantages of the latter are briefly summed up by one advocate, Guy Hutchison, secretary and sales manager of the Corbin Motor Vehicle Corporation, New Britain, Conn., as follows:

"Gasoline motors are not like steam, relying on the slow expansion of gas, but are impulse motors, where the pressure is very high for a short time, and after that can be practically neglected; therefore the piston traveling an equal distance in the same time revolves the crank further on a short-stroke motor, thereby giving more power. The short-stroke motor has shorter connecting rods, lower cylinders, smaller crankcase and lighter flywheel, all of which saves weight. The lower cylinders give a lower center of gravity, another important feature.

"The vibration is less with a short-stroke motor because each impulse is applied with a smaller lever arm. For the same reason the strain on the transmission, universal joints and level gears is less like a hammer blow. Other advantages of the short-stroke motor are that it cranks easier, is more economical of gasoline because of its smaller piston displacement, accelerates quicker and is capable of higher speed."

Elmira, N. Y.—The Charles W. Bishop Company has opened a new garage on State street, near Church, with all the modern conveniences, including a repair department equipped with complete machinery and appliances.

VALUE OF 1,600-MILE NON-STOP RUN

Among the buying public there is a tendency to place too much dependence upon speed trials and too little on reliability of endurance runs, which properly show the ability of the cars under ordinary conditions such as the average buyer is likely to meet. Speaking on this general subject, but referring specifically to the recent trip of the Jackson "Mud Hen," F. L. Holmes, general manager of the Jacobson Automobile Company, Jackson, Mich., expressed himself as follows:

"Very few people realize what a 1,600-mile non-stop run like this one means. The car was in charge of E. P. Blake, of Boston, accompanied by Dr. Charles Percival, both of whom went over this severe trip for the second time. The course followed ran from Jackson, Mich., to Bangor, Me. Runs of this character do more to demonstrate the superiority of the car than any number of races or short speed contests. Reliability and durability, together with strength and power, are more to be sought for, and 1,600 miles in the midst of winter over rough and frozen roads is a long drive, and the motoring public are not apt to pass over lightly the second performances of Messrs. Blake and Percival without realizing the full significance of covering the distance named in the short time they did and the condition of the weather and the roads. At this time of year few motorists venture on long drives, and 1,600 miles now means a strain that 7,000 miles, or a fair season's mileage average, for the ordinary owner. In fact, few cars average that distance in a year. Figure out the ride from Jackson, Mich., to Bangor, Me., together with the fact that the engine and car ran day and night, rain or snow, and that during the run the engine must not be stopped for any reason, and the magnitude of the task performed by Messrs. Blake and Percival for two successive years is apparent.

"The statistics of this run are most interesting, and show the stupendous task of the car and the component parts. In the run the motor loyally turned over without a single stop or hesitancy 3,555,000 times, during which time the carbureter delivered into its hungry and never satisfied cylinders just 7,104,000 charges of gas. Just think of the possibility of failure on this run; a deviation of a fraction of a second, a dragging wire, a clogged carbureter, or a hundred and one things would have been sufficient to have put to a stop this continuous run. Take the magneto alone, which never faltered, and which for hundreds of hours generated 7,104,000 sparks to fire these 7,000,000 charges of gasoline to furnish the propulsive energy for the 1,600 miles. This same energy and horsepower developed on the 1,600 miles was sufficient to raise the car into the air a distance of 560½ miles. There is also another interesting point, and that is the nervous and physical condition of the men who have twice made the trip. It's marvelous!"

PHILADELPHIA TRADESMEN TO HAVE HOME

PHILADELPHIA, Dec. 20—At last week's annual meeting and election the showing made by the Philadelphia Automobile Trade Association was so encouraging and the future prospects so bright, that the much-discussed project of a clubhouse, when revived, found a large majority of the members in a receptive attitude, and, as a result, President Wister appointed W. J. Foss (Pierce-Arrow), Allen Sheldon (Premier) and A. E. Maltby (Winton) a committee to secure suitable quarters. This committee went to work at once and after a thorough search secured a lease on a portion of the building now in course of erection at the southeast corner of Broad and Callowhill streets, about midway of "Automobile Row." The plans contemplate a suite extending across the entire front of the building, with meeting, committee and dining rooms, secretary's quarters, kitchen, lavatories, etc. Here will be established a clearing house for the local automobile trade, and quarters for visiting tradesmen. Secretary J. H. Beck will be on duty constantly, and it is proposed to ultimately extend the accommodations to include a comprehensive automobile library and tourists' bureau, where travelers may obtain information of all kinds. The new quarters will be ready for occupancy about March 15.

INJUNCTION AGAINST PRICE-CUTTERS

New York, Dec. 20—In a trial case, which has just been held, it appears as if the pernicious price cutting resorted to by certain small dealers may be stopped once and for all. The Circuit Court of the United States for the Southern District of New York has just granted an injunction against cut rate dealers who handle the Klaxon Warning Signals, in the case of the Lovell-McConnell Manufacturing Company, et al, vs. the E. J. Willis Company.

From the papers on file in that case, it seems that the Klaxon signals, which are covered by numerous patents, are sold under a conditional license fixing the retail price of the large model, type L, at $35, and the smaller model, type S, at $30, with a maximum discount of 5 per cent. for actual cash and that certain cut rate houses have recently been selling for retail at a price considerably less than the license price.

The owners of the Klaxon patents decided to make an example of such offenders and upon their complaint the E. J. Willis Company was obliged to submit to a decree signed by U. S. Circuit Judge Lacombe, ordering the injunction asked for.

It seems that the Federal law with respect to fixing the license retail price of patented articles is well settled and that the Klaxon people will have no difficulty in stopping every price cutter. It may be of interest to our readers to know that the decision in the above case follows a well settled principle of patent law established by many Federal decisions. (See 166 Fed. Rep. 117; 159 Fed. Rep. 175; 123 Fed. Rep. 424, and cases there cited.)

FRANKLIN PLANT STILL EXPANDING

Syracuse, N. Y., Dec. 18—The H. H. Franklin Manufacturing Company has bought four parcels of land on the south side of West Marcellus street, between Harbor Brook and Magnolia street. The consideration is private. The company is now owner of the entire frontage on the south side of West Marcellus street, between South Geddes and Magnolia streets. Each parcel extends back to previous holdings of the company. It was stated by representatives of the company that the property was obtained for future use rather than for any immediate building proposition. The West Marcellus street frontage from Geddes street to Harbor Brook is already built upon. The new move rouses expectations of more factory extension for this rapidly growing business.

23,000 CARS REGISTERED IN OHIO

Columbus, O., Dec. 11—The State of Ohio has issued 23,000 automobiles. License-tag number 23,000 was given out to-day to Miss M. L. Ferrin, 3666 Reading Road, Cincinnati. Fred H. Caley, State registrar of automobiles, estimated that fully 40,000 cars will be registered by the department during 1910.

AMERICAN AUTO EXPORTS STILL GAINING

In the monthly summary of exports and imports published by the Department of Commerce and Labor the increase in American automobile exports to foreign countries, principally European, shows a very marked increase over even as good a year as 1908. This continued setting of the tide away from us is a most welcome sign to such American firms as are about to engage to a greater or less extent in the bid for European business.

For the month of October the exports were 338 complete cars and parts sufficient to bring the total value up to $522,769, as compared with 106 cars and a value of $213,775 for last October. As an indication of the class of cars exported, however, it should be noted that the average value per car has fallen from $1,560 of October, 1908, to $1,300 per car for this October.

For the whole year, including October, the statistics show that 2,764 cars were exported, the total valuation of cars and parts reaching $6,622,626. The former is an increase of 44 per cent over 1908, while the latter improves on last year's figures by 47 per cent.

The detailed figures by countries follow:

Country	Month Oct., '09	Per Cent Change	'09, Inclu'g October	P. C't Change
British North America	$157,314	221.0	$2,120.600	102.5
United Kingdom	121,208	91.5	1,839,772	14.6
France	29,839	435.0	789,735	46.6
Mexico	57,682	90.0	375,153	50.6
Other Europe	20,533	96.7	302,968	49.6
West Indies and Bermuda	12,643	*19.2	232,137	69.4
Italy	......	.....	214,430	*3.3
British Australasia	30,226	91.3	192,337	156.0
South America	11,235	219.0	158,701	56.0
Germany	3,154	*45.0	157,974	3.9
Other Asia and Oceania	58,433	473.0	138,216	20.0
Africa	13,336	918.0	59,123	700.0
Other Countries	3,985	1,270.0	25,828	24.6
British East Indies	2,587	1,420.0	15,652	*33.9

*Loss; all other gain.

During the same two periods of time the imports showed a marked increase over last year, but not in any such proportion as the exports above. The month, in fact, showed a loss of some $36,654, but the year revealed a gain of $612,508, with figures of cars $2,509,271, and parts $740,455.

All countries but Germany and the United Kingdom showed a loss for the month, the year's figures being about the same in this respect. In the table above attention is called to the value of our exportations to English-speaking countries, or those controlled by English-speaking peoples, these amounting to three-quarters of all cars and parts exported. In imports the same does not hold, France—losing steadily each year—furnishing this year slightly more than half.

Los Angeles, Cal.—The White Company is building a 185 by 55-foot garage on Flower street between Twelfth and Pico, which will accommodate 140 machines. The entire front is to be finished in white tile. A 50 by 69-foot salesroom is included.

Employees of the Mechanical Department of the New York Pierce-Arrow Branch

This picture, taken on the roof of the building occupied by the Harrolds Motor Car Company, 233 West Fifty-fourth street, the Metropolitan agents for Pierce cars, gives some idea of the magnitude of the business done there.

Combination Hose and Chemical of Fire Department, Westfield, Mass.

The above illustrated fire apparatus, which is fitted to a Pope-Hartford chassis, has been in active service since last July, and has proved its efficiency on more than one occasion. The local authorities state they would not go back to the horse-drawn equipment, even if the cost of the new outfit was double what was paid for it

Very Long Taxicab Trip—One of the longest taxicab trips on record was recently made in the South by W. P. McManus, of Chicago, in a Cartercar. Mr. McManus is a big, busy man, who appreciates the value of time. He was at Atlanta, Ga., and wanted to make the run to Savannah, stopping at several small towns on the way and looking after business matters. Being desirous of saving as much time as possible in the transaction of this business, Mr. McManus engaged a taxicab from the Savannah Taxicab Company, which was going to be driven after the Atlanta show to Savannah by W. C. Mahoney. It is understood that a special rate was made for the whole trip. Another feature connected with the incident which makes it rather interesting is the fact that upon the arrival of the car at Savannah Mr. Mahoney discovered that a baby daughter was awaiting him at his home.

New Brake Lining—Cactus cloth, the outgrowth of Burbank's efforts to put the cactus plant to some use, may turn out to be just the thing the automobile business needs. During the past year J. D. Maxwell, designer of the Maxwell line of automobiles, has tested various brake lining materials and he now states that cactus fiber is not only the equal of asbestos, but possesses a number of qualities which make it highly desirable for the new purpose. Though no definite information is given in regard to the process by which the new material is made, it is stated that the braking and wearing value of the various materials tested rank as follows: Cactus fiber, asbestos, cork, red fiber, camel's hair, hickory blocks boiled in oil, hickory blocks, dry; cast iron.

Capital Stock Increased—With business better than ever before, many concerns are extending their field of activity. To do this it is often necessary to have more capital, so we hear of many increases in capitalization. Among the New England makers who have been forced to this step is the Gilbert Mfg. Co., New Haven, Conn., which has recently taken over the F. E. Bowers Company, New Haven, the latter being the manufacturers of the well-known Bowers carbureter. The company has had a very successful year and under the new officers expects an even better one in 1910. The new officers are: F. E. Bowers, president; E. B. Spalding, treasurer; L. F. Meyer, secretary, and W. A. Rutz, sales manager.

Now an Aeroplane Magneto—With the rapidly increasing use of aeroplanes has come about an incessant demand for a magneto of especial lightness, but just as reliable and dependable as any other able to be used on these air machines. Lavalette & Co., makers of the Eisemann Magneto, have brought out a new magneto built especially for use in aeronautic work, which is lighter than those used in motor cars, though every bit as powerful. Part of the instrument is made of aluminum and the heaviest model weighs only 16½ pounds, while the lightest of the four-cylinder type weighs but 11 pounds. The company is now in a position to furnish from stock five different styles of this new magneto.

New Parts Company in Indianapolis—The field of parts manufacturers in the Indiana city will be augmented by the Stutz Auto Parts Company, located at Tenth and Canal streets. This corporation has been recently organized to make and sell the Stutz rear axle and transmission. The latter will be made in two sizes, one for 20-25 horsepower and the other 30-40 horsepower, both three speeds, and operated selectively. The officers of the new company are: H. C. Stutz, president; H. F. Campbell, secretary and treasurer, and C. E. Stutz, general manager.

More Baltimore Taxicabs—Plans are on foot to reorganize the Stewart Taxicab Company, of this city, with a nominal capital of $100,000 by well-known local capitalists. While the company intends to operate in Baltimore and add about twenty-five additional cars to the present service, it expects to eventually extend its operations to other large cities. The idea of the company is to take over the entire livery business of Stewart & Company, including taxicabs, horses, vehicles, etc., and retain Mr. Stewart as Baltimore manager.

Protest Against Raise in Rates—With a number of other automobile manufacturers the H. H. Franklin Mfg. Co., Syracuse, N. Y., has protested against the raise in rates recently made by the Trans-Continental Freight Association for shipments across the country. The manufacturers are seeking readjustment or postponement until shippers and carriers can get together. The interest in the change may be judged from the fact that the Franklin bill amounts to $75,000.

Pope Mutual's Smoker—The eighth annual smoker of the Pope Mutual Benefit Association was held in the dining hall of the Pope Mfg. Co.'s factory at Hartford, Conn., Thursday evening. Albert L. Pope, Charles E. Walker, Wilbur C. Walker and A. W. Pope were present as guests. The business report showed $1,500 in the treasury. During the past year $1,200 has been paid out in sick benefits and $150 in death benefits.

Fire in Racine, Wis.—The plant of the Racine Mfg. Co., a manufacturer of automobile tops, was destroyed by fire December 12. The loss was $600,000, of which $250,000 was covered by insurance. The fire started in the mill room of the plant, which comprised six buildings and occupied a city block.

Trucks from Bay City, Mich.—An automobile truck manufacturing company, under the name of the Toeppner Bros. Mfg. Co., has been organized by a dozen or more local capitalists, with a stock of $100,000, of which half is paid in. The new company absorbs the Toeppner Bros. Carriage Company, and will use the latter's plant temporarily.

Lectures to Be Continued—So interesting have the free monthly lectures of the New York School of Automobile Engineers become that the management has decided to continue them throughout the season. At each one of the sessions the building at 146 West Fifty-sixth street has been uncomfortably crowded.

IN AND ABOUT THE AGENCIES

New Selling Agency for Q M S Parts—It is announced by the Q M S Company (Quincy, Manchester, Sargent) that a new selling firm has been organized to be known as the Motor Parts Company, which will hereafter handle their automobile specialties. Of the new concern, W. D. Sargent is president, F. F. Kister secretary and treasurer and C. H. Holbrook, sales manager. The general offices of the Motor Parts Company are located at Plainfield, N. J., from which point the territory east of Detroit will be covered. In the West their automobile step business will be taken care of by John C. Hoof, with offices in the First National Bank Building, Chicago. On their Auto Cle Wrench business, as in the past, the Factory Sales Corporation, 1438 Michigan avenue, Chicago, will act as distributing agents for the Western territory, and the Frank Mossberg Company, Attleboro, Mass., for the Eastern territory.

Speedwell in South and West—The Speedwell Motor Car Company announces the following agencies for 1910: Capron-Wright Automobile Company, Omaha, Neb.; H. G. Carter, Los Angeles, Cal.; Hickman & Diggs Automobile Company, Sasramento, Cal.; Racine Auto & Boat Company, Seattle, Wash.; Speedwell Motor Car Agency, Birmingham, Ala.; J. B. Alsop, Richmond, Va.; W. W. Lynn, Lynchburg, Va.; Gentilly Automobile Company, New Orleans, La.; Houston Electric Appliance Company, Houston, Tex.; Edward Moyle, Savannah, Ga.; T. W. Simpson, Abilene, Tex., and the Escambia Motor Car Company, Pensacola, Fla.

Chalmers - Detroit, Philadelphia — A change has been made in the title of the firm which will represent the Chalmers-Detroit car in the Quaker City. A few weeks ago George W. Hipple, the manager, authorized the statement that the title would be the Chalmers Motor Company, but last week it was officially changed to the Chalmers-Hipple Motor Company, with Hugh Chalmers, of Detroit, and Mr. Hipple making up the new firm. The latter is also a member of the Levy-Hipple Motor Company, of Chicago.

Franklin, Cleveland—The Franklin Automobile Company, which conducts a number of selling branches for the H. H. Franklin Mfg. Co., announces the opening of a Cleveland branch. This will be the tenth branch of the company and will be ready about January 1. C. H. Rockwell, formerly assistant sales manager of the manufacturing company, will be manager of the branch, being now in Cleveland making arrangements.

Glide, West and South—For the season of 1910 the Bartholomew Company announces the following new agents for Glide cars in the West and South: Muskogee, Okla., L. R. Kershaw; Los Angeles, Cal., W. A. Shafer; Page, N. D., Page Machinery & Auto Co.; Minneapolis, Minn., Auto Storage & Repair Co.; Atlanta, Ga., W. J. Dabney Implement Co.; Jacksonville, Fla., Fred E. Gilbert Garage.

Everitt "30" and Matheson, Philadelphia—The Matheson car, which for the past year has been represented in Philadelphia by a branch, with W. Wayne Davis as sales manager, will be transferred to the Wayne Davis Motor Company, which recently acquired the Quaker City rights for the Everitt "30," with quarters in the original establishment at Broad and Green streets.

Martin and Hart-Kraft Commercials, Philadelphia—D. P. S. Nichols, Broad and Vine streets, has landed the Philadelphia agency for the Martin motor wagon; and the Thomas Wagon Company, 1338 Race street, will represent the Hart-Kraft delivery wagons, made in York, Pa.

Auto Supply Company, New York City—This old supply house has recently removed from 1733-1737 Broadway to Columbus Circle, Broadway and Fifty-ninth street, where a complete line of automobile supplies, wearing apparel, tools and hardware will be carried.

Fiat, Chicago—The Fiat Automobile Company has a new building under construction at 2347 Michigan avenue which when completed will be one of the finest on Automobile Row. The territory is under the charge of Harry T. Clinton.

Austin, Birmingham, Ala.—George B. Kelley, superintendent of agencies for the Austin Automobile Company, has secured the Pullman Automobile Company as representative in this city for the Austin line for the coming year.

PERSONAL TRADE MENTION

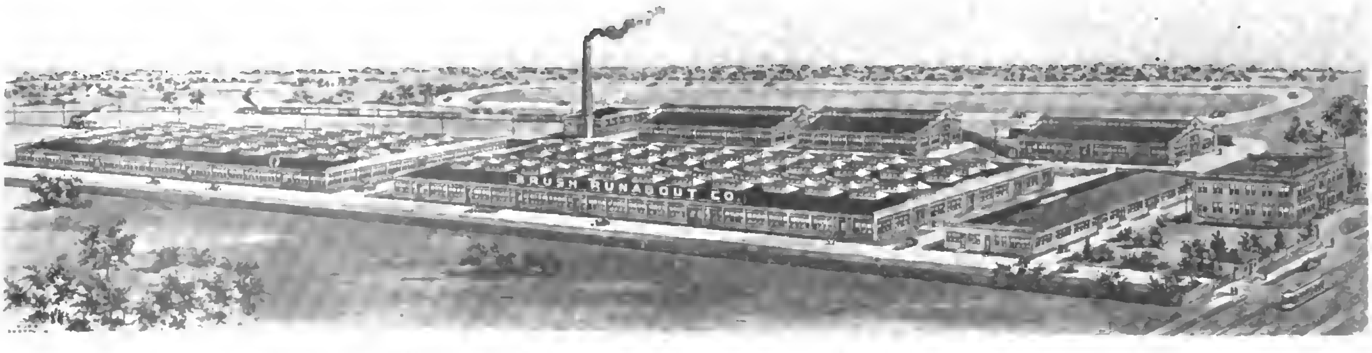
C. W. Moody, formerly manager of the Pennsylvania Rubber Company's Chicago branch, has accepted the position of general sales manager of the Swinehart Tire & Rubber Company, Akron, O. Mr. Moody is well and favorably known in the automobile trade, having been in the tire business for the past five years in Chicago. The Swinehart company has enlarged the factory and expects to deliver 100 tires per day during January and February, increasing the output still more after March 1.

Henry M. Duncan, a well-known pioneer of the automobile industry in New York, and formerly connected with the carriage trade, is now secretary and general manager of the Westchester Appliance Company, manufacturers and jobbers of automobile accessories and supplies, with headquarters at 1315 Canal Place, New York City. Mr. Duncan is prominent as one of the most versatile after-dinner speakers, and is frequently the *pièce de resistance* of automobile gatherings.

J. R. Windsor, formerly of the E. R. Thomas Company, has been appointed sales manager of the New York branch of the Allen-Kingston Motor Company, located at 1934 Broadway.

S. J. Rowe, who has been designer for the American-La France Fire Engine Company, will in the future devote his time to the Rowe Motor Company, of which he is president.

J. M. Hill, according to a statement from the Alden Sampson Manufacturing Company, Pittsfield, Mass., has resigned and is no longer connected in any way with the company.



New Home of Brush Runabout Company, Detroit, Mich., with 200,000 Feet Floor Space, Covering 38 Acres

Information for Auto Users

Michelin Anti-Skid Tires—The Michelin Company claims to have invented the anti-skid tire in its usual form, the familiar steel-studded leather tread. This tire was first brought out in 1905, and was used by the late Leon Thery on the Brasier cars with which he twice won the Gordon-Bennett.

The treads of these tires, as well as the wearing surfaces of the side walls, are protected by a tough but flexible band of ox-hide, which forms an integral part of the tire. In this band are riveted from three to five rows of hardened steel studs. By this construction the full resiliency of the tire is preserved, because the lower side walls, the parts immediately outside the beads, are of rubber, and permit the tire to absorb all shocks and jars, the same as any other good pneumatic tire. At the same time the ox-hide band protects the tread from cuts and punctures, and so prolongs the life of the shoe.

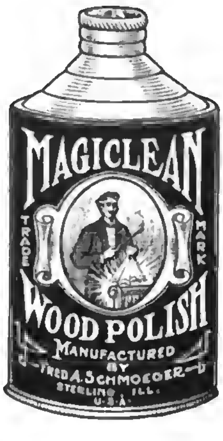
MICHELIN ANTI-SKID TIRE

These tires are especially recommended for winter driving in the city. The danger of skidding is very great when driving over Belgian block, brick or asphalt, especially after a light rain or snowfall. Anti-skid tires practically obviate any possibility of sidewise movement. They are made both in metric and in American sizes.

"Stay Shiny" and "Magiclean" Wood Polish—Both of the foregoing articles are made by the Sterling Stove Polish Company, of Sterling, Ill., and have

"STAY SHINY" COMES IN SMALL TIN CANS

made a reputation for themselves through their intrinsic merit. "Stay Shiny" is a transparent liquid that prevents tarnish and oxidization of all exposed polished metals, by forming a thin, invisible coating over the surface of the metal. It produces a beautiful lustrous finish, as hard as flint and smooth as glass, that is not affected by weather, heat, rain or mud, effectively preserving the original high polish indefinitely. It is easy to apply and easy to remove when desired; dries in a few minutes and does not get sticky or greasy; is elastic, won't crack, chip or peel off. A sample of its work supplied by the makers shows a section of old brass polished and treated with "Stay Shiny" that has been exposed to all kinds of weather for three months and still preserves the original very desirable luster.



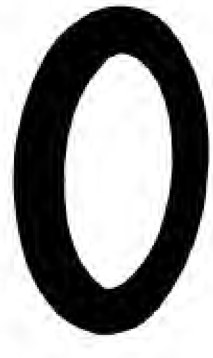
"MAGICLEAN" WOOD POLISH

"Magiclean" wood polish is making a big hit with automobilists and is made under the exact formula of the famous German "Holz Glanz." It is a scientific liquid oil preparation, being entirely liquid, requiring no shaking and contains no solid or coloring matter, acids, soap or alkali. It puts new life into the varnish and surfaces and instantly removes all dirt, grease, finger marks, cloudiness and mud stains and does not leave the surface sticky, greasy or dust catching, but with a hard, glassy, lasting luster.

"Swivelaction" Bumper—Some automobile drivers should be compelled by law to carry bumpers on their cars. Other drivers, usually the most careful, provide them from choice. Of their utility there can be no doubt, both as a protection to the automobile on which they are mounted and to others.

The "Swivelaction," the bumper brought out by the National Sales Corporation, 232 West Fifty-eighth street, New York City, has several novel features, from one of which it takes its name. The bar which extends across the front of the car is connected by two swivel joints to pivoted levers working in slotted sleeves against flexible spiral springs. A blow on the full face of the bar is absorbed by the springs directly; a glancing side blow, as when turning a corner or striking an obstruction with one end of the bar, is taken care of by the swivel joints, which carry the jar to the springs. The "Swivelaction" is so designed that the bar sets higher than usual, thus affording the maximum protection to the lamps and radiator, but at the same time it does not interfere with the cranking of the motor. The springs are carefully tempered and provide for a compression of 1,500 pounds.

Carpringco Tires—In placing Carpringco tires before the automobile public the manufacturer, the New Jersey Car Spring & Rubber company, Jersey City, N. J., lays special stress on the fact that the tires are very carefully made by hand of the highest possible grade of materials and are subjected to a supervision in manufacture that precludes all possibility of defective material reaching the purchasers. The company announces that it has adopted a new vulcanizing process by which all moisture is eliminated during this important stage of tire making, the result being that no part of the fabric is subjected to the danger of early rotting from that and all other causes.



CARPRINGCO HAND-MADE TIRE

In the case of the anti-skid tire the leather tread and the rubber carcass are treated in such a way that separation is almost impossible, thus minimizing the danger of the leather facing peeling off, and in other ways giving trouble before it could be reasonably expected to do so. The makers also guarantee that the same high quality of rubber enters into the manufacture of its red rubber inner tubes as in the type of gray color, and that this matter of quality can be better appreciated at this particular time than in the past, as the scarcity of high-grade rubber encourages the use of compounded stock.

FRONT VIEW OF "SWIVELACTION" BUMPER, SHOWING PIVOTED LEVERS

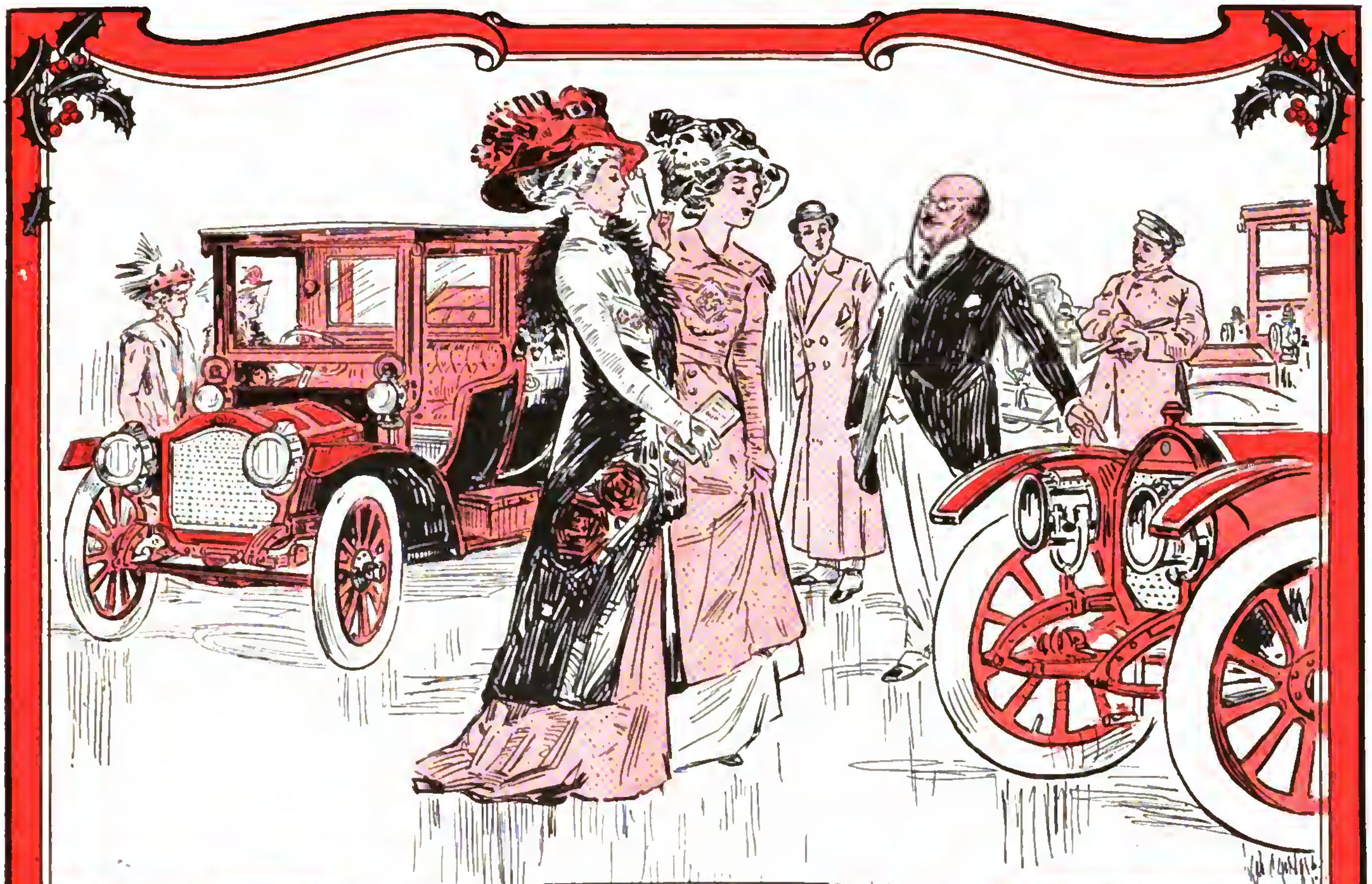
Vol. XXI NEW YORK—THURSDAY, DECEMBER 30, 1909—CHICAGO No. 27

The Automobile

First of New York's 1910 Shows

Under A. M. C. M. A. Direction in Grand Central Palace

Dec. 31 to Jan. 7



'Tis Hardest to Convince Woman

REPRESENTATIVE of the growth of a great industry in all its phases during the past year, the Tenth International Automobile Show of the American Motor Car Manufacturers' Association, opening in Grand Central Palace, New York City, on New Year's Eve, unquestionably will be the most varied and edifying assemblage of automobiles ever gathered under a single roof. Millionaire and mechanic will alike find the cars best suited to their requirements and pocketbooks. Engineers and technical men will find the contributions of a hundred creative minds to progress in this form of transportation.

So many have been the newcomers in the field, and so vast the estimates of the 1910 production, that rumors have been current of an inevitable overproduction and fall of prices. The show will dispel these ideas finally and conclusively. Instead of cutting last year's prices, most makers of medium-priced and cheaper cars have added from \$50 to \$200 to their former figures; and the indications are that Summer will see a shortage, rather than a surplus.

True, there have been more additions to the ranks of the manufacturers this year than ever before; but even if the whole industry could have exceeded the demands of the market, the increase defeated itself. The producers of parts and materials were left far behind.

As to the higher prices, this is but a reflection of the general trend, the "increased cost of living," of which so much has been said to so little purpose. Heretofore, reductions have been made in spite of this tendency. Quantity production and better sales organizations brought the familiar result seen in the case of the bicycle, but the utmost limit of economy seems now to have been reached. In many cases, however, the higher prices are not so high as they may seem at first glance, for many of the manufacturers have made changes in the direction of longer wheelbases, larger tires, bigger cylinders, and more complete equipment, which very nearly account for the apparent increase. Of every tendency in this direction, however, the show will offer a summary.

The international aspect of the show is of no small importance. Although the Importers' Automobile Salon numbers but twelve members, these all represent well-known foreign makes, and have been chosen by a strenuous process of the survival of the fittest. Thus it happens that the foreign cars exhibited are not only of the first class in their own country, but are established in the esteem of the American public. Not numerous enough to hold a show of their own, as they twice did in earlier years, the importers, nevertheless, add at least as much to the representative character of the show as they gain from inclusion under its roof.

Although many high-priced cars, both of American and foreign origin, are on exhibition, the Palace show will this year, as formerly, have rather a preponderance of medium and low-priced machines, of the distinctively popular makes. For this reason it draws a great number of automobile dealers, and also the carriage tradesmen who represent the more modern industry in small Western towns. Thousands of these will make their annual pilgrimage to New York to attend the show. The interest of the carriage trade is indicated by the request of hundreds of dealers for a repetition of the courtesies extended tentatively last year. As a result, invitations have been sent out to 2,500 carriage dealers rated at $50,000 and over, as well as to the 5,000 and more automobile dealers.

As a spectacle of the kind which attracts the general public and turns them into automobile enthusisasts, the show will be unrivalled. Exhibits to the value of over a million dollars, occupying 72,000 feet of floor space, and $30,000 spent on decorations, tell in brief the story. The Grand Central Palace, which on ordinary occasions is a far from prepossessing structure, and lacks completely the natural advantages of Madison Square Garden, has, by a supreme effort, been transformed into a dreamland of artistic beauty.

The color scheme and decorative effect is outlined by Nile green lattice work on a soft gray background of caen stone. The roof is a trellis arbor hung with grapevines, through which the sky is faintly seen. The decorations are set off by mirrors, electric fountains, and myriads of glistening lights. The real illumination comes from a number of alabaster globes of light hung by chains from the ceiling.

Attractive as are the decorations to every visitor to the show, the automobilists will, of course, be most interested in the cars themselves. The year's progress is well expressed in the 1910 models of the 84 exhibitors of complete machines. To describe, even to enumerate, the features of their design is a task of considerable magnitude. However, the lines of progress which all follow are well marked.

Simplification is the watchword. No single feature of design has been more generally adopted, nor has had wider influence, than the block cylinder casting. In several cases this casting includes not only the inlet and exhaust manifolds, but also the upper half of the crankcase. Nor has this made more difficult the part of the foundry, for the entire top of the water-jacket is now formed by a separate plate, so that the cores may be simple and have firm support. With this construction a single inlet and a single outlet for the cooling water suffice, and, with the thermo-siphon system of circulation, which is becoming general, two hose connections to the radiator give the minimum of incumbrance.

The real simplification embodied in these reforms is supplemented by an apparent simplification which is none the less praiseworthy. This generally takes the form of enclosing the valve stems and tappets by removable covers. Although the number of working parts remains the same, this enclosure gives the engine a neater appearance, lessens the noise, and keeps grit out of the many small bearings in the valve-operating mechanism. Lubricating systems are now generally contained in the crankcases of the motors, the simplification being sometimes real and sometimes only apparent, but always improving both the looks and the performance of the motor.

Transmission designs show increasing use of the two-unit principle; at least half of the exhibitors show the change-gear combined with either the motor or the rear axle. In fact, the struggle between these two forms is one of the most interesting features in the show. It takes the place of the old controversies between the magneto and the battery, and between automatic and mechanically operated inlet valves. One or the other will doubtless be adopted generally within the next few years, and those makers who have not yet tried them seem only to be waiting to see which fortune will favor.

There is a very noticeable lengthening of wheelbases and increase in tire sizes. Indeed, it is these changes which, in most cases, are the explanation of apparent raising of prices. However, the buyers of these cars more than get the value of their greater investment.

The A. M. C. M. A. show deserves the attendance of every automobilist in the country, whether he be builder, seller or buyer, or only "just interested." As an indication of the mechanical trend, its verdict is final; the practice of the American automobile industry as a whole is the practice of its exhibitors. As a business exchange, although the shows are not as prominent as formerly as a meeting place for makers and agents, it will, nevertheless, see no inconsiderable volume of business transacted. As a spectacle, for the attraction of the public and the interesting of future buyers, it is unsurpassed.

The List of Exhibitors

AMERICAN GASOLINE PLEASURE CARS

ALLEN-KINGSTON: Allen-Kingston Motor Car Co., New York City.
AMERICAN: American Motor Car Co., Indianapolis, Ind.
AMERICAN SIMPLEX: Simplex Motor Car Co., Mishawaka, Ind.
ATLAS: Atlas Motor Car Co., Springfield, Mass.
BELMONT: American Motor Co., Brockton, Mass.
BLACK-CROW: Black Mfg. Co., Chicago, Ill.
BRUSH: Brush Runabout Co., Detroit, Mich.
CAMERON: Cameron Car Co., Beverly, Mass.
CARTERCAR: Cartercar Company, Pontiac, Mich.
CHADWICK: Chadwick Engineering Works, Pottstown, Pa.
CHASE: Chase Motor Truck Co., Syracuse, N. Y.
COATES-GOSHEN: Coates-Goshen Automobile Co., Goshen, N. Y.
COLE: Cole Motor Car Co., Indianapolis, Ind.
CRAWFORD: Crawford Automobile Co., Hagerstown, Md.
DEMOT: Demotcar Sales Co., Detroit. Mich.
EMPIRE: Empire Motor Car Co., Indianapolis, Ind.
EVERITT: Metzger Motor Car Co., Detroit, Mich.
FAL-CAR: Fal Motor Co., Chicago, Ill.
FIRESTONE-COLUMBUS: Columbus Buggy Co., Columbus, O.
FORD: Ford Motor Co., Detroit, Mich.
GAETH: Gaeth Automobile Co., Cleveland, O.
GLIDE: Bartholomew Company, Peoria, Ill.
HALLADAY: Grant Sq. Automobile Co., Brooklyn, N. Y.
HUPMOBILE: Hupp Motor Car Co., Detroit, Mich.
INTER-STATE: Inter-State Automobile Co., Muncie, Ind.
JACKSON: Jackson Automobile Co., Jackson, Mich.
KISSELKAR: Kissel Motor Car Co., Hartford, Wis.
KLINE KAR: B. C. K. Motor Car Co., York, Pa.
LAMBERT: Buckeye Mfg. Co., Anderson, Ind.
LION: Lion Motor Car Co., Adrian, Mich.
McCUE-HARTFORD: McCue Company, Hartford, Conn.
McINTYRE: W. H. McIntyre Company, Auburn, Ind.
MARMON: Nordyke & Marmon, Indianapolis, Ind.
MAXWELL: Maxwell-Briscoe Motor Co., Tarrytown, N. Y.
METZ: C. H. Metz Company, Waltham, Mass.
MIDLAND: Midland Motor Co., Moline, Ill.
MIDDLEBY: Middleby Automobile Co., Reading, Pa.
MITCHELL: Mitchell Motor Car Co., Racine, Wis.
MOLINE: Moline Automobile Co., East Moline, Ill.
MOON: Moon Motor Car Co., St. Louis, Mo.
MORA: Mora Motor Car Co., Newark, N. Y.
NATIONAL: National Motor Vehicle Co., Indianapolis, Ind.
OAKLAND: Oakland Motor Car Co., Pontiac, Mich.
OHIO: Ohio Motor Car Co., Carthage, O.
OTTO: Otto Sales Co., Philadelphia, Pa.
PAIGE-DETROIT: Paige-Detroit Motor Car Co., Detroit, Mich.
PATERSON: W. A. Paterson Company, Detroit, Mich.
PENNSYLVANIA: Pennsylvania Auto-Motor Co., Bryn Mawr, Pa.
PIERCE: Pierce Motor Co., Racine, Wis.
PREMIER: Premier Motor Mfg. Co., Indianapolis, Ind.
PULLMAN: York Motor Car Co., York, Pa.
REGAL: Regal Motor Car Co., Detroit, Mich.
REO: Reo Motor Car Co., Lansing, Mich.
SCHACHT: Schacht Mfg. Co., Cincinnati, O.
STAVER: Staver Carriage Co., Chicago, Ill.
SEITZ: Seitz Automobile Co., Detroit, Mich.
SPEEDWELL: Speedwell Motor Car Co., Dayton, O.
STODDARD-DAYTON: Dayton Motor Car Co., Dayton, O.
SULTAN: Sultan Motor Car Co., New York City.

COMMERCIAL CARS AND TAXICABS

ALLEN-KINGSTON (TAXI): Allen-Kingston M. C. Co., N. Y. C.
AMERICAN TRUCK: American Motor Truck Co., Lockport, N. Y.
ATLAS (TAXI): Atlas Motor Car Co., Springfield, Mass.
CARTERCAR (TAXI): Cartercar Company, Pontiac, Mich.
CHASE: Chase Motor Truck Co., Syracuse, N. Y.
DE DION-BOUTON (TAXI): De Dion-Bouton Selling B'ch, N. Y. C.
DELAHAYE (TAXI): Delahaye Import Co., New York City.
FORD (TAXI): Ford Motor Co., Detroit, Mich.
GRABOWSKY: Grabowsky Power Wagon Co., Pontiac, Mich.
GRAMM-LOGAN: Gramm-Logan Motor Car Co., Bowling Green, O.
HART-KRAFT: Hart-Kraft Motor Co., York, Pa.
KLINE KAR: B. C. K. Motor Car Co., York, Pa.
LAMBERT: Buckeye Mfg. Co., Anderson, Ind.
LANSDEN: Lansden Company, Newark, N. J.
McINTYRE: W. H. McIntyre Company, Auburn, Ind.
MANHATTAN: Mack Bros. Motor Car Co., Allentown, Pa.
MARTIN: Martin Carriage Works, York, Pa.
MAXWELL: Maxwell-Briscoe Motor Co., Tarrytown, N. Y.
MITCHELL: Mitchell Motor Car Co., Racine, Wis.
RANDOLPH: Randolph Motor Car Co., Chicago, Ill.
RAPID: Rapid Motor Vehicle Co., Pontiac, Mich.
RELIANCE: Reliance Motor Truck Co., Owosso, Mich.
SCHACHT: Schacht Mfg. Co., Cincinnati, O.
SAURER: Saurer Motor Truck Co., New York City.
SULTAN (TAXI): Sultan Motor Car Co., New York City.

FOREIGN GASOLINE PLEASURE CARS

C. G. V.: C. G. V. Import Co., New York City.
CLEMENT-BAYARD: Bowman Automobile Co., New York City.
DE DION-BOUTON: De Dion-Bouton Selling Branch, N. Y. City.
DELAHAYE: Delahaye Import Co., New York City.
DELAUNAY-BELLEVILLE: Brewster & Company, New York City.
FIAT: Fiat Automobile Co., New York City.
HOTCHKISS: Hotchkiss Import Co., New York City.
ISOTTA: Isotta Import Co., New York City.
LANCIA: Hol-Tan Company, New York City.
PANHARD-LEVASSOR: Panhard & Levassor, New York City.
RENAULT: Renault Freres Selling Branch, New York City.
S. P. A.: Cesare Conti, New York City.
Palais de l'Automobile, New York City.

PERIODICALS

The Automobile, New York City.
Automobile Trade Directory, New York City.
Automobile Topics, New York City.
Class Journal Co., New York City.
Cycle & Auto Trade Journal, Philadelphia, Pa.
Motor Age, Chicago, Ill.
Motor, New York City.
Motor Print, Philadelphia, Pa.
Motor Vehicle Publishing Co., New York City.
New England Auto Journal, Pawtucket, R. I.

BODIES, TOPS, WINDSHIELDS, ETC.

Auto Automatic Windshield Co., Detroit, Mich.
L. C. Chase & Co., Boston, Mass.
Hill Mfg. Co., Buffalo, N. Y.
Ideal Windshield Co., New York City.
Metal Stamping Co., New York City.
Moller & Schumann Co., Brooklyn, N. Y.
Pantasote Co., New York City.
W. F. Polson, Buffalo, N. Y.
John A. Salman, Boston, Mass.
Sprague Umbrella Co., Norwalk, O.
Troy Carriage Sun Shade Co., Troy, O.
Valentine & Co., New York City.

HORNS AND SPEEDOMETERS

Gabriel Horn Mfg. Co., Cleveland, O.
Hoffecker Co., Boston, Mass.
Lovell-McConnell Mfg. Co., Newark, N. J.
Nightingale Whistle Mfg. Co., New York City.
Nonpareil Horn Mfg. Co., Brooklyn, N. Y.
Sireno Company, New York City.
Star Speedometer Co., Danville, Pa.
Stewart & Clark Mfg. Co., Chicago, Ill.
Veeder Mfg. Co., Hartford, Conn.
Warner Instrument Co., Beloit, Wis.

CARBURETERS

Auto Improvement Co., New York City.
Breeze Carbureter Co., Newark, N. J.
Byrne, Kingston & Co., Kokomo, Ind.
Gasolene Motor Efficiency Co., Jersey City, N. J.
Lovell-McConnell Mfg. Co., Newark, N. J.
Siro Carbureter Co., Springfield, Mass.
Stromberg Motor Devices Co., Chicago, Ill.
Wheeler & Schebler, Indianapolis, Ind.

IGNITION

American Elec. Novelty Co., New York City.
Atwater-Kent Mfg. Co., Philadelphia, Pa.
Auburn Mica Co., Auburn, N. Y.
Eastern Carbon Works, Jersey City, N. J.
Electric Storage Battery Co., Philadelphia, Pa.
Geiszler Storage Battery Co., New York City.
Heinze Electric Co., Lowell, Mass.
Herz & Co., New York City.
High Frequency Coil Co., Los Angeles, Cal.
Kokomo Electric Co., Kokomo, Ind.
Lovell-McConnell Mfg. Co., Newark, N. J.
Lutz-Lockwood Mfg. Co., New York City.

The List of Exhibitors

A. R. Mosler Co., New York City.
National Carbon Co., Cleveland, O.
New York Coil Co., New York City.
Osburn Electric Co., Detroit, Mich.
Pittsfield Spark Coil Co., Dalton, Mass.
Remy Electric Co., Anderson, Ind.
F. W. Smith, Aberdeen, S. D.
C. F. Splitdorf, New York City.
Union Battery Co., Belleville, N. J.
Vesta Accumulator Co., Chicago, Ill.
Westchester Appliance Co., New York City.
Westinghouse Co., Pittsburg, Pa.
Witherbee Igniter Co., Springfield, Mass.

LAMPS

Atwood-Castle Co., Amesbury, Mass.
Badger Brass Mfg. Co., Kenosha, Wis.
R. E. Dietz & Co., New York City.
Edmunds & Jones, Detroit, Mich.
Gray & Davis, Amesbury, Mass.
C. M. Hall Lamp Co., Detroit, Mich.
Rushmore Dynamo Works, Plainfield, N. J.

LUBRICANTS

Connecticut Oil Co., Waterbury, Conn.
Adam Cook's Sons, New York City.
Jos. Dixon Crucible Co., Jersey City, N. J.
Duffy Grease Co., New York City.
Havoline Oil Co., New York City.
G. A. Haws, New York City.
W. P. Miller's Sons, Long Island City, N. Y.

MAGNETOS

Bosch Magneto Co., New York City.
J. S. Bretz Co., New York City.
Heinze Electric Co., Lowell, Mass.
Herz & Co., New York City.
Hess-Bright Mfg. Co., Philadelphia, Pa.
Lavalette & Co., New York City.
Motsinger Device Mfg. Co., Pendleton, Ind.
Nilmelior Electrical Co., New York City.
Pittsfield Spark Coil Co., Dalton, Mass.
C. F. Splitdorf, New York City.
Witherbee Igniter Co., Springfield, Mass.

SUPPLIES

Automobile Supply Co., New York City.
Garage Equipment Co., Milwaukee, Wis.
Emil Grossman Co., New York City.
Chas. E. Miller, New York City.
Victor Auto Supply Mfg. Co., New York City.

SHOCK ABSORBERS

Ernest Flentje, Cambridge, Mass.
Gabriel Horn Mfg. Co., Cleveland, O.
Hartford Suspension Co., Jersey City, N. J.
Kilgore Mfg. Co., Boston, Mass.
J. H. Sager & Co., Rochester, N. Y.
Supplementary Spiral Spring Co., New York City.

STRUCTURAL PARTS

American Ball Bearing Co., Cleveland, Mass.
Baldwin Chain Mfg. Co., Worcester, Mass.
Briscoe Mfg. Co., Detroit, Mich.
Brown-Lipe Gear Co., Syracuse, N. Y.
F. A. Brownell, Rochester, N. Y.
Carlson Motor & Truck Co., Philadelphia, Pa.
Columbia Nut & Bolt Co., Bridgeport, Conn.
Cotta Transmission Co., Rockford, Ill.
Wm. Cramp & Sons Co., Philadelphia, Pa.
Diamond Chain Mfg. Co., Indianapolis, Ind.
Doehler Die-Casting Co., Brooklyn, N. Y.
Dover Stamping & Mfg. Co., Cambridge, Mass.
Driggs-Seabury Ordnance Corp., Sharon, Pa.
Excelsior Motor Mfg. Co., Chicago, Ill.
P. A. Frasse Co., New York City.
Gemmer Mfg. Co., Detroit, Mich.
Hayes Mfg. Co., Detroit, Mich.
Hess-Bright Mfg. Co., Philadelphia, Pa.
International Engineering Co., New York City.
Janney-Steinmetz Co., Philadelphia, Pa.
Johns-Manville Co., New York City.
I. G. Johnson & Co., New York City.
W. J. Kells Mfg. Co., New York City.
L. A. W. Motor Co., Providence, R. I.
Lavigne Mfg. Co., Detroit, Mich.
Lebanon Steel Casting Co., Lebanon, Pa.
Light Mfg. Co., Pottstown, Pa.
Livingstone Radiator & Mfg. Co., New York City.
McCord Mfg. Co., Detroit, Mich.
Manhattan Screw & Stamping Co., New York City.
Merchant & Evans, Philadelphia, Pa.
Muncie Gear Works, Muncie, Ind.
Newark Rivet Works, Newark, N. J.
N. J. Car & Spring Co., Jersey City, N. J.
Perfection Spring Co., Cleveland, O.
R. I. V. Co., New York City.
Royal Equipment Co., Bridgeport, Conn.
A. O. Smith Co., Milwaukee, Wis
Spicer Universal Joint Mfg. Co., Plainfield, N. J.
Standard Metalwork Co., Thompsonville, Conn.
Standard Roller Bearing Co., Philadelphia, Pa.
Standard Welding Co., Cleveland, O.
Timken-Detroit Axle Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, O.
D. M. Tuttle Co., Canastota, N. Y.
Vanadium Metals Co., Pittsburg, Pa.
Warner Gear Co., Muncie, Ind.
Warner Mfg. Co., Toledo, O.
Whitney Mfg. Co., Hartford, Conn.
York Auto Wheel Co., York, Pa.

TIRES AND RIMS

Ajax-Grieb Rubber Company, New York City.
American Stepney Spare Wheel Co., New York City.
Batavia Rubber Co., Batavia, N. Y.
Calmon Pneumatic Tire Co., New York City.
Consolidated Rubber Tire Co., New York City.
Continental Caoutchouc Co., New York City.
Dayton Rubber Mfg. Co., Dayton, O.
Diamond Rubber Co., Akron, O.
Doolittle Rim Co., New York City.
Empire Tire Co., Trenton, N. J.
Firestone Tire & Rubber Co., Akron, O.
Fisk Rubber Co., Chicopee Falls, Mass.
J. L. Gibney & Bro., Philadelphia, Pa.
B. F. Goodrich Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
G. & J. Tire Co., Indianapolis, Ind.
Hartford Rubber Works Co., Hartford, Conn.
Howard Demountable Rim Co., Trenton, N. J.
Leather Tire Goods Co., Niagara Falls, N. Y.
Michelin Tire Co., Milltown, N. J.
Morgan & Wright, Detroit, Mich.
Newmastic Tire Co., New York City.
Pennsylvania Rubber Co., Jeannette, Pa.
Republic Rubber Co., Youngstown, O.
Rutherford Rubber Co., Rutherford, N. J.
C. A. Shaler & Co., Waupun, Wis.
Standard Leather Washer Co., Newark, N. J.
Stevens Company, New York City.
Swinehart Clincher Tire & Rubber Co., Akron, O.
Victor Tire Traction Co., Boston, Mass.
Zeglen Tire Co., Chicago, Ill.

MISCELLANEOUS

H. T. Alexander, New York City.
Allen Auto Specialty Co., New York City.
American Elec. Novelty Co., New York City.
Atlas Rubber Co., Buffalo, N. Y.
Auto Improvement Co., New York City.
S. F. Bowser & Co., Fort Wayne, Ind.
Brown Co., Syracuse, N. Y.
Chester Eng'g and Machine Co., Chester, Pa.
Clover Mfg. Co., New York City.
Coes Wrench Co., Worcester, Mass.
Compact Co., New York City.
Frank H. Cross, New York City.
Cryder & Co., New York City.
Elite Mfg. Co., Ashland, O.
Fried-Ostermann Co., Rockford, Ill.
Gilbert Mfg. Co., New Haven, Conn.
Oliver Light, Providence, R. I.
N. Lazarnick, New York City.
Morrison-Ricker Co., Grinnell, Ia.
A. J. Meyers, New York City.
National Surety Co., New York City.
Noonan Tool & Machine Co., Rome, N. Y.
Perfection Wrench Co., Port Chester, N. Y.
Q. M. S. Motor Parts Co., Plainfield, N. J.
Raimes & Co., New York City.
Rothstein Mfg. Co., New York City.
Shipman Instrument Co., Sunbury, Pa.
Stanley & Patterson, New York City.
Spooner & Wells, New York City.
Stewart Auto Academy, New York City.
Joseph Tracy, New York City.
Traver Mfg. Co., Far Rockaway, N. Y.
United States Light & Heating Co., New York City.
Vehicle Apron & Hood Co., Columbus, O.
Wayne Oil Tank & Pump Co., Fort Wayne, Ind.
Westinghouse Companies, Boonton, N. J.
Wilson Trading Co., New York City.
Woven Steel Hose & Rubber Co., Trenton, N. J.
Y. M. C. A., New York City.

The Men Who Run The Show 1910

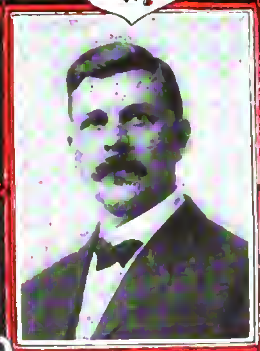

Benjamin Briscoe


Alfred Reeves General Manager


H. O. Smith.


S. H. Mora


David J Post


R. E. Olds, Chairman


E. R. Hollander

IN the conduct of what is announced as the "Tenth International Automobile Show," to be held in the Grand Central Palace from December 31 to January 7, past masters in the promoting of automobile exhibitions are numerous. Of course, the show is under the direct auspices of the American Motor Car Manufacturers' Association, but directly allied are the Importers' Automobile Salon and the Motor and Accessory Manufacturers, thus involving American cars and foreign importations, and accessories for both. R. E. Olds is the chairman of the 1910 show committee, and his connection with the automobile industry goes back to its inception in this country. Alongside of him is Alfred Reeves, the general manager, well known generally as the man who has done the most in making the A. M. C. M. A. a prominent factor in the automobile-making world. H. O. Smith, chairman of the committee of management of the A. M. C. M. A., needs no introduction, and another equally well known member of the show committee is Benjamin Briscoe, an ex-chairman and the predecessor of Mr. Smith. S. H. Mora has been an industrious committee member, and has earned his apparent permanent place. David J. Post is the experienced representative of the Motor and Accessory Manufacturers, and he has been a participant in expositions from the earliest days of the bicycle down to the present time, being one of those natural graduates into the motor-driven vehicle field. E. R. Hollander is the spokesman of the importers, and he was one of the pioneers of foreign cars in this country.

H. O. Smith, Chairman of the A. M. C. M. A. Committee of Management, contributes the following summing up of the situation:

Like the self-made man, the motor-car industry has forced recognition and respect. It is probable that no industry has ever started with so much to overcome. In the early days the financier's lack of belief and faith in the ultimate success was well-nigh universal. As the industry grew, the opposition of the banker seemed to more than keep pace. There are none so blind as those who will not see, and the persistent blindness of capitalists who secured their positions by their ability to foresee industrial developments was one of the most remarkable features of the automobile trade. But progress, development and demand could not be stopped—there was too much merit behind the proposition. While this was yet a struggling industry, seemingly floundering and groping in the dark for a guiding light, a statement was made by one who had doubtless made a study of the situation that it would take a panic to really develop the automobile industry. This statement has since proved almost prophetic, and the man responsible for the statement must be credited with unusual foresight, although he probably realized but little of the real truth this statement carried. The depression of 1907 measured the stability, strength and soundness of our country and every branch of trade, and it will be remembered that probably no other line held its own, while the automobile business continued to grow in spite of the would-be discouragement on all sides. Results have proven that there was little reason for the depression beyond the lack of confidence and belief that the general demand was not stable, and the remarkable part of it all lay in the fact that the most discredited industry at that time, the automobile, was the greatest help in averting a panic and restoring such confidence as was scarcely hoped for. The fact that the automobile business would not be kept down caused the thoughtful to pause and consider. Why the remarkable record?

Saving of time and lessening of distance are two important factors in our modern civilization. The motor car is the great agency which has met these requirements in a practical way, and to a degree never dreamed of, and it possesses a third and important virtue of being able to do this at a very marked saving in cost. It is the going motor car which has forced recognition, and it is to-day quite as indispensable as the telephone, telegraph, or railway train. It is safe to predict that we have not more than scratched the surface of the possible demand for the motor propelled vehicle. The motor car was first looked upon as the rich man's and the sportsman's toy—later, as a pleasure vehicle to be classed as a luxury, but to-day we are forced to admit that it is the practical conveyance of the future. It would be quite as reasonable to expect the transcontinental traveler to return to the prairie schooner as for the motor-car user to return to the horse-drawn vehicle. In fact, the step from the horse-drawn vehicle to the motor car is quite as advanced as turning to the use of the railway cars, except that the use of the motor car is brought home to us in a more general and telling way.

Many do not to-day realize the firm way in which the motor car has established itself. To the physician, the contractor, in fact, to any man who finds it necessary to be in divers locations in the ordinary routine of work, they prove indispensable, and as yet we are only beginning to understand the possible uses a motor car can be put to advantage. We have seen an industry spring up in a night as it were—and move from nothing to a position of probably fifth in importance among the great industries of this country, and in the brief period of less than ten years. We are only beginning to realize the scope of this modern agency of progress, and it is impossible to measure its ultimate influence and usefulness.

There is another and interesting phase. It has been said that the motor car in France affords employment for more people than any other line, and in America we are employing directly and indirectly more people than they are. It has set a new mark in the consumption of rubber. It requires hundreds of thousands of hides per year for upholstering. It is safe to say that the motor car builders are furnishing the greatest number of orders placed with our machinery builders, and the development of the most modern device to facilitate production and standardization is directly attributable to the motor car builder. They have been directly responsible as well for the development of high class anti-fatigue steels. So that it can be seen that the motor car has not only been forcing recognition, but its requirements have reached out in various channels until it has become a great factor in the labor market and materials of various sorts and kinds.

Alfred Reeves, General Manager American Motor Car Manufacturers' Association, tells why the building of motor cars is now a national industry:

Automobile making is now a national industry and on a par with any other line of manufacturing in America. This is best evidenced by the Tenth International Automobile show which will open on New Year's Eve, when 325 exhibitors will show products from every nook and corner of the United States. That the industry is national is proved too by the statistics showing the millions of dollars of capital involved, the thousands of cars made and sold, and the thousands of employees of automobile and automobile parts factories. Figures that are conservative in every way make it appear certain that 200,000 motor cars are scheduled for 1910. They will be made in 21 different States by 263 makers located as follows:

Michigan	49	Wisconsin	6
Illinois	39	New Jersey	4
Indiana	30	California	4
Ohio	30	Rhode Island	3
New York	23	Nebraska	2
Pennsylvania	18	Maryland	2
Massachusetts	14	Colorado	1
Missouri	12	Nevada	1
Connecticut	10	Texas	1
Iowa	7	Kansas	1
Minnesota	6		

Of this number it may be said that 100 are legitimate makers, turning out cars that are factors in the market. Seventy-five others produce less than 75 cars each, and are little heard of, while the remainder may be considered beginners whose products may not get beyond the experimental state. New York, for example, although credited in the above official list with 23 makers, has not more than seven substantial automobile factories.

Taking 80 of these leading makers and compiling their estimates for 1910, coupled with the reports from the parts makers and the inspection made while visiting 62 prominent factories last Spring, shows that the 200,000 cars for next year will be divided primarily among the five States.

Michigan is king, for in 1910 it will produce not less than 102,000 motor cars. Illinois will turn out 15,300; Indiana, 21,025; Ohio, 22,750; Wisconsin, 11,000; New York, 10,400; Massachusetts, 4,100; Pennsylvania, 3,250; Connecticut, 2,100.

When it is taken into consideration that the capital involved is between $150,000,000 and $175,000,000, that there are 5,200 agents for motor cars throughout the country maintaining garages and salesrooms, the whole employing more than 200,000 employees, no one can deny that the making of automobiles is now one of America's most important industries.

With the rapid growth of the automobile industry there has been a general improvement in the good-road system throughout the country, a general increase in business among hotels and roadhouses, and a general increase of trade among the hundreds of concerns that supply parts, materials and accessories for the motor car and its followers. In fact, one of the most remarkable features of this new branch of manufacturing is the innumerable ramifications through which it has interwoven itself into the commercial system of the country, influencing directly or indirectly the lives of many millions.

Considering automobile making as a national industry, it is worth noting that the National Grange, the big aggregation of farmers with a membership of more than a million, is advocating the passage of a Federal good roads bill having for its purpose national aid for roads throughout the country. This is in line with the national idea that the building of roads should be encouraged by the national government, and appropriations made for that purpose, the same as for rivers and harbors. The farmer has always been an important factor in road improvements, and now that he is using the automobile, he is a stronger advocate that ever—all tending toward the recognition of motor car building as a national industry.

PROGRAM OF PALACE SHOW WEEK

Friday, Dec. 31, 3 P. M.—Private view for members Automobile Club of America, American Automobile Association, Long Island Automobile Club, and city officials; 8 P. M., formal opening of show to public.

Saturday, Jan. 1—Show open from 9 A. M. to 10.30 P. M. Smoker at Automobile Club of America to Grand Central Palace Show exhibitors; "Army and Navy Night."

Monday, Jan. 3—New York Automobile Trade Association meeting. Manhattan Hotel, 12 o'clock; "Engineers' Night."

Tuesday, Jan. 4—Society Day, admission $1; 10 A. M., annual meeting of Society of Automobile Engineers at Automobile Club of America; 8 P. M., dinner of Society of Automobile Engineers, Automobile Club of America.

Wednesday, Jan. 5—Meeting of the Good Roads Board of the American Automobile Association; 6 P. M., annual meeting of Motor and Accessory Manufacturers, at Waldorf-Astoria Hotel, followed by banquet at 7:30 o'clock; "Merchants' Night."

Thursday, Jan. 6, 2 P. M.—Meeting Committee of Management of American Motor Car Manufacturers' Association; 7 P. M., Dealers' dinner given by Maxwell-Briscoe Motor Company, Hotel Manhattan; "New York Night."

Friday, Jan. 7—First annual meeting of Manufacturers' Contest Association, Manhattan Hotel; President Benjamin Briscoe will preside.

Tables Which Tell a Condensed Story

TENDENCIES in every branch of the industry can never be expressed so completely or in such compact form as in a good table of specifications. When every separate detail of the cars is brought into a single column a glance suffices to tell which form of construction preponderates. At the same time such a table may be regarded as an encyclopedia of automobile knowledge, from which one can determine at a moment's notice the salient features of a given car.

As the price is generally the first thing considered for any car, the price column immediately follows the name. Ordinarily the price given includes an equipment consisting of the necessary tools, five lamps and a horn. There is a growing and laudable tendency, however, to make the price include a Cape top and often a wind shield. Whenever the top is included in the given price, that fact is indicated by a dagger (†). In several of these cases a wind shield is also included, but it was not found practicable to distinguish this also.

Horsepower ratings are in all cases those given by the A. L. A. M. formula, disregarding the maker's rating when it differs from this standard. It is plain that this is the only fair way to rate for comparison a number of different cars, and this rating has the additional advantage of showing at once the comparative cylinder sizes of the foreign cars, which are measured in millimeters. No attempt has been made to rate two-cycle motors, as the formula was never intended to cover these. Rather than give arbitrary figures, therefore, the horsepower spaces of two-cycle motors have been left blank, except for an asterisk (*) to indicate that the omission of figures was intentional.

The columns following these, containing the type of body, the number of passengers (or, for commercial cars, the load in tons) will be self-explanatory. The types of bodies variously designated as toy tonneaus and pony tonneaus are all grouped as baby tonneaus. When a number of different body styles are fitted on the same chassis, the touring body alone is given. The rule has been to give each separate chassis one line, without regard to the number of bodies which are interchangeable on it.

Various systems of lubrication are in use, and it has not always been found possible to distinguish between these as sharply as might have been desired. In general, those systems in which the oil is circulated and used over and over are designated by the word "pump." Those cases in which several pumps are used for forcing the oil to bearings or cylinders, the oil often being expected to splash about in the crankcase, but not being used again, are designated as "mechanical" by the abbreviation "mech." preceded by a figure indicating the number of such feeds. The "splash" systems are those in which a quantity of oil is injected into the crankcase by the driver, different methods being employed of assuring that it reaches the cylinders and bearings.

The location of the change-gear box is indicated in the column following that describing the gear. The word "motor" means that the box forms a unit with the motor; "frame," that it is a separate unit supported from the main frame; "shaft," that it is on the front end of the propeller shaft, just behind the universal joint; and "axle," that it forms a unit with the rear axle. In the next column the word "shaft," indicating that the car is shaft-driven, is followed by a figure "1" or "2," denoting the number of universal joints in the drive shaft. This gives a good indication of the axle construction, as when but one joint is used the shaft is always surrounded by a tube which is used to take the torsion strains from the axle.

For the convenience of Southern automobilists, those cars which are made with the Southern standard 60-inch tread as an option to the regular standard are marked with a double dagger (‡) in the column giving the tread.

UNDER $1,000

$485	Brush	Runabout
500	Reo	Runabout
550	Demot	Runabout
600	Maxwell	Runabout
600	McIntyre	Runabout
600	Metz	Runabout
750	Hupmobile	Runabout
850	Cameron	Runabout
850	Empire	Roadster
875	Schacht	Runabout
900	Maxwell	Runabout
900	Ford	Roadster
950	Ford	Touring

$1,000 TO $1,499

$1,000	Maxwell	Touring
1,000	Reo	Touring
1,050	Mora	Runabout
1,100	Cameron	Surrey
1,100	Cartercar	Roadster
1,100	Mitchell	Roadster
1,200	Black-Crow	Touring
1,200	Lambert	Baby tonn.
1,250	Jackson	Touring
1,250	McIntyre	Touring
1,250	Middleby	Touring
1,250	Oakland	Baby tonn.
1,250	Regal	Touring
1,250	Reo	Touring
1,275	Lambert	Touring
1,350	Crawford	Touring
1,350	Everitt	Touring
1,350	Mitchell	Touring
1,400	Paterson	Touring

$1,500 TO $1,999

$1,500	Cameron	Touring
1,500	KisselKar	Touring
1,500	Maxwell	Touring
1,500	Moline	Touring
1,500	Moon	Touring
1,575	Kline Kar	Touring
1,600	Cartercar	Touring
1,600	De Dion-Bouton	Chassis
1,600	Staver	Touring
1,600	Stoddard-Dayton	Touring
1,650	Fal-Car	Touring
1,650	Pullman	Baby tonn.
$1,700	Lambert	Touring
1,700	Oakland	Touring
1,750	Inter-State	Touring
1,750	Jackson	Touring
1,750	McIntyre	Touring
1,750	Pierce	Touring
1,800	De Dion-Bouton	Chassis
1,800	Midland	Touring
1,850	Ohio	Touring

$2,000 TO $2,499

$2,000	Atlas	Touring
2,000	Crawford	Touring
2,000	Firestone-Columbus	Touring
2,000	KisselKar	Touring
2,000	Mitchell	Touring
2,000	Pullman	Touring
2,100	Stoddard-Dayton	Touring
2,200	De Dion-Bouton	Runabout
2,250	De Dion-Bouton	Chassis
2,250	Midland	Touring
2,250	Staver	Touring
2,350	Jackson	Touring
2,500	Atlas	Baby tonn.
2,500	Atlas	Touring
2,500	C. G. V.	Chassis
2,500	Clément-Bayard	Chassis
2,500	Glide	Touring
2,500	KisselKar	Baby tonn.
2,500	KisselKar	Touring
2,500	Kline Kar	Runabout
2,500	Kline Kar	Touring
2,500	Moline	Touring
2,500	Mora	Touring
2,500	National	Touring
2,500	Pennsylvania	Touring
2,500	Premier	Touring
2,650	Marmon	Touring
2,750	Stoddard-Dayton	Baby tonn.
2,800	Delaunay-Belleville	Chassis
2,800	Stoddard-Dayton	Touring
2,925	Coates-Goshen	Baby tonn.

$3,000 TO $3,999

$3,000	Austin	Touring
3,000	Clément-Bayard	Chassis
3,000	KisselKar	Baby tonn.
3,000	KisselKar	Touring
3,000	Lancia	Chassis
3,000	Moon	Touring
$3,000	Pennsylvania	Touring
3,000	Pullman	Roadster
3,000	Sharp-Arrow	Baby tonn.
3,250	C. G. V.	Chassis
3,250	Coates-Goshen	Baby tonn.
3,250	Delaunay-Belleville	Chassis
3,300	Lancia	Chassis
3,500	Clément-Bayard	Chassis
3,500	Crawford	Touring
3,500	De Dion-Bouton	Chassis
3,500	Delaunay-Belleville	Chassis
3,500	Gaeth	Touring
3,500	Lancia	Runabout
3,500	Pennsylvania	Touring
3,500	Premier	Touring
3,500	Pullman	Touring
3,500	Renault	Limousine
3,750	Clément-Bayard	Chassis

$4,000 TO $4,999

$4,000	American	Roadster
4,000	American	Baby tonn.
4,000	American	Touring
4,000	American Simplex	Touring
4,000	C. G. V.	Chassis
4,000	Delaunay-Belleville	Chassis
4,200	National	Touring
4,250	Clément-Bayard 25	Chassis
4,250	Clément-Bayard 35	Chassis
4,500	Austin	Touring
4,500	De Dion-Bouton	Chassis
4,500	Pennsylvania	Touring
4,750	Clément-Bayard 30	Chassis
4,750	Clément-Bayard 50	Chassis

$5,000 AND OVER

$5,000	Delaunay-Belleville	Chassis
5,000	National	Touring
5,100	Delaunay-Belleville	Chassis
5,500	Chadwick	Touring
5,500	De Dion-Bouton	Chassis
5,500	Panhard	Limousine
5,500	Renault	Touring
5,750	Renault	Limousine
6,000	Austin	Touring
6,100	Delaunay-Belleville	Chassis
6,500	Chadwick	Runabout
6,500	Panhard	Touring
7,000	Delaunay-Belleville	Chassis
10,000	Delaunay-Belleville	Chassis

DETAILS OF 1910 CARS, EXHIBITED AT THE TENTH ANNUAL A. M. C. M. A. SHOW—(AMERICAN GASOLINE PLEASURE CARS)

MAKE AND MODEL	Price	H.P.	BODY Type	BODY Seats	MOTOR Cylinders	MOTOR Bore	MOTOR Stroke	MOTOR Cyl. Cast	COOLING Radiator	COOLING Pump	IGNITION Magneto	IGNITION Battery	Lubrication	Clutch	TRANSMISSION Type	TRANSMISSION Speeds	TRANSMISSION Location	TRANSMISSION Drive	Wheelbase	Tread	Frame	BEARINGS Motor	BEARINGS Transmission	BEARINGS Axle	Weight	TIRES Front	TIRES Rear
American	$4000	46.0	R'dster.	3	4	5⅜	5½	Pairs	H'comb.	Centf'l	Bosch	Storage	7 mech.	Cone	Sel.	4	Frame	Shaft 1	110	56	P. steel	3 plain	Ball	Ball	2,800	40x4	40x4
American	4000	46.0	Tour'g.	5	4	5⅜	5½	Pairs	H'comb.	Centf'l	Bosch	Storage	7 mech.	Cone	Sel.	4	Frame	Shaft 1	122	56	P. steel	3 plain	Ball	Ball	2,900	40x4	40x4
American	4000	46.0	Tour'g.	7	4	5⅜	5½	Pairs	H'comb.	Centf'l	Bosch	Storage	7 mech.	Cone	Sel.	4	Frame	Shaft 1	124	56	P. steel	3 plain	Ball	Ball	3,100	36x4	36x5
Am. Simplex	4000	*	Tour'g.	7	4	5	5	Pairs	Cellular	Centf'l	Magneto	Storage	10 mech.	5-plate	Sel.	3	Axle	Shaft	117	....	P. steel	5 plain	Ball	Ball	3,800	36x4	36x5
Atlas F	2000	*	Tour'g.	5	3	4½	4½	Single	Tubular	Centf'l	None	Dry	7 mech.	Ex. band	Sel.	3	Frame	Shaft 2	110	56	P. steel	4 plain	Roller	Roller	2,400	34x4	34x4
Atlas G	2500	*	B. tonn.	4	4	5	5	Single	Cellular	Centf'l	None	Dry	9 mech.	Ex. band	Sel.	3	Frame	Shaft 2	120	56	P. steel	5 plain	Roller	Roller	2,600	36x4	36x4
Atlas H	2500	*	Tour'g.	5	4	5	5	Single	Cellular	Centf'l	None	Dry	9 mech.	Ex. band	Sel.	3	Frame	Shaft 2	128	56	P. steel	5 plain	Roller	Roller	2,600	36x4½	36x4½
Austin 45	†3000	45.9	Tour'g.	5	6	4⅜	5¼	Pairs	......	......	Magneto	Battery	......	......	Sel.	3	Frame	Shaft	125	....	P. steel	......	......	......	3,200	36x4	36x4
Austin 50	†4500	48.6	Tour'g.	7	6	4½	6	Single	......	......	Magneto	Battery	......	......	Sel.	4	Frame	Shaft	134	....	P. steel	......	......	......	3,750	36x4½	36x4½
Austin 70	†6000	72.6	Tour'g.	7	6	5½	5½	Single	......	......	Magneto	Battery	......	......	Sel.	4	Frame	Shaft	140	....	P. steel	......	......	......	4,500	37x5	37x5
Black-Crow	1200	24.0	Tour'g.	5	4	3⅞	4½	......	......	......	Remy	Battery	......	......	Sel.	3	Axle	Shaft	107	....	P. steel	Plain	Roller	Roller	......	32	32x
Brush	485	6.4	R'bout.	2	1	4	5	Single	Tubular	None	None	Dry	......	Disc	Plan.	2	Frame	2-chain	80	‡56	Wood	2 plain	Ball	Ball	1,050	28x3	28x3
Cameron 15	850	24.0	R'bout.	2	4	3⅞	3½	Single	Air c'l'd.	Air c'l'd.	Magneto	Dry	Pump	Cone	Sel.	3	Axle	Shaft 1	100	‡56	P. steel	3 plain	Ball	Ball	1,075	32x3	32x3
Cameron 16	1100	24.0	Tour'g.	5	4	3⅞	3½	Single	Air c'l'd.	Air c'l'd.	Magneto	Dry	Pump	Cone	Sel.	3	Axle	Shaft 1	104	‡56	P. steel	3 plain	Ball	Ball	1,400	30x3½	30x3½
Cameron 11	1500	36.1	Tour'g.	5	6	3⅞	3½	Single	Air c'l'd.	Air c'l'd.	Magneto	Dry	Pump	Cone	Sel.	3	Axle	Shaft 1	114	‡56	P. steel	4 plain	Ball	Ball	1,675	34x3½	34x3½
Cartercar H	1100	25.6	R'bout.	3	4	4	4	Pairs	Tubular	None	Splitdorf	Dry	Pump	None	Fric'n.	...	Frame	1-chain	100	‡56	P. steel	3 plain	Ball	Roller	2,000	32x3½	32x3½
Cartercar L	1600	28.9	Tour'g.	5	4	4¼	4½	Pairs	Tubular	Centf'l	Splitdorf	Dry	Pump	None	Fric'n.	...	Frame	1-chain	110	‡56	P. steel	3 plain	Ball	Roller	2,300	34x4	34x4
Chase	900	*	Surrey	4	3	4½	4	Single	Air c'l'd.	......	None	Dry	Splash	Plate	Plan.	2	......	2-chain	100	56	Armored	4 plain	Ball	Rol'er	1,500	40x1⅞	40x1⅞
Chadwick	5500	60.0	Tour'g.	7	6	5	6	Pairs	Cellular	Cent'f'l	Bosch	Dry	14 mech.	Ex. band	Sel.	4	Frame	2-chain	130	56	P. steel	4 plain	Ball	Ball	3,500	36x4½	36x5
Chadwick	6500	60.0	R'bout.	2	6	5	6	Pairs	Cellular	Cent'f'l	Bosch	Dry	14 mech.	Ex. band	Sel.	4	Frame	2-chain	112	56	P. steel	4 plain	Ball	Ball	3,000	36x4½	36x4½
Coates-Goshen	2925	32.4	B. tonn.	4	4	4½	5	Single	Cellular	Gear	Bosch	Storage	Pump	Cone	Sel.	3	Frame	Shaft 2	116	56	P. steel	5 plain	Ball	Roller	2,800	36x4	36x4
Coates-Goshen	3250	40.0	B. tonn.	4	4	5	5½	Pairs	Cellular	Gear	Bosch	Storage	Pump	Cone	Sel.	3	Frame	Shaft 1	123	56	P. steel	3 plain	Ball	Roller	3,000	36x4½	36x4½
Crawford	1350	28.9	Tour'g.	5	4	4¼	4½	Pairs	Cellular	Cent'f'l	Remy	Dry	Pump	Cone	Sel.	3	Frame	Shaft 1	110	56	P. steel	3 plain	Ball	Ball	2,250	32x3½	32x3½
Crawford	3000	40.0	Tour'g.	5	4	5	5	Single	Cellular	Cent'f'l	Remy	Storage	Pump	Disc	Sel.	4	Frame	Shaft 2	125	56	P. steel	5 plain	Ball	Ball	3,250	34x4	34x4½
Crawford	3500	40.0	Tour'g.	8	4	5	5½	Single	Cellular	Cent'f'l	Remy	Storage	Pump	Disc	Sel.	4	Frame	Shaft 2	...	...	P. steel	5 plain	Ball	Ball	......	36x4½	36x5
Demot	550	10.5	R'bout.	2	2	3⅝	3½	Single	Tubular	None	Remy	Dry	Splash	Disc	Plan.	2	Motor	Shaft	80	56	P. steel	2 ball	Ball	Ball	800	30x2½	30x2½
Empire	850	19.6	R'bout.	2	4	3½	4	Block	Tubular	None	Magneto	Battery	Splash	Cone	Sel.	2	Frame	2-chain	96	...	P. steel	Plain	......	......	1,350	32x3½	32x3½
Everitt	1350	25.6	Tour'g.	5	4	4	4½	Block	Tubular	Cent'f'l	Magneto	Dry	Splash	Cone	Sel.	3	Axle	Shaft 1	110	56	P. steel	3 plain	......	......	2,200	34x3½	34x3½
Fal-Car	1650	28.9	Tour'g.	5	4	4¼	4½	Pairs	Tubular	......	Magneto	Battery	Pump	Cone	Sel.	3	......	Shaft	110	56	P. steel	3 plain	Ball	Roller	1,900	34x3½	34x3½
Firestone	......	25.6	B. tonn.	4	4	4	4	Pairs	Tubular	Cent'f'l	......	Dry	Pump	Cone	Sel.	3	Frame	Shaft 1	106	50	P. steel	3 plain	Ball	Ball	1,750	32x3½	32x3½
Firestone	2000	32.4	Tour'g.	5	4	4½	4½	Pairs	Cellular	Cent'f'l	......	Dry	Pump	Cone	Sel.	3	Frame	Shaft 1	120	56	P. steel	3 plain	Ball	Ball	2,175	34x4	34x4
Ford T	950	22.5	Tour'g.	5	4	3¾	4	Block	Tubular	None	Ford sp.	None	Splash	Disc	Plan.	2	Motor	Shaft 1	100	‡56	P. steel	3 plain	Plain	Roller	1,200	30x3	30x3½
Gaeth	3500	38.0	Tour'g.	7	4	4⅞	5¼	Pairs	H'comb.	None	M-B	Dry	4 mech.	Con. b'd.	Sel.	3	Frame	Shaft 2	120	56	P. steel	3 plain	Ball	Ball	3,200	36x4	36x4½
Glide	2500	36.1	Tour'g.	5	4	4¾	5	Single	H'comb.	Cent'f'l	Eisem'n.	Storage	Pump	Disc	Sel.	3	......	Shaft	120	56½	P. steel	Plain	Roller	Roller	2,800	36x4½	36x4½
Houpt	......	48.4	Tour'g.	...	4	5½	6	Pairs	......	Cent'f'l	......	......	......	53-disc.	Sel.	4	Frame	Shaft	127	...	P. steel	3 plain	Ball	......	3,100	36x4	36x5
Houpt	......	72.6	Tour'g.	...	6	5½	6	Pairs	......	Cent'f'l	......	......	......	53-disc.	Sel.	4	Frame	Shaft	140	...	P. steel	4 plain	Ball	......	3,900	36x4	36x5
Hupmobile	750	16.9	R'bout.	2	4	3¼	3⅜	Pairs	Tubular	None	Bosch	None	Splash	Disc	Sel.	2	Motor	Shaft 1	86	‡56	P. steel	3 plain	Plain	Roller	1,100	30x3	30x3
Inter-State	1750	32.4	Tour'g.	5	4	4½	5	Pairs	......	Cent'f'l	U. & H.	Battery	Pump	63-disc.	Sel.	3	Shaft	Shaft 1	118	56½	P. steel	3 plain	Ball	Roller	2,700	34x4	34x4
Jackson	1250	25.6	Tour'g.	5	4	4	4	Single	H'comb.	None	Splitd'f.	Dry	Splash	Cone	Sel.	3	Motor	Shaft	105	56½	P. steel	5 plain	Ball	Roller	1,950	32x3½	32x3½
Jackson	1750	32.4	Tour'g.	5	4	4½	4½	Single	H'comb.	None	Splitd'f.	Dry	Splash	Disc	Sel.	3	Motor	Shaft	110	56½	P. steel	5 plain	Ball	Roller	2,650	34x4	34x4
Jackson	2350	36.1	Tour'g.	5	4	4¾	4¾	Single	H'comb.	None	Splitd'f.	Dry	Splash	Disc	Sel.	3	Motor	Shaft	120	56½	P. steel	5 plain	Ball	Roller	2,850	36x4	36x4
KisselKar	1500	28.9	Tour'g.	5	4	4¼	4½	Pairs	Tubular	Cent'f'l	Remy	Dry	6 mech.	Cone	Sel.	3	Frame	Shaft 2	112	56	P. steel	3 plain	Ball	Roller	......	34x4	34x4
KisselKar	2000	38.0	Tour'g.	5	4	4⅞	4¾	Pairs	Tubular	Cent'f'l	Remy	Dry	6 mech.	Cone	Sel.	4	Frame	Shaft 2	120	56	P. steel	3 plain	Roller	Roller	......	36x3½	36x4
KisselKar	2500	38.0	Tour'g.	7	4	4⅞	4¾	Pairs	Tubular	Cent'f'l	Bosch	Dry	6 mech.	Cone	Sel.	4	Frame	Shaft 2	124	56	P. steel	3 plain	Roller	Roller	......	36x4	36x4½
KisselKar	2500	38.0	B. tonn.	4	4	4⅞	4¾	Pairs	Tubular	Cent'f'l	Bosch	Dry	6 mech.	Cone	Sel.	4	Frame	Shaft 2	124	56	P. steel	3 plain	Roller	Roller	......	40x4	40x4
KisselKar	3000	54.1	Tour'g.	7	6	4¾	4¾	Pairs	Tubular	Cent'f'l	Bosch	Dry	8 mech.	Cone	Sel.	4	Frame	Shaft 2	132	56	P. steel	4 plain	Roller	Roller	......	36x4	36x4½
KisselKar	3000	54.1	B. tonn.	4	6	4¾	4¾	Pairs	Tubular	Cent'f'l	Bosch	Dry	8 mech.	Cone	Sel.	4	Frame	Shaft 2	132	56	P. steel	4 plain	Roller	Roller	......	40x4	40x4

NOTE: *Two-cycle motor. †Price includes top. ‡Also 60 inches.

DETAILS OF 1910 CARS, EXHIBITED AT THE TENTH ANNUAL A. M. C. M. A. SHOW—(AMERICAN GASOLINE PLEASURE CARS—Continued)

MAKE AND MODEL	Price	H.P.	BODY Type	BODY Seats	MOTOR Cylinders	MOTOR Bore	MOTOR Stroke	MOTOR Cyl. Cast	COOLING Radiator	COOLING Pump	IGNITION Magneto	IGNITION Battery	Lubrication	Clutch	TRANSMISSION Type	TRANSMISSION Speeds	TRANSMISSION Location	TRANSMISSION Drive	Wheelbase	Tread	Frame	BEARINGS Motor	BEARINGS Transmission	BEARINGS Axle	Weight	TIRES Front	TIRES Rear
Kline Kar	$1575		Tour'g.	5	4			Single	Cellular	Cent'f'l	Bosch	Battery	Pump	Cone	Sel.	3		Shaft	109	56	P. steel	5 plain	Ball	Roller	1,900	34x3½	34x3½
Kline Kar	2500		R'bout.	2	6			Single	Cellular	Cent'f'l	Bosch	Battery	Pump	Cone	Sel.	3		Shaft	108	56	P. steel	7 plain	Ball	Roller			
Kline Kar	2500		Tour'g.	5	6			Single	Cellular	Cent'f'l	Bosch	Battery	Pump	Cone	Sel.	3		Shaft	122	56	P. steel	7 plain	Ball	Roller	2,700	36x4	36x4
Lambert	1200	25.6	B. tonn.	4	4	4	4	Block	Tubular	None	Magneto	Battery		None	Fric'n		Frame	1-chain	100	56	P. steel				1,600	32x3½	32x3½
Lambert	1275	25.6	Tour'g.	5	4	4	4	Block	Tubular	None	Magneto	Battery		None	Fric'n		Frame	1-chain	110	56	P. steel				1,700	32x3½	32x3½
Lambert	1700	25.6	Tour'g.	5	4	4	4	Block	Tubular	None	Magneto	Battery		None	Fric'n		Frame	1-chain	115	56	P. steel				1,800	34x3½	34x3½
Lion	1500	22.5	Tour'g.	5	4	3¾	4½	Pairs	H'comb.	Cent'f'l	Bosch		7 mech.	Cone	Sel.	3	Motor	Shaft 1	112	56	P. steel	3 plain	Roller	Roller	1,900	36x3½	36x3½
Marmon 32	2650	32.4	Tour'g.	5	4	4½	5	Pairs	H'comb.	Cent'f'l	Bosch	Dry	Pump	Cone	Sel.	3	Axle	Shaft 2	116	56½	P. steel	3 plain	Ball	Ball	2,300	34x4	34x4
Maxwell	600	12.8	R'bout.	2	2	4	4	Single	Cellular	None	Splitd'f.	Dry	Splash	Disc	Plan.	2	Motor	Shaft 2	82	‡56½	P. steel	2 plain	Plain	Roller	1,150	28x3	28x3
Maxwell	900	22.5	R'bout.	2	4	3¾	4	Pairs	Cellular	None	Splitd'f.	Dry	5 mech.	15-disc.	Prog.	3	Motor	Shaft 2	93	‡56½	P. steel	3 plain	Roller	Roller	1,500	30x3½	30x3½
Maxwell	1500	28.9	Tour'g.	5	4	4¼	4½	Single	Cellular	None	Splitd'f.	Dry	5 mech.	Disc	Prog.	3	Motor	Shaft 2	110	‡56½	P. steel	5 plain	Roller	Roller	2,500	34x4	34x4
McIntyre	600	18.0	R'bout.	2	2	4¾	4¾	Single		None	Extra	Battery	Mech.	Disc	Plan.	2		2-chain	90	‡56		2 plain				30x3	30x3
McIntyre	1250	27.2	Tour'g.	5	4	4⅛	3¾				Splitd'f.	Dry	Pump	Cone	Sel.	3		Shaft	112	‡56	P. steel	Plain	Roller	Roller		36x3½	36x3½
McIntyre	1750	28.9	Tour'g.	5	4	4¼	5½	Pairs			Bosch	Dry	Pump	Cone	Sel.	3		Shaft	115	‡56	P. steel	3 plain	Ball	Roller		37x4	37x4
Metz	600	9.8	R'bout.	2	2	3½	3½	Single	Air c'l'd.	Air c'l'd.	Bosch	None	Splash	None	Fric'n		Frame	2-chain	81	56½	P. steel	2 ball	Ball	Ball	550	28x2½	28x2½
Middleby	1250	25.6	Tour'g.	5	4	4	4	Single	Air c'l'd.	Air c'l'd.	Splitd'f.	Battery	4 mech.		Prog.	3		Shaft	108	56½	P. steel	Plain		Roller	2,200	33x4	33x4
Midland	1800	32.4	Tour'g.	5	4	4½	5	Pairs	Tubular	Cent'f'l	Remy	Dry	Pump	3-plate	Sel.	3	Motor	Shaft 1	115	56	P. steel	3 plain	Roller	Ball	2,400	34x4	34x4
Midland	2250	32.4	Tour'g.	5	4	4½	5¼	Pairs	Tubular	Centf'l	Remy	Dry	Pump	3-plate	Sel.	3	Frame	Shaft 1	118	56	P. steel	Plain	Roller	Roller	2,700	36x4	36x4
Mitchell	1100	28.9	R'bout.	3	4	4¼	5	Pairs	Cellular	Cent'f'l	Splitd'f.	Dry	6 mech.	Cone	Sel.	3	Frame	Shaft	100	‡56½	P. steel	3 plain	Roller	Roller	1,800	32x3	32x3
Mitchell	1350	28.9	Tour'g.	5	4	4¼	5	Pairs	Cellular	Cent'f'l	Splitd'f.	Dry	6 mech.	Cone	Sel.	3	Frame	Shaft	112	‡56½	P. steel	3 plain	Roller	Ball	2,300	34x3½	34x3½
Mitchell	2000	43.8	Tour'g.	7	6	4¼	5	Pairs	Cellular	Cent'f'l	Splitd'f.	Dry	8 mech.	Cone	Sel.	3	Frame	Shaft	130	‡56½	P. steel	4 plain	Roller	Ball	3,300	36x4	36x4
Moline	1500	25.6	Tour'g.	5	4	4	4½	Pairs	Tubular	None	Splitd'f.	Battery		Cone	Sel.	3		Shaft	110		P. steel	3 plain	Roller	Roller	2,100	34x3½	34x3½
Moline	2500	32.4	Tour'g.	5	4	4½	5	Pairs	Tubular	None	Bosch	Battery		Cone	Sel.	3		Shaft	116		P. steel	3 plain	Roller	Roller	2,650	36x3½	36x4
Moon 30	1500	28.9	Tour'g.	5	4	4¼	5	Pairs	Tubular	Cent'f'l	Remy	Dry	Pump	Ex. band	Sel.	3	Axle	Shaft 1	110	56	P. steel	3 plain	Roller	Roller	2,400	34x3½	34x3½
Moon 45	3000	36.1	Tour'g.	5	4	4¾	5	Pairs	H'comb.	Cent'f'l	Bosch	Dry	Pump	Disc	Sel.	4	Frame	Shaft	120	56	P. steel	3 plain	Roller	Roller	2,850	36x4	36x4½
Mora 20	1050	16.9	R'bout.	2	4	3¼	3½	Pairs	Tubular	None	Remy	Dry	Pump	Ex. band	Sel.	2	Axle	Shaft 2	84	56	P. steel	3 plain	Roller	Roller	1,300	32x3	32x3
Mora 40	2500	32.4	Tour'g.	5	4	4½	5⅛	Pairs	Tubular	Cent'f'l	Bosch	Storage	Pump	Cone	Sel.	3	Motor	Shaft 1	112	56	P. steel	3 plain	Ball	Roller	2,500	34x4	34x4
National	2500	40.0	Tour'g.	5	4	5	5¼	Pairs	H'comb.	Cent'f'l	Bosch	Storage	Pump	Cone	Sel.	3	Frame	Shaft 1	124	56	P. steel	3 plain	Ball	Roller	2,850	36x4	36x4
National	4200	48.6	Tour'g.	5	6	4½	4¾	Single	H'comb.	Cent'f'l	Bosch	Storage	Pump	Cone	Sel.	3	Frame	Shaft 1	130	56	P. steel	4 plain	Ball	Ball	3,100	36x4½	36x4½
National	5000	60.0	Tour'g.	5	6	5	5	Single	H'comb.	Cent'f'l	Bosch	Storage	Pump	Cone	Sel.	3	Frame	Shaft 1	137	56	P. steel	4 plain	Ball	Ball	3,750	36x5	36x5
Oakland	1250	25.6	Tour'g.	4	4	4	4	Pairs	Tubular	Cent'f'l	Magneto	Battery	Pump	Disc	Sel.	3		Shaft	100	56	P. steel	3 plain	Ball	Roller	1,800	32x3½	32x3½
Oakland	1700	32.4	Tour'g.	5	4	4½	5	Pairs	Tubular	Cent'f'l	Magneto	Battery	Pump	Disc	Sel.	3		Shaft	112	56	P. steel	3 plain	Ball	Roller	2,250	34x4	34x4
Ohio	†1850	28.9	Tour'g.	5	4	4¼	4¾	Pairs	Cellular	None	Splitd'f.	Dry	Pump	3-plate	Sel.	3	Motor	Shaft	115	56	P. steel	3 plain	Ball	Ball	2,300	34x4	34x4
Paige-Detroit	800	*	R'bout.		3	3¾	4	Single	Tubular	None	Magneto			Cone	Sel.	2		Shaft	90	56	P. steel	4 plain				32x3	32x3
Paterson	1400	25.6	Tour'g.	5	4	4	4	Pairs	Tubular	None	Remy	Dry	Splash	Cone	Sel.	2		Shaft 2	104	56	P. steel	3 plain	Ball	Roller	2,000	32x3½	32x3½
Pennsylvania	2500	28.9	Tour'g.	5	4	4¼	4¼	Pairs	Cellular	Gear	Bosch	Battery	Mech.	Cone	Sel.	3	Axle	Shaft	110	56	P. steel	3 plain	Ball	Ball	2,300	34x4	34x4
Pennsylvania	3000	36.1	Tour'g.	5	4	4¾	5¼	Pairs	Cellular	Gear	Bosch	Battery	Mech.	Cone	Sel.	3	Axle	Shaft	114	56	P. steel	3 plain	Ball	Ball	3,000	34x4	34x4½
Pennsylvania	3500	36.1	Tour'g.	7	4	4¾	5¼	Pairs	Cellular	Gear	Bosch	Battery	Mech.	Cone	Sel.	3	Axle	Shaft	122	56	P. steel	3 plain	Ball	Ball	3,300	36x4	36x4½
Pennsylvania	4500	54.1	Tour'g.	5	6	4¾	5¼	Pairs	Cellular	Gear	Bosch	Battery	Mech.	Cone	Sel.	3	Axle	Shaft	129	56	P. steel	4 plain	Ball	Ball	3,300	36x4	36x4½
Pierce	1750	28.9	Tour'g.	5	4	4¼	5	Pairs	H'comb.	Cent'f'l	Remy	Dry	Pump	39-disc.	Sel.	3	Frame	Shaft 2	112	56	P. steel	3 plain	Roller	Roller	2,700	34x4	34x4
Premier	2500	32.4	Tour'g.	5	4	4½	5¼	Pairs	Cellular	Cent'f'l	M-B.	Extra	5 mech.	Disc	Sel.	3	Frame	Shaft	120	56½	P. steel	3 plain	Ball	Ball	2,800	34x4	34x4
Premier	3500	48.6	Tour'g.	7	6	4½	5¼	Pairs	Cellular	Cent'f'l	M-B.	Battery	7 mech.	Disc	Sel.	3	Frame	Shaft	139½	56½	P. steel	4 plain	Ball	Ball		36x4	36x5
Pullman	1650	25.6	Tour'g.	4	4	4	5	Single	Cellular	Cent'f'l	Bosch	Dry	Pump	Cone	Sel.	3	Frame	Shaft	108	56½	P. steel	5 plain	Ball	Roller	1,800	34x3½	34x3½
Pullman	2000	32.4	Tour'g.	5	4	4½	4¾	Single	Cellular	Cent'f'l	Bosch	Dry	Pump	Cone	Sel.	3	Frame	Shaft	112	56½	P. steel	5 plain	Ball	Roller	2,400	34x4	34x4
Pullman	3000	40.0	R'dster	3	4	5	5¼	Single	Cellular	Cent'f'l	Bosch	Dry	Pump	Cone	Sel.	4	Frame	Shaft	110	56½	P. steel	5 plain	Ball	Roller	2,600	36x4	36x4
Pullman	3500	44.1	Tour'g.	7	4	5¼	6	Single	Cellular	Cent'f'l	Bosch	Dry	Pump	Cone	Sel.	4	Frame	Shaft	124	56½	P. steel	5 plain	Ball	Roller	3,500	36x4	36x4
Regal	1250	25.6	Tour'g.	5	4	4	4	Pairs	Tubular	Gear	Remy	Battery	Pump	Cone	Sel.	3	Frame	Shaft 2	107	56	P. steel	3 plain	Roller	Roller	2,000	32x3½	32x3½

NOTE: *Two-cycle motor. †Price includes top. ‡Also 60 inches.

DETAILS OF 1910 CARS, EXHIBITED AT THE TENTH ANNUAL A. M. C. M. A. SHOW—(AMERICAN GASOLINE PLEASURE CARS—Continued)

MAKE AND MODEL			BODY		MOTOR				COOLING		IGNITION				TRANSMISSION							BEARINGS				TIRES	
	Price	H.P.	Type	Seats	Cylinders	Bore	Stroke	Cyl. Cast	Radiator	Pump	Magneto	Battery	Lubrication	Clutch	Type	Speeds	Location	Drive	Wheelbase	Tread	Frame	Motor	Transmission	Axle	Weight	Front	Rear
Reo	500	9.0	R'bout.	2	1	4¾	6	Single.	Tubular.	Gear	None	Dry	Splash	Plate	Plan.	2	Motor	1-chain.	78	‡55	P. steel	2 plain	Plain	Roller.	...	28x3	28x3
Reo	1000	18.0	Tour'g.	5	2	4¾	6	Single.	Tubular.	Gear	None	Dry	Splash	Plate	Plan.	2	Motor	1-chain.	96	‡55	P. steel	2 plain	Plain	Roller.	...	32x3½	32x3½
Reo	1250	25.6	Tour'g.	5	4	4	4½	Pairs.	Tubular.	Gear	Splitd'f.	Dry	Pump	Disc.	Sel.	3	Frame	Shaft 2.	108	56	P. steel	3 plain	Ball	Roller.	2.100	34x3½	34x3½
Sharp-Arrow	3000	40.0	R'bout.	2	4	5	5	Pairs.	Cellular.	Cent'f'l.	Bosch	Dry	Pump	Cone	Sel.	3	Frame	Shaft 2.	108	56	P. steel	3 plain	Ball	Ball	2.500	36x3½	36x4
Sharp-Arrow	3050	40.0	Tour'g.	5	4	5	5	Pairs.	Cellular.	Cent'f'l.	Bosch	Dry	Pump	Cone	Sel.	3	Frame	Shaft 2.	120	56	P. steel	3 plain	Ball	Ball	2.700	36x4	36x4
Speedwell	2500	40.0	Tour'g.	5	4	5	5	Pairs.	H'comb.	Cent'f'l.	Bosch	Storage.	4 mech.	Cone	Sel.	3	Frame	Shaft 2.	121	56	P. steel	3 plain	Roller.	Roller.	2.600	36x4	36x4
Staver	1600	25.6	Tour'g.	5	4	4	4	Pairs.	Cellular.	None	Splitd'f.	Dry	Splash	Disc.	Sel.	3	Frame	Shaft 1.	112	56	P. steel	3 plain	Roller.	Ball	2.150	34x3½	34x3½
Staver	2250	38.4	Tour'g.	5	6	4	4	Pairs.	Cellular.	None	Bosch	Dry	Splash	Disc.	Sel.	3	Frame	Shaft 1.	124	56	P. steel	4 plain	Roller.	Ball	2.500	36x4	36x4
Stoddard-D'ton	1600	24.0	Tour'g.	5	4	3¾	4½	Pairs.	Tubular.	Cent'f'l.	Splitd'f.	Dry	Mech.	Cone	Sel.	3	Frame	Shaft 1.	108	56	P. steel	3 plain	Roller.	Roller.	2.500	32x4	32x4
Stoddard-D'ton	2100	28.0	Tour'g.	5	4	4 3/16	5	Pairs.	Tubular.	Cent'f'l.	Pittsf'd.	Dry	Mech.	Cone	Sel.	3	Frame	Shaft 1.	116	56	P. steel	3 plain	Roller.	Roller.	2.970	34x4	34x4
Stoddard-D'ton	2750	36.1	Tour'g.	4	4	4¾	5	Pairs.	Tubular.	Cent'f'l.	Bosch	Dry	Mech.	Cone	Sel.	3	Frame	Shaft 1.	120	56	P. steel	3 plain	Roller.	Roller.	3.450	36x4½	36x4½
Stoddard-D'ton	2800	36.1	Tour'g.	7	4	4¾	5	Pairs.	Tubular.	Cent'f'l.	Bosch	Dry	Mech.	Cone	Sel.	3	Frame	Shaft 1.	128	56	P. steel	3 plain	Roller.	Roller.	3,550	36x4½	36x4½
Sultan	2800	14.4	Limous.	6	4	3	4¾	Pairs.	Tubular.	None	Bosch	None	2 mech.	Cone	Sel.	3	Frame	Shaft 2.	97	55¼	P. steel	3 plain	Ball	Ball	2.450	32x4	32x4
Washington	1750	28.9	Tour'g.	5	4	4¼	4½	Pairs.	Tubular.	None	Remy	Dry	Pump	Disc.	Sel.	3	Frame	Shaft 2.	112	56	P. steel	3 plain	Ball	Ball	2,800	34x4	34x4
Washington	2250	34.2	Tour'g.	5	4	4⅜	5¼	Pairs	Tubular.	None	Remy	Dry	Pump	Disc.	Sel.	3	Frame	Shaft 2.	112	56	P. steel	3 plain	Ball	Ball	2,800	34x4	34x4

FOREIGN GASOLINE PLEASURE CARS

MAKE AND MODEL	Price	H.P.	Type	Seats	Cylinders	Bore	Stroke	Cyl. Cast	Radiator	Pump	Magneto	Battery	Lubrication	Clutch	Type	Speeds	Location	Drive	Wheelbase	Tread	Frame	Motor	Transmission	Axle	Weight	Front	Rear
C. G. V.	2500	15.9	Extra	...	4	80	120	Block.	Tubular.	None	Bosch	None	Pump	Cone	Prog.	3	Frame	Shaft 1.	100	51	P. steel	3 plain	Ball	Ball	1.800	810x90	810x90
C. G. V.	3250	22.4	Extra	...	4	95	130	Block.	Tubular.	None	Bosch	Storage.	Pump	Cone	Sel.	4	Frame	Shaft 1.	116	51	P. steel	3 plain	Ball	Ball	1.900	875x105	875x105
C. G. V.	4000	23.8	Extra	...	6	80	120	Pairs.	Tubular.	None	Bosch	Storage.	Pump	Cone	Sel.	4	Frame	Shaft 1.	116	51	P. steel	4 plain	Ball	Ball	2.000	875x105	875x105
Clement-Bayard	2500	15.9	Extra	...	4	80	120	...	H'comb.	Cent'f'l.	Bosch	Storage.	...	...	Prog.	3	Frame	Shaft	110	...	P. steel	Plain	Ball	Ball	...	810x90	815x105
Clement-Bayard	3000	20.1	Extra	...	4	90	120	...	H'comb.	Cent'f'l.	Bosch	Storage.	...	...	Sel.	4	Frame	Shaft	120	...	P. steel	Plain	Ball	Ball	...	870x90	875x105
Clement-Bayard	3500	24.8	Extra	...	4	100	120	...	H'comb.	Cent'f'l.	Bosch	Storage.	...	...	Sel.	4	Frame	Shaft	120	...	P. steel	Plain	Ball	Ball	...	875x90	875x105
Clement-Bayard	3750	23.8	Extra	...	6	80	120	...	H'comb.	Cent'f'l.	Bosch	Storage.	...	...	Sel.	4	Frame	Shaft	125	...	P. steel	Plain	Ball	Ball	...	...	...
Clement-Bayard	4250	30.1	Extra	...	6	90	120	...	H'comb.	Cent'f'l.	Bosch	Storage.	...	...	Sel.	4	Frame	Shaft	135	...	P. steel	Plain	Ball	Ball	...	...	...
Clement-Bayard	4250	35.8	Extra	...	4	120	140	...	H'comb.	Cent'f'l.	Bosch	Storage	...	...	Sel.	4	Frame	2-chain.	125	...	P. steel	Plain	Ball	Ball	...	915x105	920x120
Clement-Bayard	4750	37.2	Extra	...	6	100	120	...	H'comb.	Cent'f'l.	Bosch	Storage.	...	...	Sel.	4	Frame	Shaft	135	...	P. steel	Plain	Ball	Ball	...	...	...
Clement-Bayard	4750	48.6	Extra	...	4	140	140	...	H'comb.	Cent'f'l.	Bosch	Storage.	...	...	Sel.	4	Frame	2-chain.	130	...	P. steel	Plain	Ball	Ball	...	915x105	920x120
De Dion-Bouton	1600	6.2	Extra	...	1	100	130	Single.	Tubular.	Cent'f'l.	Bosch	None	Pump	3-plate	Sel.	3	Frame	2-shaft.	103¾	50½	P. steel	2 plain	Ball	Ball	...	760x90	760x90
De Dion-Bouton	1800	10.5	Extra	...	4	65	100	Block.	Tubular.	Cent'f'l.	Bosch	None	Pump	3-plate	Sel.	3	Frame	2-shaft	106¼	50½	P. steel	3 plain	Ball	Ball	...	760x90	760x90
De Dion-Bouton	2200	6.2	R'bout.	2	1	100	160	Single.	Tubular.	Cent'f'l.	Bosch	None	Pump	3-plate	Sel.	3	Frame	2-shaft.	92¼	48	P. steel	2 plain	Ball	Ball	...	760x90	760x90
De Dion-Bouton	2250	14.0	Extra	...	4	75	120	Pairs.	Tubular.	Cent'f'l.	Bosch	None	Pump	3-plate	Sel.	3	Frame	2-shaft	110⅜	50½	P. steel	3 plain	Ball	Ball	...	810x90	810x90
De Dion-Bouton	3500	24.8	Extra	...	4	100	130	Pairs.	Tubular.	Cent'f'l.	Bosch	None	Pump	3-plate	Sel.	4	Frame	2-shaft.	122½	55	P. steel	3 plain	Ball	Ball	...	880x120	880x120
De Dion-Bouton	4500	35.8	Extra	...	4	120	130	Single.	Tubular.	Cent'f'l.	Bosch	None	Pump	3-plate	Sel.	4	Frame	2-shaft.	130½	58	P. steel	5 plain	Ball	Ball	...	935x135	935x135
De Dion-Bouton	5500	40.2	Extra	...	8	90	125	Pairs.	Tubular.	Cent'f'l.	Bosch	None	Pump	3-plate	Sel.	4	Frame	2-shaft.	130½	58	P. steel	3 plain	Ball	Ball	...	935x135	935x135
Delaunay-B'lle	2800	17.9	Extra	...	4	85	120	Block.	H'comb.	Cent'f'l.	Bosch	Storage.	Pump	Cone	Prog.	3	Frame	Shaft 1.	118	...	P. steel	...	...	...	...	815x105	815x105
Delaunay-B'lle	3250	19.3	Extra	...	6	72	85	Threes	H'comb.	Cent'f'l.	Bosch	Storage.	Pump	Cone	Prog.	4	Frame	Shaft 1.	123	...	P. steel	...	...	...	...	815x105	815x105
Delaunay-B'lle	3500	23.8	Extra	...	4	98	122	Pairs.	H'comb.	Cent'f'l.	Bosch	Storage.	Pump	Cone	Prog.	4	Frame	Shaft 1.	123	...	P. steel	...	...	...	...	880x120	880x120
Delaunay-B'lle	4000	19.3	Extra	...	6	72	105	Threes	H'comb.	Cent'f'l.	Bosch	Storage.	Pump	Cone	Prog.	4	Frame	Shaft 1.	128	...	P. steel	...	...	...	...	920x120	920x120
Delaunay-B'lle	5000	30.1	Extra	...	4	110	130	Single.	H'comb.	Cent'f'l.	Bosch	Storage.	Pump	Cone	Prog.	4	Frame	2-chain.	128	...	P. steel	...	...	...	...	880x120	880x120
Delaunay-B'lle	5100	35.7	Extra	...	6	98	122	Pairs.	H'comb.	Cent'f'l.	Bosch	Storage.	Pump	Cone	Prog	4	Frame	Shaft 1.	138	...	P. steel	...	...	...	...	920x120	920x120
Delaunay-B'lle	6100	44.5	Extra	...	4	134	140	Single.	H'comb.	Cent'f'l.	Bosch	Storage.	Pump	Cone	Prog.	4	Frame	2-chain.	130	...	P. steel	...	...	...	...	935x135	935x135
Delaunay-B'lle	7000	49.2	Extra	...	6	115	130	Single.	H'comb.	Cent'f'l.	Bosch	Storage.	Pump	Cone	Prog.	4	Frame	2-chain.	144	...	P. steel	...	...	...	...	935x135	935x135
Delaunay-B'lle	10000	66.8	Extra	...	6	134	140	Single	H'omb.	Cent'f'l.	Bosch	Storage.	Pump	Cone	Prog.	4	Frame	2-chain.	157	...	P. steel	...	...	...	...	935x135	1000x150
Fiat	2750	15.9	Extra	...	4	80	100	Block.	H'comh.	Cent'f'l.	Bosch	None	Mech.	Disc.	Sel.	4	Frame	Shaft 1.	107	54	P. steel	3 plain	Ball	Ball	1,500	810x90	810x90
Fiat	3500	20.1	Extra	...	4	90	120	Pairs.	H'comb.	Cent'f'l.	Bosch	None	Mech.	Disc.	Sel.	4	Frame	Shaft 1.	120	54	P. steel	3 plain	Ball	Ball	1,900	810x90	810x90
Fiat	4500	30.0	Extra	...	4	110	130	Pairs.	H'comb.	Cent'f'l.	Bosch	None	Mech.	Disc.	Sel.	4	Frame	Shaft 1.	120	56	P. steel	3 plain	Ball	Ball	2,350	820x120	820x120
Fiat	5000	41.9	Extra	...	4	130	140	Pairs.	H'comb.	Cent'f'l.	Bosch	None	Mech.	Disc.	Sel.	4	Frame	2-chain.	126	56	P. steel	3 plain	Ball	Ball	2,500	920x120	920x120
Fiat	5250	41.9	Extra	...	4	130	140	Pairs.	H'comb.	Cent'f'l.	Bosch	None	Mech.	Disc.	Sel.	4	Frame	Shaft 1.	125	56	P. steel	3 plain	Ball	Ball	2,550	920x120	920x120
Fiat	6000	45.0	Extra	...	6	110	130	Pairs.	H'comh.	Cent'f'l.	Bosch	None	Mech.	Disc.	Sel.	4	Frame	2-chain.	130	56	P. steel	4 plain	Ball	Ball	2,650	920x120	920x120
Fiat	7500	41.9	Extra	...	4	130	190	Pairs.	H'comb.	Cent'f'l.	Bosch	None	Mech.	Disc.	Sel.	4	Frame	2-chain.	114	56	P. steel	3 plain	Ball	Ball	2,425	880x120	880x120
Hotchkiss	2850	15.9	Extra	...	4	80	110	Block.	H'comb.	Cent'f'l.	Eisem'n.	None	3 mech.	Cono	Sel.	3	Frame	Shaft 2.	109½	53	P. steel	3 plain	Ball	Ball	2,200	810x80	810x90
Hotchkiss	3650	22.4	Extra	...	4	95	110	Block.	H'comb.	Cent'f'l.	Eisem'n.	None	3 mech.	Cone	Sel.	4	Frame	Shaft 2.	119	53	P. steel	3 plain	Ball	Ball	2,500	875x105	875x105
Hotchkiss	4500	30.0	Extra	...	4	110	130	Pairs.	H'comb.	Cent'f'l.	Eisem'n.	None	3 mech.	Cone	Sel.	4	Frame	Shaft 2.	126	55	P. steel	3 plain	Ball	Ball	3,000	880x120	880x120
Hotchkiss	6500	53.6	Extra	...	6	120	140	Pairs.	H'comb.	Cent'f'l.	Eisem'n.	None	3 mech.	Cone	Sel.	4	Frame	Shaft 2.	143½	55	P. steel	4 plain	Ball	Ball	3.500	920x120	920x120

NOTE: ‡Also 60 inches.

DETAILS OF 1910 CARS, EXHIBITED AT THE TENTH ANNUAL A. M. C. M. A. SHOW—(FOREIGN GASOLINE PLEASURE CARS—Continued)

MAKE AND MODEL	Price	H.P.	BODY Type	BODY Seats	MOTOR Cylinders	MOTOR Bore	MOTOR Stroke	MOTOR Cyl. Cast	COOLING Radiator	COOLING Pump	IGNITION Magneto	IGNITION Battery	Lubrication	Clutch	TRANSMISSION Type	TRANSMISSION Speeds	TRANSMISSION Location	Drive	Wheelbase	Tread	Frame	BEARINGS Motor	BEARINGS Transmission	BEARINGS Axle	Weight	TIRES Front	TIRES Rear
Isotta	2750	10.5	R'bout.	2	4	65	100	Block.	H'comb.	Cent'f'l.	Eisem'n.	None	3 mech.	Disc.	Sel.	4	Frame.	Shaft 1.	82½	49¼	P. steel.	2pl. 1bl.	Ball.	Ball.	1,450	810x90	810x90
Isotta	3500	20.1	Extra		4	90	120	Pairs.	H'comb.	Cent'f'l.	Bosch	None	3 mech.	Disc.	Sel.	4	Frame.	Shaft 1.	118	55⅛	P. steel.	2pl., 1bl.	Ball.	Ball.	1,850	875x105	875x105
Isotta	4500	30.0	Extra		4	110	130	Pairs.	H'comb.	Cent'f'l.	Bosch	None	4 mech.	Disc.	Sel.	4	Frame.	Shaft 1.	120	55¼	P. steel.	2pl. 1bl.	Ball.	Ball.	2,150	870x90	880x120
Isotta	5600	41.9	Extra		4	130	150	Pairs.	H'comb.	Cent'f'l.	Bosch	None	4 mech.	Disc.	Sel.	4	Frame.	Shaft 1.	124	55⅛	P. steel.	2pl., 1bl.	Ball.	Ball.	2,450	875x105	935x135
Isotta	5600	41.9	Extra		4	130	150	Pairs.	H'comb.	Cent'f'l.	Bosch	None	4 mech.	Disc.	Sel.	4	Frame.	2-chain.	124	55⅛	P. steel.	2pl., 1bl.	Ball.	Ball.	2,400	875x105	935x135
Isotta	6500	41.9	R'bout.	2	4	130	150	Pairs.	H'comb.	Cent'f'l.	Bosch	None	4 mech	Disc.	Sel.	4	Frame.	2-chain.	110	55¼	P. steel.	2pl., 1bl.	Ball.	Ball.	2,400	875x105	935x135
Isotta	7500	55.8	Extra		4	150	160	Pairs.	H'comb.	Cent'f'l.	Bosch	None	4 mech.	Disc.	Sel.	4	Frame.	2-chain.	128	55⅛	P. steel.	2pl., 1bl.	Ball.	Ball.	2,700	875x105	935x135
Isotta	8500	52.2	R'bout.	2	4	145	120	Pairs.	H'comb.	Cent'f'l.	Eisem'n.	None	4 mech.	Disc.	Sel.	3	Frame.	2-chain.	118	55⅛	P. steel.	2pl., 1bl.	Ball.	Ball.	2,500	870x90	880x120
Lancia	3000	20.1	Extra		4	90	100	Pairs.	H'comb.	Cent'f'l.	Bosch	None	Pump	Disc.	Sel.	4	Frame.	Shaft 1.	110	54	P. steel.	3 plain.	Ball.	Ball.	1,800	810x100	820x120
Lancia	3300	22.4	Extra		4	95	110	Block.	H'comb.	Cent'f'l.	Bosch	None	Pump	Disc.	Sel.	4	Frame.	Shaft 1.	115	54	P. steel.	3 plain.	Ball.	Ball.	1,800	810x100	820x120
Lancia	3500	22.4	R'bout.	2	4	95	110	Block.	H'comb.	Cent'f'l.	Bosch	None	Pump	Disc.	Sel.	4	Frame.	Shaft 1.	105	54	P. steel.	3 plain.	Ball.	Bal.	1,800	810x100	820x120
Panhard-Levas'r.	5500	20.1	Limous.	7	4	90	130	Single.	Tubular.	Cent'f'l.	Eisem'n.	Storage.	Pump	Disc.	Prog.	4	Frame.	Shaft 1.	115	56	P. steel.	5 plain.	Ball.	Ball.	2,900	875x105	875x105
Panhard-Levas'r.	6500	33.6	B. tonn.	5	6	95	130	Single.	H'comb.	Cent'f'l.	Eisem'n.	Storage.	Pump	Disc.	Prog.	4	Frame.	Shaft 1.	115	56	P. steel.	7 plain.	Ball.	Ball.	2,600	880x120	880x120
Renault	3500	12.2	Limous.	5	4	70	115	Block.	Tubular.	None	Bosch	None	5 mech.	Cone	Prog.	4	Frame.	Shaft 2.	99	53	P. steel.	3 plain.	Ball.	Ball.	1,800	810x90	810x90
Renault	5500	24.8	Tour'g.	5	4	100	140	Pairs.	Tubular.	None	Bosch	None	Mech.	Cone	Prog.	4	Frame.	Shaft 2.	120	55	P. steel.	3 plain.	Ball.	Ball.	2,800	915x105	920x120
Renault	5750	26.9	Limous.	5	6	85	120	Threes	Tubular.	None	Bosch	None	Mech.	Cone	Prog.	4	Frame.	Shaft 2.	120	55	P. steel.	3 plain.	Ball.	Ball.	3,500	875x105	880x120

GASOLINE COMMERCIAL AUTOMOBILES

MAKE AND MODEL	Price	H.P.	BODY Type	BODY Tons	MOTOR Cylinders	MOTOR Bore	MOTOR Stroke	MOTOR Cyl. Cast	COOLING Radiator	COOLING Pump	IGNITION Magneto	IGNITION Battery	Lubrication	Clutch	TRANSMISSION Type	TRANSMISSION Speeds	TRANSMISSION Location	Drive	Wheelbase	Tread	Frame	BEARINGS Motor	BEARINGS Transmission	BEARINGS Axle	Weight	TIRES Front	TIRES Rear
American Truck	3500	38.0	Express	2	4	4¾	5½	Pairs.	H'comb.	Cent'f'l.	Bosch	Storage.	10 mech.	Cone	Plan.	2	Frame.	2-chain.	132	56½	Armor'd.	5 plain.	Roller.	Roller.	5,000	36x4	36x5
American Truck	4000	38.0	Extra	3	4	4¾	5½	Pairs.	H'comb.	Cent'f'l.	Bosch	Storage.	10 mech.	Cone	Plan.	2	Frame	2-chain.	130	62	Armor'd.	5 plain.	Roller.	Roller.	7,500	36x5	36x4d
American Truck	4500	44.1	Extra	5	4	5¼	6	Single.	H'comb.	Cent'f'l.	Bosch	Storage.	10 mech.	Cone	Plan.	2	Frame.	2-chain.	130	62	Armor'd.	5 plain.	Roller.	Roller.	8,300	36x7	36x5d
Atlas	2400	*	Taxicab		2	4½	4½	Single.	Cellular.	Cent'f'l.	Bosch	Dry	5 mech.	Ex. band	Sell.	3	Frame	Shaft 2.	102	56	P. steel.	3 plain.	Roller.	Roller.	2,600	30x4	30x4
Chase	750	*	Deliv'y.	½	2	4½	4	Single.	Air c'l'd.	Air c'l'd.	None	Dry	Splash	Plate	Plan.	2		2-chain.	84	56	Armored	3 plain.	Ball.	Roller.	1,400	37x1¾	40x1¾
Chase	900	*	Deliv'y.	½	3	3¾	4	Single.	Air c'l'd.	Air c'l'd.	None	Dry	Splash	Plate	Plan.	2		2-chain.	100	56	Armored	4 plain.	Ball.	Roller.	1,650	37x1¾	40x1¾
Ford	1100	22.5	Taxicab		4	3¾	4	Block.	Tubular.	None	Ford sp'l	None	Splash	Disc.	Plan.	2	Motor.	Shaft 1.	100	‡56	P. steel.	3 plain.	Plain.	Roller.	1,500	30x3	30x3½
Gramm-Logan	1800	25.6	Deliv'y.	¾	4	4	4	Pairs.	Tubular.	Cent'f'l.	Splitd'f.	Storage.	Pump	Disc.	Prog.	2	Frame.	2-chain.	120	56	Angle	3 plain.	Roller.	Roller.	2,200	34x3	34x3
Gramm-Logan	2500	28.9	Truck	2	4	4½	5	Pairs.	Tubular.	Cent'f'l.	Splitd'f.	Storage.	Pump	Disc.	Prog.	3	Frame.	2-chain.	104	66	Channel.	3 plain.	Roller.	Roller.	3,000	36x3½	36x3½
Gramm-Logan	3500	36.1	Truck	3	4	4¾	5	Pairs.	Tubular.	Cent'f'l.	Splitd'f.	Storage.	Pump	Disc.	Prog.	3	Frame.	2-chain.	120	66	Channel.	3 plain.	Roller.	Roller.	5,000	36x5	36x3½d
Hart-Kraft	1150	16.2	Extra	½	2	4½	4	Single.	Tubular.	None	Splitd'f.	Dry	Splash	Disc.	Plan.	2	Motor.	2-chain.	90	56	Armored	2 ball.	Roller.	Roller.	1,800	34x2½	34x2½
Kline Kar	1400		Deliv'y.	¾	2			Single.	Tubular.	None	Magneto.	Battery			Plan.	2	Frame.	2-chain.	86	56	Angle	2 plain.	Roller.	Roller.	1,850	36x3	36x3
Manhattan	4350	48.6	Truck	3	4	5½	6	Pairs.	H'comb.	Cent'f'l.	Bosch	Storage.	8 mech.	Cone	Sel.	3	Frame.	2-chain.	126	68	Channel.	3 plain.	Ball.	Roller.	6,500	36x5	36x3½d
Manhattan	5050	48.6	Truck	5	4	5½	6	Pairs.	H'comb.	Cent'f'l.	Bosch	Storage.	8 mech.	Cone	Sel.	3	Frame.	2-chain.	153	68	Channel.	3 plain.	Ball.	Roller.		36x6	36x4d
Manhattan	5500	48.6	20 Pas.		4	5½	6	Pairs.	H'comb.	Cent'f'l.	Bosch	Storage.	8 mech.	Cone	Sel.	3	Frame.	2-chain.	148	68	Channel.	3 plain.	Ball.	Roller.		36x4½	36x3½d
Martin	1400	16.2	Deliv'y.	¾	2	4½	4½	Single.			Magneto.	Battery.	4 mech.	Cn. band	Plan.	2	Motor.	2-chain	88	56				Roller.	1,800	34x2½	34x2½
Martin	1500	16.2	Deliv'y.	½	2	4½	5	Single.			Magneto.	Battery.	4 mech.	Cn. band	Plan.	2	Motor.	2-chain.	92	56				Roller.	2,240	36x2½	36x2½
McIntyre	950	23.0	Deliv'y.	1	2	5⅝	4¾	Single.	Tubular.	None	None	Dry	Mech.	Plate	Plan.	2	Frame.	2-chain.	95		Angle	2 plain.	Plain.	Roller.		34x2	34x2
Randolph		18.0		1	2	4¾	5¼	Single.	Tubular.	None	Magneto.	Storage.	Pump	Con. b'd.	Sel.	3	Frame.	2-chain.	100		P. steel.	2 plain.	Ball.	Roller.	2,750	34x3	36x3½
Randolph		32.4		2	4	4½	5	Pairs.	Tubular.	Gear	Magneto.	Storage.	Pump	Con. b'd.	Sel.	3	Frame.	2-chain.	116		P. steel.	3 plain.	Ball.	Roller.	4,200	36x4	36x5
Randolph		32.4		3	4	4½	5	Pairs.	Tubular.	Gear	Magneto.	Storage.	Pump	Con. b'd.	Sel.	3	Frame.	2-chain.	132		P. steel.	3 plain.	Ball.	Roller.	5,700	36x5	36x4d
Randolph		40.0		4	4	5	6	Pairs.	Tubular.	Gear	Magneto.	Storage.	Pump	Con. b'd.	Sel.	3	Frame.	2-chain.	150		P. steel.	3 plain.	Ball.	Roller.	8,500	38x6	40x5d

NOTE: *Two-cycle motor. ‡Also 60 inches.

DETAILS OF 1910 CARS, EXHIBITED AT THE TENTH ANNUAL A. M. C. M. A. SHOW—(GASOLINE COMMERCIAL AUTOMOBILES—Continued)

MAKE AND MODEL	Price	H.P.	BODY Type	BODY Tons	MOTOR Cylinders	MOTOR Bore	MOTOR Stroke	MOTOR Cyl. Cast	COOLING Radiator	COOLING Pump	IGNITION Magneto	IGNITION Battery	Lubrication	Clutch	TRANSMISSION Type	TRANSMISSION Speeds	TRANSMISSION Location	TRANSMISSION Drive	Wheelbase	Tread	Frame	BEARINGS Motor	BEARINGS Transmission	BEARINGS Axle	Weight	TIRES Front	TIRES Rear
Rapid		20.0	Extra	1	2	5	5	Single	Tubular	Cent'f'l	None	Storage	5 mech	3-plate	Flan	2	Frame	2-chain	100	56	Angle	2 plain	Plain	Roller	2.250	32x3½	32x3½
Rapid		22.0	Extra	1½	2	5¼	5	Single	Tubular	Cent'f'l	None	Storage	5 mech	3-plate	Flan	2	Frame	2-chain	111	56	Angle	2 plain	Plain	Roller	2,680	32x4	34x4
Rapid		36.1	Extra	3	4	4¾	5½	Pairs	Tubular	Cent'f'l	Magneto	Storage	7 mech	Disc	Sel	3	Frame	2-chain	138	68	Channel	3 plain	Roller	Roller	6,000	36x5	36x3½d
Rap d		48.4	Extra	5	4	5½	6½	Pairs	Tubular	Cent'f'l	Magneto	Storage	7 mech	Disc	Sel	3	Frame	2-chain	160	68	Channel	3 plain	Roller	Roller	7,500	36x6	36x4d
R iance	2750	*	Extra	2	2	5¼	5	Single	Cellular	Cent'f'l	None	Storage	9 mech	Disc	Sel	3	Frame	2-chain	120	58	Channel	3 plain	Ball	Roller	4,250	34x4	34x3d
Reliance	3100	*	Extra		3	5¼	5	Single	Cellular	Cent'f'l	None	Storage	11 mech	Disc	Sel	3	Frame	2-chain	120	58	Channel	4 plain	Ball	Roller	4,500	34x4	34x3d
Reliance	3500	*	Extra		3	5¼	5	Single	Cellular	Cent'f'l	None	Storage	11 mech	Disc	Sel	3	Frame	2-chain	138	63	Channel	4 plain	Ball	Roller	5,900	36x5	36x4d
Reliance	3750	*	Extra		4	5¼	5	Single	Cellular	Cent'f'l	None	Storage	14 mech	Disc	Sel	3	Frame	2-chain	138	63	Channel	5 plain	Ball	Roller	6,100	36x5	36x4d
Reliance	4400	*	Extra		4	5¼	5	Single	Cellular	Cent'f'l	None	Storage	14 mech	Disc	Sel	3	Frame	2-chain	138	63	Channel	5 plain	Ball	Roller	7,000	36x6	36x4d
Saurer		19.6	Extra	2	4	3½	4¾	Pairs	H'comb	Cent'f'l	Eiscm'n	None	Mech	Disc	Sel	4	Frame	2-chain	141	64	P. steel	3 plain	Ball	Ball	5,000	34x4	34x4d
Saurer	5500	28.9	Extra	4	4	4¼	5½	Pairs	H'comb	Cent'f'l	Eisem'n	None	Mech	Disc	Sel	4	Frame	2-chain	153	64	P. steel	3 plain	Ball	Ball	6.000	36x5	42x5d
Schacht	850	21.0	Deliv'y	½	2	5¼	4½	Single	Tubular	None	Extra	Dry	6 mech	Plate	Plan	2	Frame	2-chain	104	56	P. steel	2 plain	Plain	Roller	1.400	32x3½	32x3½
Sultan	2800	14.4	Taxicab		4	3	4¾	Pairs	Tubular	None	Bosch	None	2 mech	Cone	Sel	3	Frame	Shaft 2	97	55	P. steel	3 plain				32x4	32x4

NOTE: *Two-cycle motor.

ADDENDA (too late for classification):

Grabowsky (commercial), $2,300: 24.2 H.P.; 1-ton delivery; 2-cyl. 5½x5 single; tubular, no pump; storage batteries, magneto extra; 4-feed oiler; cone clutch; 2-speed planetary gear; 2-chain drive; 102-inch wheelbase, 56 or 60-inch tread; pressed steel frame; plain crankshaft and transmission bearings, roller-bearing axles; tires 32x3½ inches front and rear.

Grabowsky (commercial), $3,500; 28.8 H.P.; 3-ton truck; 2-cyl. 6x5 single; other specifications as above, except 151-inch wheelbase and tires 34x4 front and 36x3½ dual rear.

McCue-Hartford (American pleasure), $2,750; 5-passenger touring; four cylinders; Bosch magneto and battery; pump lubrication; cone clutch; 3-speed selective change-gear on frame; shaft drive, 1 joint; 123-inch wheelbase, 56-inch tread; pressed steel frame; ball bearings in transmission and axle; tires 36x4 front and rear.

CARS OF THE PALACE SHOW

AMERICAN

*American, *Atlas, Allen-Kingston, Belmont, Black, *Brush, Cameron, *Cartercar, *Chadwick, Coates-Goshen, Cole-Thirty, Crawford, Demot, Empire, Everitt, Fal Car, *Ford, *Gaeth, *Glide, Halladay, *Hupmobile, Inter-State, *Jackson, KisselKar, Kline Kar, *Lambert, Lion, McCue-Hartford, *McIntyre, *Marmon, *Maxwell, Metz, Middleby, *Midland, *Mitchell, *Moline, *Moon, *Mora, *National, *Oakland, *Ohio, Paige-Detroit, Paterson, *Pennsylvania, *Pierce, *Premier, *Pullman, *Regal, *Reo, Schacht, Seitz, *Simplex, *Speedwell, Staver, *Stoddard-Dayton, Sultan.

FOREIGN

C. G. V., Clement-Bayard, DeDion-Bouton, Delahaye, Delaunay-Belleville, Fiat, Hotchkiss, Isotta, Lancia, Panhard-Levassor, Renault, S. P. A.

COMMERCIAL

American Truck, *Brush, Carlson, Chase, Firestone, *Grabowsky, Gramm-Logan, Hart-Kraft, Lansden, *Manhattan, *Martin, Monitor, Otto, Randolph, *Rapid, Reliance, Saurer.

*Members of the American Motor Car Manufacturers' Association.

FEATURES OF TENTH INTERNATIONAL SHOW

Opens New Year's Eve.

Three hundred and twenty-five exhibitors.

Value of exhibits, $1,100,000.

Lowest priced car, $378.

Highest priced car, $10,000.

Expected attendance, 110,000.

Seventy-two exhibits of leading American cars.

Twelve exhibits of foreign cars.

Seventeen exhibits of commercial vehicles.

Fastest American light car, Maxwell.

Fastest foreign light car, Lancia.

Fastest American car, National.

Fastest foreign car, Fiat, 102 miles an hour.

Number of square feet exhibition space, 72,000.

Expected attendance of carriage dealers, 1,500.

Expected attendance of automobile dealers, 4,000.

Thirty thousand dollars expended for decorations.

Exhibit of famous racing trophies, including Grand Prize Gold Cup.

Acceptance from public officials for private view, 3 p. m. December 31, army and navy night, engineers' night, merchants' night and New York night.

Show open from December 31 to January 7, except Sunday.

Decorative scheme, trellis garden effect with 10,000 electric lights, plate glass mirrors, electrical fountain, porte cochere, paintings, palms and potted plants.

Show under management of American Motor Car Manufacturers' Association, with Importers Automobile Salon and Motor and Accessory Manufacturers.

Headquarters during week for American Automobile Association, New York Automobile Trade Association, Bureau of Tours of Automobile Club of America and American Motor Car Manufacturers' Association.

Reasons Why One Should Buy

AMERICAN SIMPLEX: George S. Waite, Sales Manager—Suppose you could remove from the four-cycle automobile engine you are interested in, all valves, guides, springs, noisy front gears, and the other complications incidental thereto and add immeasurably more power, would you not consider that you had radically improved the car, and increased your motoring satisfaction?

You cannot, of course, nor can the man that designed it. But that is exactly what we do in the American Simplex. We eliminate these objectionable working parts and dismiss forever the four-cycle "bugbear," intermittent power.

In design and mechanism, it meets the certain approbation of every engineer who inspects it. In construction, it is sturdy and powerful, adhering to a high standard with a painstaking attention to the most minute details, possibly only in a thoroughly equipped factory and under the supervision of a competent engineering force.

In a word, a manufactured, not an assembled car.

We possess the unqualified endorsement of American Simplex owners all over this broad continent, and in the multitude of counselors there is safety.

If the foregoing statements are correct—and we invite corroboration—there is no reason why an automobile buyer should not purchase the American Simplex motor car.

ATLAS: P. A. Williams, Jr., Sales Manager—The average automobilist to-day demands safety, comfort, silence, style, power, fair speed, simplicity, durability and low maintenance charge—and usually a fair price. The Atlas combines all of these features to a greater extent than any other car.

First.—Safety. Every part of the engine and car is made of the best quality of material—thoroughly tried and tested under severest conditions.

Second.—Comfort. Experience has shown that the three-quarter elliptic spring now being generally adopted and first used in this country on the Atlas cars gives the easiest riding car, eliminating all side sway of the platform springs—the springs of the Atlas are extra long, three-quarter elliptic, made from imported Krupp silicomanganese steel, the best material known for this purpose—which, combined with the long 128-in. wheelbase, gives a car which for comfort has no superior.

Third.—Silence. The absence of external moving parts makes the engine the quietest engine running.

Fourth.—Style. Atlas cars are classy in lines, are highly finished and handsomely upholstered in hand-buffed leather with every convenience and comfort.

Fifth.—Power. The Atlas 60-horsepower engine is the highest-powered engine put into a medium-price car; furthermore, this power is developed at an engine speed of twelve to thirteen hundred revolutions, giving an available power in the hands of the ordinary user for general work and hill-climbing.

Sixth.—Speed. This power gives ample speed for every class of work.

Seventh.—Simplicity. The Atlas engine is the simplest engine built—a crankshaft and two moving parts to each cylinder.

Eighth.—Durability. The Atlas engine will outwear any other automobile engine built. The crankshaft is hardened, ground and polished; the bearings and shaft are indestructible under ordinary conditions and engine parts replacements are unknown.

Ninth.—Low Maintenance. The absence of replacement makes the maintenance cost the lowest.

Tenth.—First Cost. The price is several hundred dollars less than any other car of equal power and quality.

BLACK-CROW: C. C. Darnall, Sales Manager—The all-important reason why a buyer should invest in a Black-Crow car is that by so doing he can get all of the important features, up-to-date improvements, and standard equipment known to the present-day automobile manufacturer at the astonishingly low price of $1,000, within the reach of everyone.

The 107-inch wheelbase affords ample leg room in the body, greatly benefits the riding qualities and gives the car a big appearance. The motor is assembled en bloc with a five-bearing crankshaft, and runs absolutely noiseless. The constant level self-contained splash lubrication system, in connection with a plunger pump, is a late improvement. The multiple-disc clutch, containing a sufficient number of large steel discs and a heavy spring, permits of gradual engagement and is perfectly dependable.

Large honeycomb-type radiator, in connection with spacious water jackets, forms an ideal cooling system. The Remy magneto furnishes a desirable current supply and ignition system. The straight-line shaft drive, in connection with a single universal joint and rear axle transmission, is a construction that is rapidly coming to the front. The selective-type sliding-gear transmission requires no comment. There is not a gear in the transmission of less than ⅞-inch face. The gears are set on square shafts instead of being fastened with keys and the shafts run on Hyatt high-duty roller bearings. Hyatt-roller bearings are used throughout with the exception of the front wheels, which turn on two-point balls.

Control, consisting of two foot pedals, two hand levers and a large steering wheel with spark and throttle control on top of wheel, is just the same as that found in nearly all high-priced, high-grade cars.

Taking the car as a whole, it is a nicely finished, neat appearing, easy riding, smooth running and perfectly reliable machine.

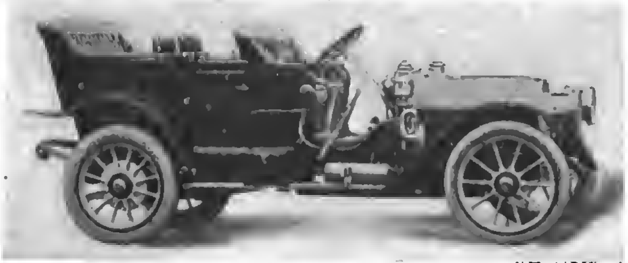
BRUSH RUNABOUT: Brush Runabout Company—Perhaps there is no other automobile which fills the peculiar position of the Brush Runabout. It has been called "everybody's car"; properly so, in view of its general utility, it being used, for illustration, in the plant of the Chalmers-Detroit, for messenger service, delivering material and the dozen and one things for which a serviceable car can be employed around a big plant, and in the doing portrays a condition which should be readily appreciated, *i. e.*, the Brush is a serviceable car, free from complication, easy to start, sure to go, and devoid of annoying complication.

The design of this car differs from the underlying scheme of the average small car, in that it is not a study of some ponderous touring car; it is especially contrived in every particular to serve a utility end. The style and finish of the car, while differing, may be regarded nevertheless, as satisfying, and in road work, whether in pleasure or utility pursuits, the car has proven out. The best argument that can be advanced for the Brush then, all things considered, is that it is selected for every class of use by buyers of acumen, and it is being sold by the thousand, after wide opportunity to find out its qualities, the prime idea being that it is a nimble serviceable automobile.

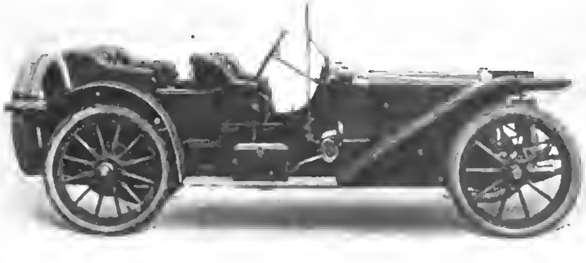
CARTERCAR: W. H. Radford, Sales Manager—The reasons a prospective automobile purchaser should buy a Cartercar are that it will give a maximum amount of service, at a minimum cost in expense and trouble, for the longest time, in the hands of an ordinary user. The car will climb a 50 per cent grade with a full load and will plough through mud holes and sand spots which stall other cars.

Reasons for this are that with a friction transmission, any number of speeds are obtainable and the same ratio of motor power is delivered to the rear wheels on the lower speeds as is delivered on high. Opposed to this, the lower speeds on cars with geared transmission consume a much higher percentage of power when it is needed the most, as in sand, on hills, slippery streets, etc.

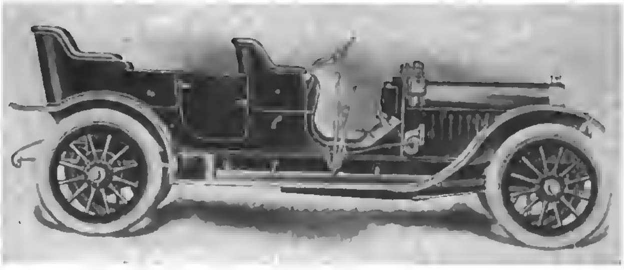
The chain-in-oil drive is practically noiseless and does not require attention except in adding a little lubricant from time to



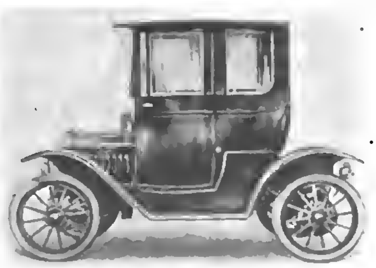
American Simplex Two-Cycle, Four-Cylinder 50-Horsepower



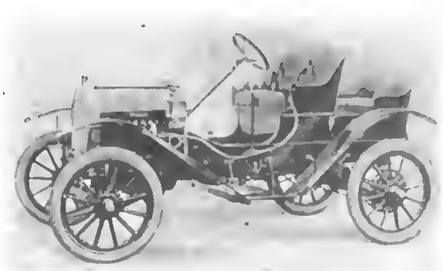
American Traveler Four-Cylinder 50-Horsepower



Atlas Two-Cycle, Four-Cylinder 60-Horsepower



Brush One-Cylinder, 10-Horsepower Model D Coupe



Brush One-Cylinder, 10-Horsepower Model D Runabout

time. An inexperienced driver could operate the Cartercar without injuring the mechanism. The single-lever control avoids the possibility of confusion in operating the car. There is no clutch to slip—no gears to strip—no grease packing—no universal joints—no shaft drive and no bevel gears. Surely a car which is a complete success with these omitteed is a good proposition.

On crowded city streets or rough roads any lower speed could be dropped into with ease and there will be no grinding of gears or racing of the motor.

This car is built along the latest approved lines, has style and snap, is roomy and elegantly finished. The equipment is complete and the value is real.

CHADWICK: M. H. Adams—The Perfected Chadwick Great Six to-day presents a strong appeal to the prospective customer because of a mechanical construction original and distinctive and small details producing a complete and harmonious whole, tending to fulfill every function that would prove desirable in an ideal car.

The control of the car is of wonderful flexibility, cars throttling from seventy (or better) miles per hour on direct, to five, without the slightest skipping or irregularity of running in the engine whatever. The carbureter, the engine control, the clutch, the steering gear, the transmission and the entire driving mechanism of the car have been designed with special reference to ease of handling both at high and low speeds.

It is only by the employment of exclusive designs that many of the serious faults in motor-car construction have been overcome. While ease of control in a high-powered motor car is a luxury, ease of riding qualities is even more so, and the use of a peculiar type of spring design and flexible chain drive, with the correct proportioning throughout the entire car, give ease of riding qualities which are unsurpassed, and are of the very utmost importance in any car capable of high speeds.

Durability as a factor has been carefully considered and worked out after many years of experience. The employment of correct engineering design, the use of the highest quality of special materials, the maintaining of an organization whose standard is the very highest quality of workmanship, have produced to-day a car capable of enormous mileage with minimum upkeep. In any motor car the factor of safety to the individual, the assurance against expense from defective design or material are of the utmost importance. In the Chadwick car are not only embodied that quality of material and workmanship that is a positive guarantee of safety, but throughout it contains details of design and construction which are designed solely with reference to protection against accidents.

On this car the entire steering mechanism is to-day the most carefully designed of any car in the world, and the same attitude is carried throughout the entire chassis. As a rule, a car strong in mechanical design and construction does not have body designs of equal attractiveness, but in the Chadwick car the body designs are beautiful, graceful, and each and every detail of body design is correct in every particular and will satisfy the most discriminating purchaser. The Perfected Chadwick Great Six is to-day offered as the production of an organization whose only aim is to build the very best.

CRAWFORD: Geo. D. Crawford, Treasurer—The following qualities should influence a careful buyer of an automobile to select a Crawford: It possesses the power requisite to a satisfactory car, not only sufficient to enable it to carry its load swiftly and smoothly over the ordinary road, but reserve force equal to all road emergencies.

This power is transmitted through gears made of special grade of nickel steel, tested to stand the greatest strain.

The Crawford will commend itself by its practicability and simplicity of design, eliminating complications, fads, and fancies in mechanism, reducing loss of power from friction to a minimum, and by its beauty of outline, perfection in finish, comfort in riding, and further, in that it offers the highest intrinsic value.

EMPIRE: J. G. Wood—Empire cars were designed to meet the requirements of the man who desires to purchase a car of not only low first cost, but low maintenance cost, realizing that a large per cent. of the maintenance cost of a car lies in the wear and tear of the tires. The Empire cars are built with this primarily in view.

Contrary to the average practice of making small cars extremely light, the Empire Company has added weight where they thought it was necessary. For this reason such parts as axles and parts of the driving mechanism are unusually heavy, in fact as heavy as many of the medium-sized touring cars.

The car is extremely easy riding on account of its spring suspension, which consists of four-sided platform springs in the rear and three-quarter elliptics in the front. This in conjunction with a double sidechain drive practically eliminates undue tire wear, also relieves all excessive strains from the frame and driving mechanism. The double sidechain drive is very neatly installed, the chains being run in pressed-steel housings so that they are absolutely noiseless and give no trouble whatever.

Tire equipment is rather unusual for a car of this price, 32 by 3 1-2 inch size being used all around, q.d. rims being furnished as regular equipment. The car is also equipped with a Remy dual ignition system.

In brief, the Empire cars are extremely well adapted to the use of doctors or salesmen who must take into account the maintenance cost of a car.

GAETH: L. E. Stone, Secretary—We would present the following arguments to convince a prospective purchaser that the Gaeth car suits his purposes:

In the first place our car is the simplest standard, four-cylinder car in every respect now being manufactured.

In addition, due to our limited output each car is constructed, tested, and inspected under the personal supervision of our designer, Paul Gaeth.

Third, our car is equipped with make-and-brake ignition which has proven unique in its simplicity and reliability, and besides is the only make-and-break ignition which will start on the spark in the same manner as the high tension.

Fourth, our thermo-syphon system of cooling has been brought to such a state of perfection that we have absolutely no trouble in cooling our motor under any circumstances of usage. This system eliminates the necessity of a pump with its troubles.

Fifth, the greater part of our car is manufactured and finished in our own shops.

Sixth, we use every effort to make our car as well finished in all details as any machine upon the market, irrespective of price.

Our machine is constructed of the best obtainable materials, and in such a manner that there can be no question as to its long life, durability and satisfaction.

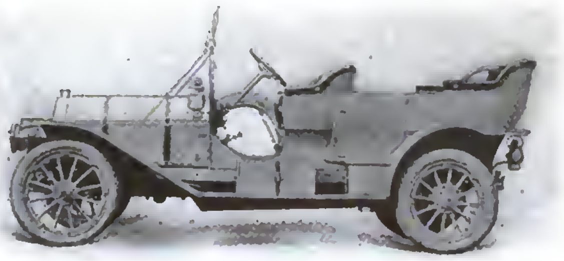
GLIDE: R. A. Whitney, Sales Manager—In presenting the 1910 Models of the Glide to the public, we shall continue to stand on the platform of "Quality" backed up by a long and growing list of satisfied users scattered over the entire United States.

Our nine years of experience in manufacturing Glide cars has been a constant progress of eliminating weak points and substituting those features which have been found worthy, until the Glide stands to-day fully standardized, perfect in detail, and offers a full dollar of value for every dollar of price asked.

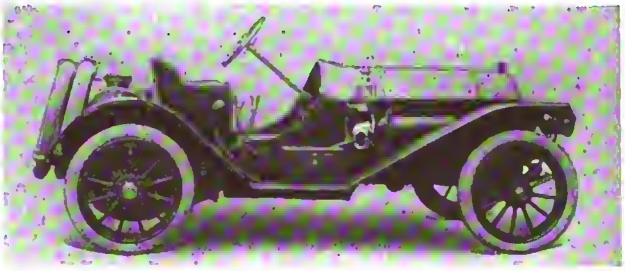
The Glide has pioneered many of the basic features now used successfully by some of the best American cars and we cheerfully invite comparisons, irrespective of price.

We have found no radical changes necessary in our 1910 Models, such changes being rather in refinement of detail and finish. The body lines have been refined, weight reduced, frame and body lowered without reducing the road clearance, larger tires and a straight-line drive, steering wheels are larger and all woodwork of Circassian walnut. The 1910 Glide has a dozen other features, every one of which are real improvements.

We guarantee satisfaction. We guarantee every piece and

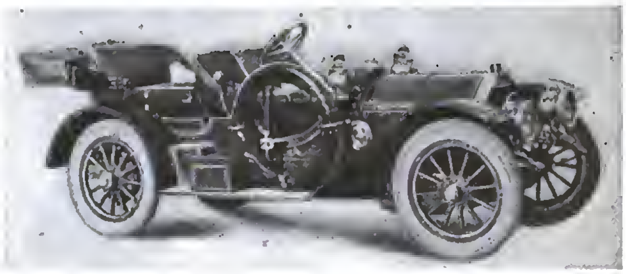


Chadwick Six-Cylinder 60-Horsepower Touring

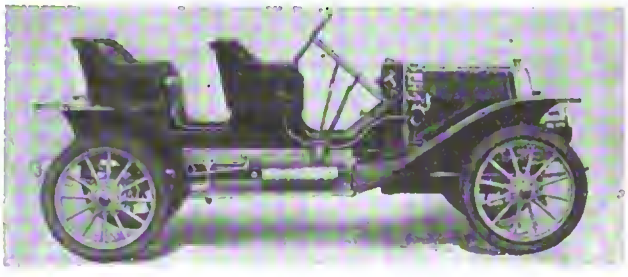


Chadwick Six-Cylinder 60-Horsepower Runabout

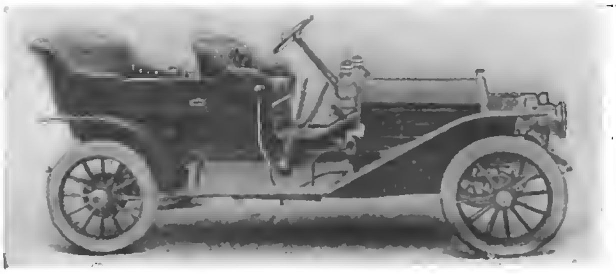
Chase Two-Cycle Three-Cylinder 20-Horsepower



Coates-Gosken Four-Cylinder 32-Horsepower

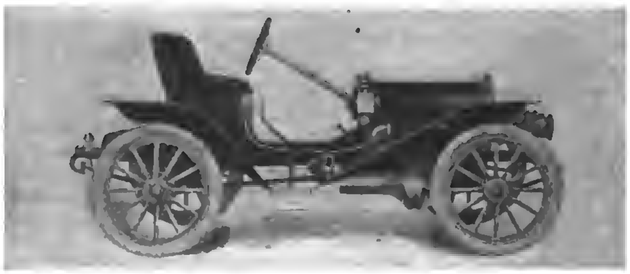


Cole "30" Four-Cylinder 30-Horsepower Touring

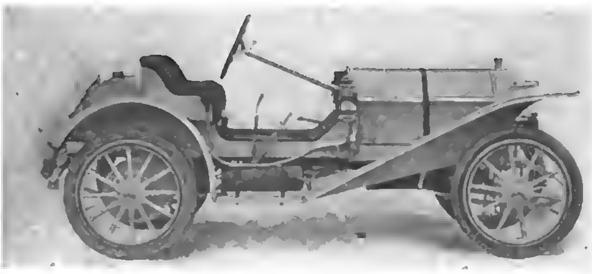


Crawford Four-Cylinder 30-Horsepower Touring

Cameron Air-Cooled Six-Cylinder 36-Horsepower



Demot Two-Cylinder 10-Horsepower Runabout



Empire "20" Four-Cylincer 20-Horsepower Model B

Everitt "30" Four-Cylinder 30-Horsepower Touring

part of a Glide car for one year free of defective material and imperfect workmanship, and will make good if such a piece is found.

Glide cars are now built throughout in our own shops, and with our new factory giving us 85,000 square feet of additional floor space, we feel the Glide is just entering on a new era of prosperity and that we are in a better position than ever before to make prompt deliveries and meet the demands of our agents and customers.

HOLSMAN: George E. Sherman, Advertising Manager—If you are looking for a practical, every-day-in-the-year car, that will negotiate all kinds of roads in all kinds of weather, you should buy a Holsman, because of its:

1. Solid Tires—which eliminate the enormous cost and trouble attendant upon the use of pneumatics. The high, flexible wheels make easy riding.
2. Simplicity—No differential. No transmission gears. No clutch. Easy control.
3. Direct Drive—from motor shaft to wheels on all speeds.
4. All-Ball-and-Roller-Bearing Motor—friction bearings and connecting rods being entirely eliminated.
5. Superior System of Lubrication—gasoline solution.
6. Economy of Up-Keep—on account of small number of parts.
7. Durability—many Holsmans have been in daily service six and seven years.
8. Hill-Climbing Ability—look up our Algonquin hill-climbing records. The direct drive, the high horse-power as compared to the weight of the car, and the application of that power near the outside rim of the rear wheels (where the greatest leverage is secured) make the Holsman able to go through sand, snow, slush and mud and up any hill ordinarily traversed by horse-drawn vehicles.

HUPMOBILE: R. C. Hupp—The real reason that the manufacture of the Hupmobile was decided on was the direct result of the experience the writer had in the production of cheap cars. In years gone by it has been assumed that as a man did not pay a high price for an automobile he could not expect to have it stand up. The cheap cars were always spoken of as being very good cars "for the money." In a great many cases these cheap cars were of pretty good size; in fact, they nearly always were heavy. The cheap cars without exception had planetary transmissions and used dry cells for ignition.

A small car was therefore mapped out by us in which we incorporated only the very best material. Our drawings specified close work, and the result was that we found we could build a small car of the highest grade at a low price. We discovered one thing absolutely, and that is that the bigger the automobile that is made right, the more it will cost. By placing our seats well back and using a patented spring suspension we found that we could carry two large people to the very best advantage. After having produced one thousand cars we find that this car has opened up an entirely new field in the automobile business. It has absolutely dissipated the former idea that a small car cannot be made well. and appeals, not only to people in moderate circumstances, but has become very popular with those who maintain large cars and wish the small car for general use.

INTER-STATE: C. E. Easton, Advertising Manager—Principal among the reasons why a man should buy an Inter-State car is the fact that we started in the automobile manufacturing business at a time when motor car practice had become standardized, and we incorporated in our first models only those features which had been tried out and found satisfactory.

The most important reason for our ability to give greater value is that the reliable features which have been developed by countless experiments made by the motor car trade were at an enormous cost to themselves. By embodying these features in our first models it enabled us to give more motor car for the money than even the older manufacturers.

Then in our new models we have further refined the high standard of design, material and workmanship, making it a high-grade car at a moderate price. These refinements consist of more power, longer wheelbase, adoption of three-quarter spring suspension, rolling push rod contact, multiple disc clutch of 63 tempered steel plates and 6 springs, eliminating the possibility of the weakening of a single spring construction.

A unit construction is carried out from the point where the power leaves the motor to the rear wheels. This transmission and axle system is practically as strong as if the complete system were one single casting or forging, as all connections and flanges are designed to give the highest factor of safety possible.

The transmission is especially interesting from the fact that the clutch and gear set are contained in a single aluminum case. The gears are of vanadium steel and are one size heavier than have ever been used before. This eliminates wear and breaking of gears, but does not decrease the ease of shifting, as all engaging teeth are chamfered with an improved curve.

Other features of particular importance are the centrifugal pump integral, with crank case; the rotary gear oil pump outside of crank case, giving perfect accessibility; the high tension imported U & H magneto. All of this equipment is located on one side of motor and driven by one shaft, the simplicity and perfect alignment of these parts being at once apparent to any one lifting the hood.

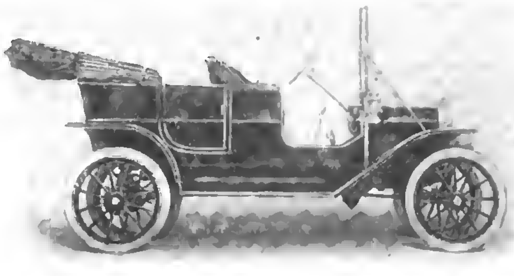
Last, but not least, a perfect interchangeability of parts. This is accomplished by our almost perfect machine tool equipment, as at the time of installing these machines the machine tool trade had produced automatic machinery especially adapted to automobile manufacture.

JACKSON: Jackson Automobile Company—From the agent's point of view, the Jackson offers attractions, among which a line of cars covering the requirement, most thoroughly, there being 50, 40, and 30 models, and the "30," which is intended to be a popular car, has a magneto in the ignition system as well as many other refinements, which, but a year or two ago, would have to be searched tor in high-priced "foreign" automobiles.

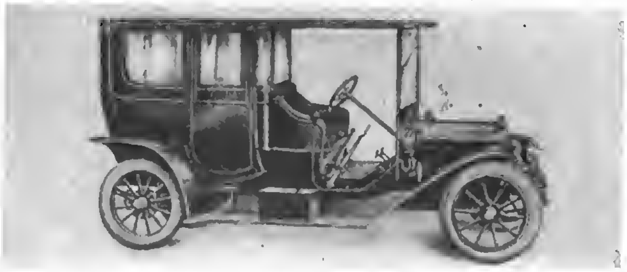
Then, in Jackson cars, of all models, there is a certain harmony from the engineering point of view, which, for that matter, would be of small avail were it not for the Jackson policy of having in the shop a wholesome respect for the intentions and demands of the engineers who lay out the cars. But, even good intentions, in the absence of good facilities, would count for naught; in the Jackson plant, as well as fine machine tools with which to do the work, there is a wide equipment for use in drop-forging the parts, and with this equipment, attended by a heat treatment department of competence, the engineer has but to say the word and he may have anything he indicates.

Prompt delivery, if it does not mean hurry, is worth more than a little, and, in the Jackson plant, in view of the scope of facilities offered, there is ample evidence of ability to deliver without having to stint the process. Materials, such as should be used in automobile construction, are available in the Jackson storeroom in quantity sufficient and to spare. The purchasing department, acting in conjunction with the engineering department, settled this important matter many months ago, and purchasers, as well as agents, are now in a position to reap the reward. Jackson results is what they will get, and the Jackson reputation is not at stake.

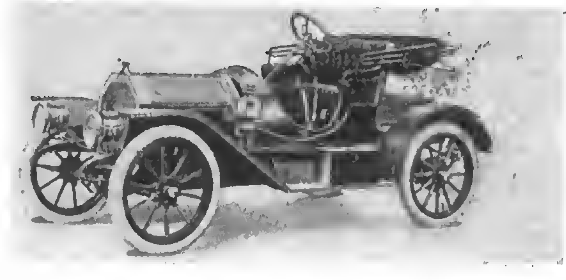
KLINE KAR: William P. Seig—The Kline Kar 40-50-horsepower car is the best offering at anything near its price because it is the only six-cylinder motor with en-bloc system, a bearing between each cylinder and each cylinder removable, one independent of the other, and includes in its specifications: 36-inch wheels, 122-inch wheelbase, three-quarter scroll elliptic springs, selective sliding gear transmission, two separate systems of ignition, including Bosch magneto, and single unit coil with switch located on the steering column, flat tube cellular radiator,



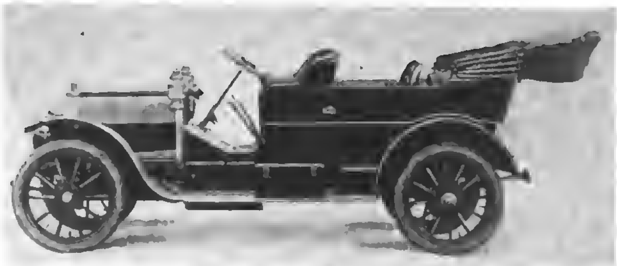
Ford Four-Cylinder 20-Horsepower Touring



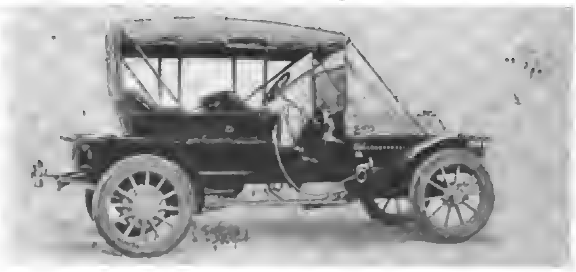
Firestone-Columbus Four-Cylinder 25-Horsepower



Firestone-Columbus 35-Horsepower Runabout



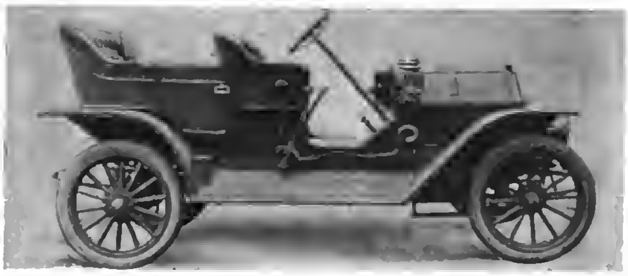
Gaeth Four-Cylinder 38-Horsepower Touring



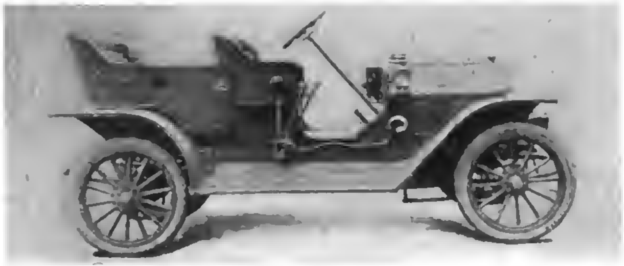
Gilde Suburbsn Four-Cylinder 40-Horsepower

Hupmobile Four-Cylinder Light Roadster

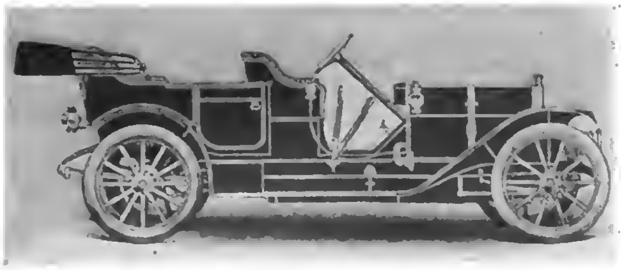
Inter-State Four-Cylinder 40-Horsepower



Jackson "50" Four-Cylinder Touring



Jackson "30" Four-Cylinder Touring



Kline Kar Six-Cylinder 40-Horsepower

11-inch road clearance, full floating rear axle, "I" beam front axle, high-grade finish, best grade hand-buffed leather upholstering.

Rushmore lamp equipment, straight line body, the lines carried out inside the tonneau, giving ample room for the occupants, thus eliminating cramped positions. The dash, hood strips, rim on steering wheel, coil box, strip on top of tonneau doors are all made of Circassian walnut, alloy of steel used throughout, and, in fact, everything installed in the car is the best that money can procure and skilled mechanics can manufacture.

McINTYRE: George F. Lemon, Sales Manager—Having been asked why a man should buy a McIntyre, the writer would like to know in return why a man should *not* buy a McIntyre. Never having been in the market for a motor car, we may not have the correct viewpoint, but it would seem that a purchaser of one would be largely governed by the same principles that apply in the purchase of any other article. Most purchases are made, we think, from the buyer forming the opinion that the article he is purchasing possesses merit to a greater degree than competing articles, thus putting the article to be purchased on a comparative basis.

There are no secrets about motor car construction. The materials which enter into such construction may be bought in such quantities as may be desired (if one is lucky and places one's order far enough in advance), and of such varying degrees of goodness as may be desired. No one manufacturer has a monopoly of labor, skill, or brains, consequently it would seem that the production of a good motor car would be dependent (as is most other lines of manufacture) upon the tendency of the manufacturer to give the most in quality and quantity for the money.

We have assumed that we could manufacture a four-cylinder motor car and sell it for $1,400 which would embody every detail of simplicity, comfort, and quality. And in designing the McIntyre 30 we have borne in mind all that has been accomplished by other manufacturers—and, as stated before, there is no uncertainty as to what constitutes goodness in automobile construction. For instance, it is pretty generally conceded that transmission gears, etc., shall be made of a certain quality of nickel steel, that an open-hearth steel, free from phosphorus, silica, etc., and running rather high in carbon, makes the best crankshafts; that a wheelbase of at least 112 in. is necessary to have an easy riding car; that 36-in. wheels are better than 32 in., and so on.

In offering the McIntyre 30 we are offering a car which possesses absolutely every feature possessed by any five-passenger car, except that of extreme speed—so we would like to know why shouldn't a man buy a McIntyre, when by so doing he can save anywhere from $300 to $1,000 and get everything that is to be had at any price, except great speed, in a five-passenger touring car.

We know this is a mighty broad statement, but we say it advisedly and with a full understanding of its meaning in every particular. A great many men who know something of motor car construction have asked the writer how we can give so much car at the price. There is a reason, of course, but it is another story. Suffice it to say that we do it. While this refers particularly to the McIntyre 30, it is also true and to the same extent of the McIntyre 20 at $600.

Again we ask, why shouldn't a man buy a McIntyre?

MARMON: Nordyke & Marmon Company—The Marmon "Thirty-two" is moderate in size, power and weight—consistent in price. Designed and manufactured entirely by a concern of sixty years' manufacturing experience, whose products enjoy a world-wide reputation second to none.

This Marmon car is manufactured from the best materials obtainable, and the workmanship is of the highest order. The proof of this is apparent to any one who will take the trouble to see for himself by visiting the factory. It is the easiest riding car in the world—those who own it say so; so do those who ride in it. It is easy on tires, because it is properly proportioned in weight with reference to power and capacity. It has a simple, economical and unfailing oiling system—a system found only in the Marmon car. The brakes are more than adequate. The rear system is simple, clean-cut and very accessible. The body is of cast aluminum and steel—far more substantial and better finished than usual.

The stability of the car has been proved beyond question by its success in the hands of users, and notably by its showing in Glidden tours and many endurance contests, and by winning many long races on track and road.

MAXWELL: C. W. Kelsey, Superintendent of Sales—All automobile salesmen are alike in that they are naturally prejudiced in favor of their own article and see their competitors' goods only in a distorted way, magnifying their faults and minimizing their good points, so that it is hard for a prospective customer to get honest opinions. Owners are likewise biased in favor of the cars that they have; thus the buyer, oftentimes handicapped by the lack of mechanical knowledge, is in no position to judge, and buys the car handled by the best salesman.

Now, in order to reach all classes of customers and to avoid, so far as it is possible, these natural prejudices, we will compare our car with those high-grade, high-priced American machines which on American roads and under American conditions stand to-day pre-eminently in the highest ranks, namely, with the Packard, Pierce and Peerless.

Take, for instance, the Maxwell motor. In general design it is almost exactly like all of these. The cylinders are of the T-head vertical type, with the valves on opposite sides interchangeable and mechanically operated, and cast from gray iron. On all of these cars this type of cylinder is used. The crankshafts on the Maxwell car are drop-forged, heat-treated and ground to one one-thousandth part of an inch and run on multiple bearings, all of which is precisely the same as will be found on other cars.

Crankcase and transmission case are cast from aluminum alloy. This same material is likewise used on these other machines. In our transmission we find one of the greatest variations, but so far as the material and its treatment is concerned they are alike, even to the sand blasting which the gears receive.

The clutch on our cars is different from those employed on any of these, but then every one of the above employs a clutch different from every other. We use the multiple disc type running in oil. We have never used anything else.

The Maxwell radiator is of the cellular type which is found on all three of these cars. It is just as finely constructed, and costs in proportion to its size just as much.

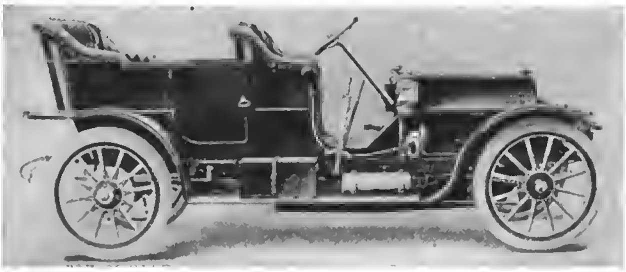
We use an American-made magneto instead of an imported foreign one, as these cars do. We believe that this magneto will give equal results. On the Maxwell car that ran 10,000 miles without stopping its motor we used one of these, and it proved up to our entire satisfaction, giving absolutely no trouble.

The drive from our transmission to the rear axle is the same as is used on all of these cars—that is, a shaft drive with two universal joints. Our rear axle is the standard live type.

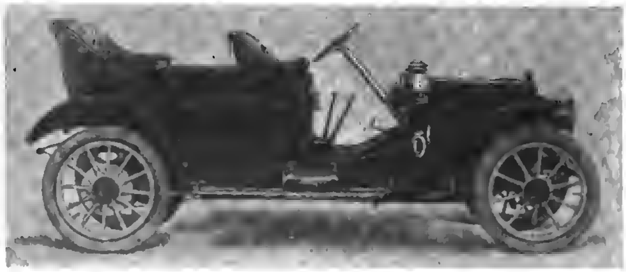
The bodies on all Maxwell cars are made of steel instead of aluminum, as is the case on some of these high-priced cars. The difference is that the aluminum costs more and is lighter, but it has not the strength the steel has. The painting of these bodies is much the same in all plants, though our bodies are sand blasted in order to make the paint adhere permanently. All receive approximately the same number of coats of paint.

Maxwell bodies are upholstered in real leather, using real hair for stuffing. This leather is of excellent quality. It does not cost us, however, as much as the specially finished enameled leather used on our more expensive competitors.

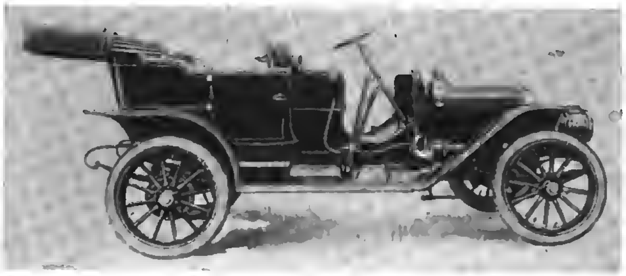
All machinery parts in our cars are as accurately made and of as good a quality material as can be furnished. All revolving and reciprocating parts, like the pistons, piston rings, crankshafts, push rods, cylinders, etc., are ground. The material varies



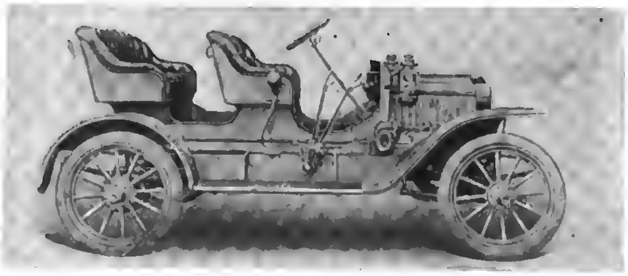
KisselKar Four-Cylinder 40-Horsepower



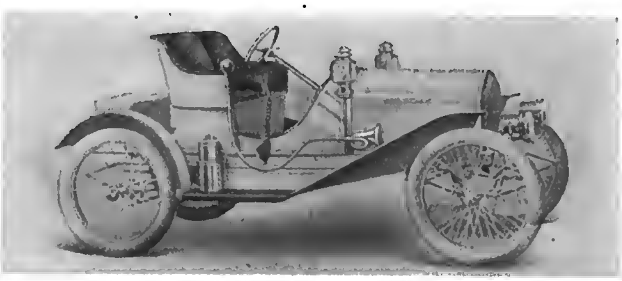
Marmon "32" Four-Cylinder Touring



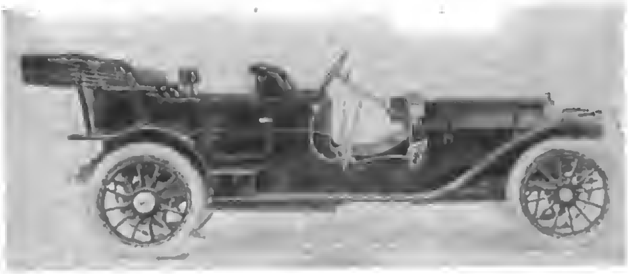
Maxwell Model E Four-Cylinder 30-Horsepower



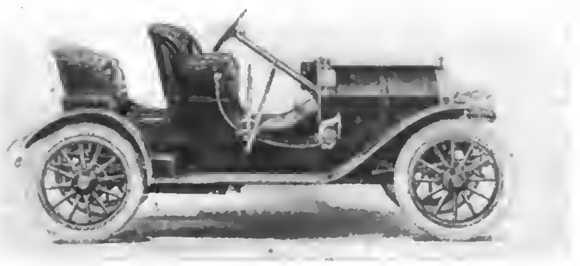
Maxwell Model Q Four-Cylinder 22-Horsepower



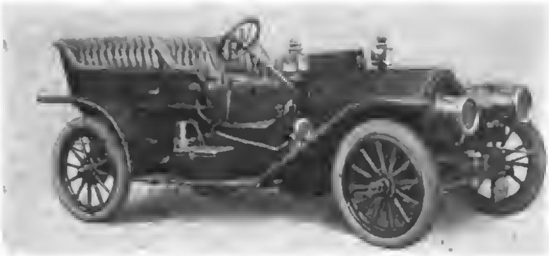
Metz Two-Cylinder 10-Horsepower Runabout



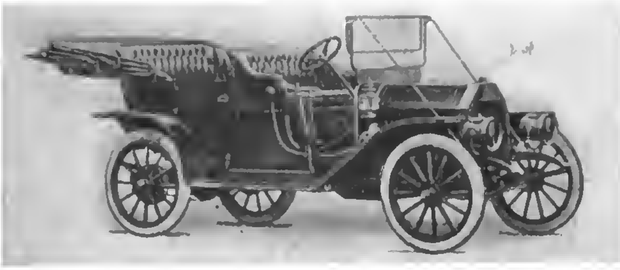
Mitchell Six-Cylinder 60-Horsepower Touring



Mitchell Four-Cylinder 30-Horsepower Runabout



Middleby Air-Cooled Four-Cylinder 20-Horsepower



Moline Model M Four-Cylinder 30-Horsepower

Mora Light Four-Cylinder 40-Horsepower

with the different parts, from chrome vanadium to ordinary cast iron, each one of the best for its particular purpose.

Now you will say, if you use the same material and your workmanship is just as good, why the big difference in price?

Well, in the first place, our material is only the same in the vital and important mechanical parts, like the axles, motor, transmission and frame. We save on our bodies. We have by using steel shifting levers, brass plated, instead of solid brass, and so on, and of course with our three enormous plants, with their magnificent equipment, and our tremendous capital, we are enabled to manufacture practically every part in our own shops. This, of course, saves us the profit, parts manufacturers would make were we to buy outside. But the real economy comes in the great quantities which we manufacture and sell.

Our output is three times the output of the Packard, Pierce and Peerless combined. We have only one sales organization for all of these cars, instead of three for one-third the number. Our advertising only costs us what any *one* of these companies would spend. We have only one president and one general manager to pay instead of eight, and then you must remember that when you buy a Tiffany setting you pay for the name "Tiffany." There is no charge for the name "Maxwell" on a Maxwell car.

METZ: C. H. Metz, President—No argument will induce the man who longs for a palace and who has the means to acquire and maintain it, to put up with being in a modest cottage.

The expense of maintaing our little car in comparison with the big tourist is in about the same proportion as the cost of dwelling in a cottage is to the luxury of living in a mansion.

If it is a matter of how many miles per dollar for your automobile use and pleasure, we can figure as close as anyone in the business, and our statements can be substantiated. We do not pretend to tell you what you should purchase, but you owe it to yourself, if your means are limited, to ascertain which car will carry you the farthest with the least trouble and expense, coupled with the greatest amount of comfort. This is what we had in mind when we designed and built our light and serviceable Metz car. That our judgment has been sound is evinced by the recent almost universal tendency abroad for smaller and lighter automobiles.

MIDDLEBY: Middleby Auto Company—Among tbe many reasons why a man should buy our make of car is the fact that we are making a car at a low price, but at the same time giving material and workmanship that goes into a car for twice or three times its price. All the cars of our latest type that we have on the road are giving perfect satisfaction, proving themselves to be cars for all kinds of roads and country.

Another reason that a person should buy a Middleby car is because he can use same all year around without being troubled with the same heating in the Summer time or freezing in the Winter time.

Another reason is because it costs less to maintain than many of the cars made.

MITCHELL: James W. Gilson, Sales Manager—Now that the pendulum has swung around to the popular-priced car, the capacity of the immense Mitchell factory is being taxed to the utmost to supply the demand. Beginning in 1905, just 350 automobiles were marketed. In 1906 the number had been increased to 666, officers of the concern practically planning to increase production twofold each year. The ratio was maintained the following year, the 1907 output being 1,367. In 1908 the production was 2,166 cars despite the hard times, while the 1909 supply was a trifle more than 3,000 cars. The output of 1910 models of all kinds will approximate 6,700 cars, or $7,000,000 worth in round numbers.

Arguing backward from all this demand, which has been built up in a natural and reasonable manner, we think that this slowly but constantly increasing demand for our product on the part of past users and their friends among whom tbey have spread the good word, speaks more highly for the car than could volumes and volumes without end of exaggerated statement.

When the new six-cylinder car to sell at $2,000 was anonunced, the plans called for but 500 of them in 1910. The preliminary announcement brought orders for 1,000, so that the material was ordered on this new basis. Now, it appears as if this would be insufficient to go around. This, like the story of our steady growth, argues strongly in favor of our product, that is, the fact that people want it should mean that it is worthy.

MORA: W. N. Freeman, Treasurer—The reasons why a man who is in the market to purchase a strictly high-grade car of medium size and weight and at a moderate price should place his order for a 1910 Mora is because there is in all the world no power plant like this:

A motor than which there is none better built.

A selective type transmission of same design as has been used in Mora cars for past two years, without replacement of a single gear.

An aluminum pan construction which has been thoroughly tried and tested for four years, supports motor and transmission, keeping both in absolute and permanent alignment, making a unit construction and holding everything in an accessible position to get at as well as serving as a positive mud shield. Completely housed direct shaft drive from selective type transmission to rear axle. Excellent brake construction and spring suspension. Proper arrangement for passenger load with close coupled tonneau, lending luxuriously easy riding and economical wear on tires. Mechanical construction that is right combined with exterior lines graceful and finish strictly high grade.

Very briefly stated the above are a few of the reasons why the 1910 Mora should appeal to the prospective purchasers.

Our company's motto is not how many cars can we build, but how well can we build them.

We court comparison of the Mora with cars selling at twice the price. After careful comparison, we believe, the man who knows will come to the conclusion that the Mora furnishes the greatest value offered for 1910 in high-grade cars.

NATIONAL: National Motor Vehicle Company—The National is available to that class of buyers who want to go fast and far. The motor is designed with large valves, they being fully half the diameter of the cylinder, in diameter. As a result, considering compression, setting of valves, shapes of cams, and the desired accuracy of machining of parts, the motors of this make have torque in proportion to speed, even when the speed is approaching 2,000 revolutions per minute.

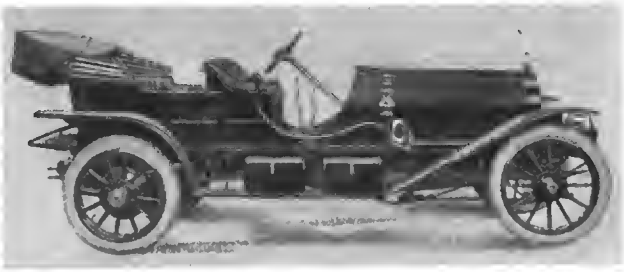
Desiring to deliver automobiles of great power, which is a matter of properly designing the motors, makes it necessary to select the material with great care. As a result, in National crankshafts, for illustration, the material is absolutely without a peer, and the design is that which assures long life, it being the case that the crankshafts are statically, and in a kinetic sense, balanced.

Motors of the National characteristics require profuse lubrictaion, and in the National this matter has been handled without gloves. A competent gear pump, located in the under half of the motor case, delivers the requisite amount of oil to every part to be lubricated, and, in order to tell the driver where he is at, a sight glass is located on the dash, through which the oil must flow on its way. Before National automobiles are delivered to agents or users they are given a thorough test in the shop and on the road, and it is the aim of the maker to have perfect harmony among the cars which make up the product of the National plant. The chief engineer at the National is there for the purpose of fixing quality and he fixes it.

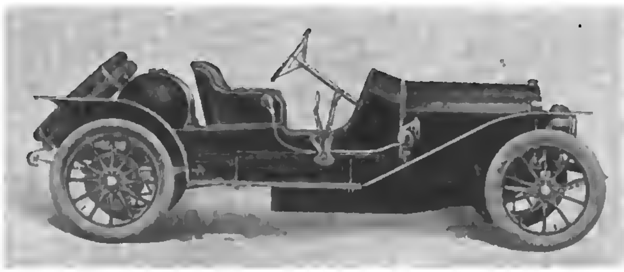
PAIGE-DETROIT: Fred. O. Paige, President—In designing the Paige-Detroit roadster, the aim has been to give the public a perfected vehicle, simple in construction, easily controlled, durable and comfortable for the rider.

McIntyre Four-Cylinder 30-Horsepower Touring

Ohio Four-Cylinder 30-Horsepower Touring



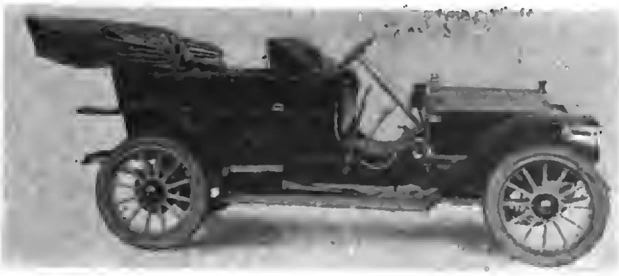
Pennsylvania F Six-Cylinder 54-Horsepower

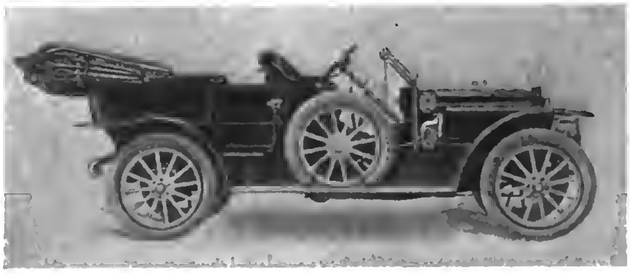


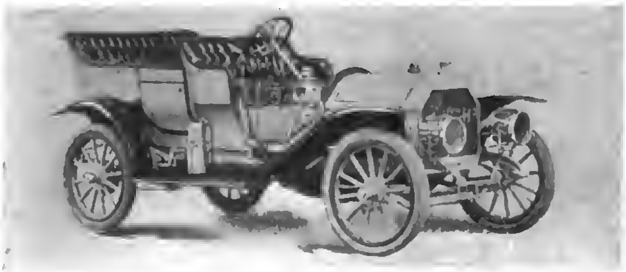
Premier Four-Cylinder 40-Horsepower Runabout

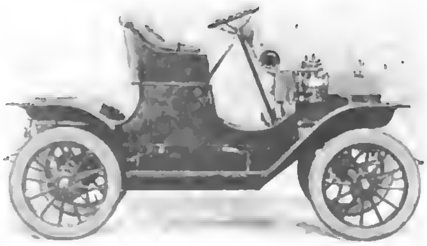
Premier Six-Cylinder 60-Horsepower Touring


Paterson Four-Cylinder 30-Horsepower Touring


Pullman Four-Cylinder 35-Horsepower


Rambler Four-Cylinder Touring Car


Regal Four-Cylinder 30-Horsepower Touring


Reo One-Cylinder 10-Horsepower Runabout

Our motor is of the valveless, two-cycle, three-cylinder type, thus eliminating over one hundred working parts, found in all four-cycle motors, such as valves, cams, rollers, push rods, rocker arms, springs, etc., with all their bearings and gears, all of which must be kept in good working order. These are the parts which make trouble and require constant attention. The three-cylinder two-cycle engine gives the same results as a six-cylinder, four-cycle.

Spring construction of the Paige-Detroit roadster is a very important feature of the car.

The car in general appearance equals the $3,000 and $4,000 cars.

PARRY: Max. Parry, Advertising Department—Maybe Jack went up the beanstalk, but he would have hustled mighty hard to follow the growth of the Parry Auto Company at Indianapolis. His rival is no other than D. M. Parry, famous as a leader among manufacturers, who incorporated this company last July for $1,000,000, and after gathering about him his corps of designers, mechanics and officials, as well as the superintendent of the greatest auto factory of to-day, he told his dream.

These three facts would allow him to give away more of a car for $1,285 or $1,485 than all others. First, the production must be limited to two models, a roadster and a touring car. Secondly, there should be no experiments to charge to the buyer, and lastly, the 5,000 cars to be produced would permit close figuring on stock, wherewith he ended, "Let's call it the Parry idea."

Then things began to happen. The "idea" grew until in 90 days Mr. Parry was working 350 men, occupying 24 acres of buildings and delivering finished cars to agents. Even as we chronicle these events, the factory is shipping out over 10 machines a day and fast approaching the summit of the year's efforts when every night will close on the production of 35 cars.

A proof of the recognized ability of the Parry Company came in requests for $4,000,000 worth of cars within 30 days after its announcement. The public is demanding a medium-priced car and will certainly take kindly to such as the "Parry," where plenty of power is combined with a pleasing balance of design.

The factory, lately vacated by the Standard Wheel Works, is composed of little over a mile of busy floor space upon which you may watch the complete growth of an automobile. The Parry Company machines many parts, such as crankcases, cylinders, tools and jigs. Motors are assembled at the shops and then set up in a prepared chassis, whereupon the tester breaks it in on the Parry track.

The Parry claims distinction in having a 4 1-4 x 4 1-2-inch motor, which, according to A. L. A. M. rating, owns 30-horsepower. Besides this the valves are in the head, a fact that means less heat and more power. The motor rests on a wheelbase of 116 inches and over this sets a low gray roadster or a big blue touring car. It will be interesting to watch whether this new company can turn out the proposed 5,000 cars. At present the plant is running in a most satisfactory manner and daily gathering momentum for its tremendous schedule. At its head is a capable manufacturer and if you ask him he will smile and tell you it's really too easy.

PIERCE: J. G. Cowling, General Manager—In presenting our Model "K" Pierce-Racine car to the public for 1910, we do so with every confidence, having "tried it out" under all sorts of conditions, in all weathers, and on a great variety of roads.

We have in no way attempted any freaks in our construction, but have confined ourselves to what we consider, from our long experience in motor building, the best of mechanical practice. All working parts have been tested out severely, both in the laboratory and on the road, and the fact that we guarantee the car for one year against breakage due to imperfect parts and workmanship indicates our belief in it.

The motor is the culmination of fifteen years of motor building, and the result is a quiet, smooth running and powerful engine that will take the car anywhere.

No expense has been spared in carrying out the details of construction, such as finish and equipment. Particular attention has been given to spring suspension and balance, and the whole represents a perfect motor car that will satisfy and endure.

PREMIER: H. O. Smith, President—There are numerous reasons why a discriminating buyer would be partial to a Premier, a few of the reasons which we might mention as to "Why buy a Premier," and are valuable to the intending purchaser, especially one who had not previously owned a motor car, as follows:

Because the Premier has fulfilled every promise by performance.

Buying a Premier car is an investment that pays to the buyer big dividends in service and satisfaction.

To prove why one should buy a Premier, the car has been entered into every reliability and endurance contest that promised special difficulties.

Its showing for consistency and reliability in these contests has been second to none.

Because the Premier makers have backed up every assertion they have ever made by performance and not promises.

Because every ounce of material that enters into the construction of the Premier car is the very best that can be obtained from any source or at any price.

The Premier's showing in the reliability contests is a record of consistent performance which is second to no car in the market at any price. These contests, with the observers and the technical examination, provided at the conclusion, not only show up the car and how it stands up in comparison with other cars, but is a test of every part entering into the car, and the proof of the way it stands up in service in the combination.

There is a reason for good showings as well as bad showings. A car after all is only a combination of the several necessary parts, and the whole combination is no better than each and all of the parts.

We believe that the Premier can be judged by any feature of the car which should serve as a criterion, and the proof of the value of these several parts is shown in the results which have been obtained from Premier cars.

This proof, which amply supports the worth of every part of the Premier, should we believe be sufficient grounds for deciding upon the purchase of a Premier car.

PULLMAN: H. R. Averill, Asst. General Manager—The most potent reasons why *your* automobile should be a Pullman are best expressed in the two slogans adopted by its makers—"Not only the best at the price, but the best at any price" and "Some cars cost more to buy, but no car costs more to build."

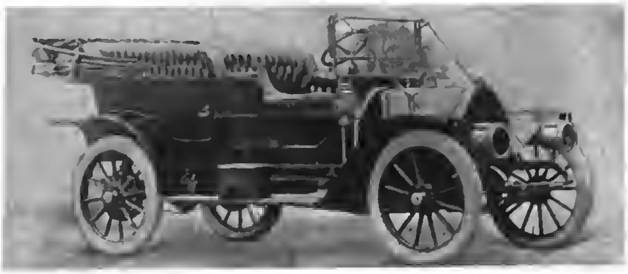
The fact that Pullman automobiles are made and not assembled by the Pullman Motor Car Company is another very good reason, for every part of these famous automobiles is made under the direct supervision of some officer.

Everything of the best is used in their making, and the broad guarantee under which their agents sell makes unsatisfactory dealings almost impossible.

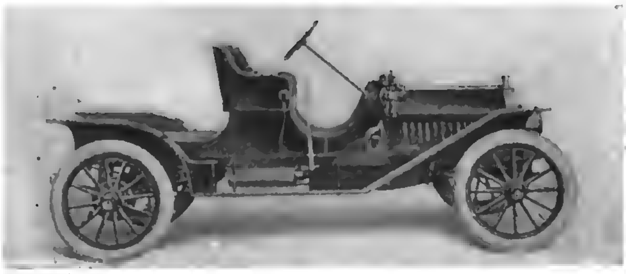
It is, without question, the ideal family car and to those who seek speed and power they have a model that fills the bill.

It is the winner over 40 times in contests for speed, reliability and hill-climbing, often demonstrating its superiority over other cars of twice the horsepower and cost.

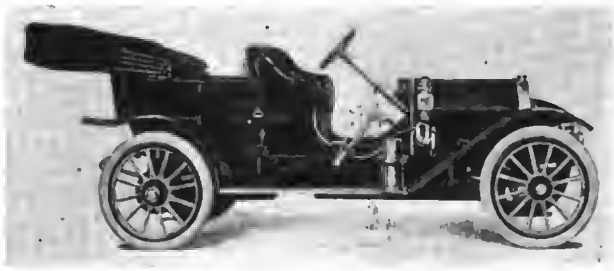
Prospective owners or owners dissatisfied with their present cars will find keen satisfaction in having one of the many agents give them a Pullman demonstration, and it is well worth bearing in mind that when you start anywhere in a Pullman, you get there in the same Pullman.



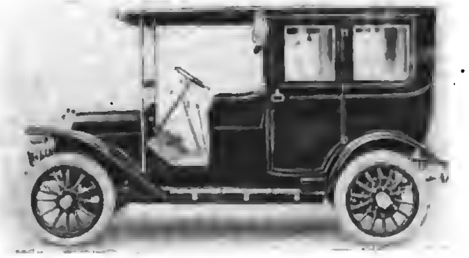
Reo Four-Cylinder 35-Horsepower Touring



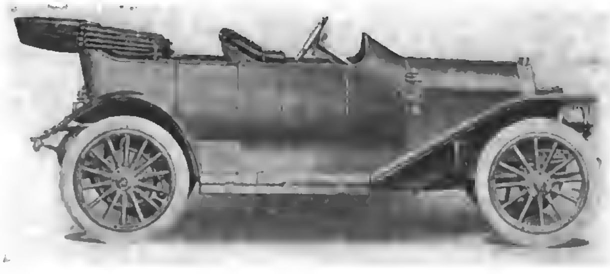
Schacht Model S Two-Cylinder 21-Horsepower



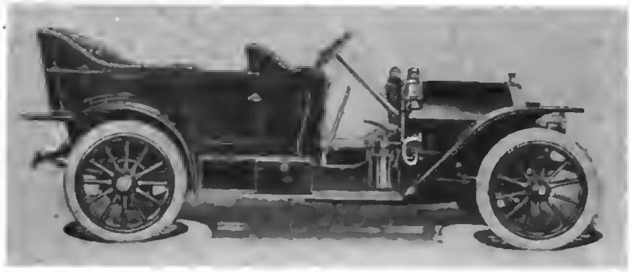
Staver Four-Cylinder 25-Horsepower Touring



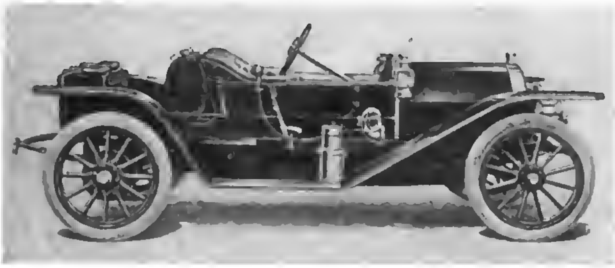
Stoddard-Dayton 10-T Four-Cylinder 30-Horsepower



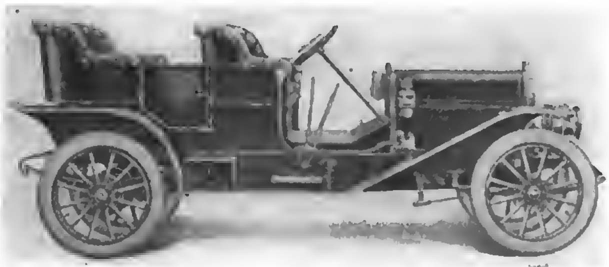
Stoddard Dayton 10-K Four-Cylinder 50-Horsepower



Speedwell 10-D Four-Cylinder 40-Horsepower

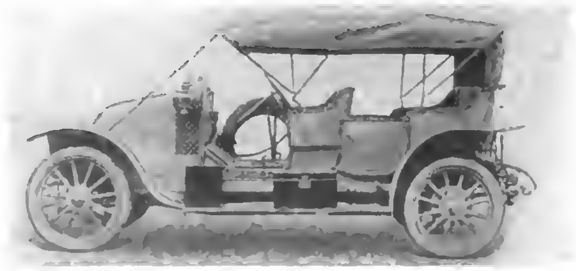


Speedwell 10-D Four-Cylinder 40-Horsepower



Black-Crow F Four-Cylinder 24-Horsepower

McIntyre Two-Cylinder 20-Horsepower



Renault Special Four-Cylinder 35-Horsepower

REGAL: N. I. Taylor, Advertising Department—Some years ago the Regal Motor Car Company built the Regal "30," the first four-cylinder 30-horsepower car to be sold for $1,250; the original car in its class. We have always more than maintained our leadership in this class, leadership in quality, style and perfection of all working parts. The Regal "30" of to-day is not a new car, but an evolutionary product, a good car with years of experience back of it, which has been continually improved and refined, until to-day it stands unquestionably recognized as the greatest automobile value in America for $1,250.

You should buy a Regal "30," because we positively know that in buying a Regal car you get better value for $1,250 than you can duplicate in any other car listed at less than $2,000. Its perfect construction, superior quality of material used, beauty of design and easy riding qualities most readily recommend it to the most exacting buyer. The Regal "30" is a beautiful traveler on rough roads and an exceptional hill climber.

Anything you want in any car at any price you'll find it in the Regal. Regal "30" can accomplish anything any other car will. The cost of maintenance and upkeep is at a minimum. We have not been annually expending enormous sums in experimenting on new cars, but our every effort has been directed toward the perfection of the Regal "30." This car is a finished product in every detail and readily meets the demands of the most critical purchasers. Regal "30" is a quality car, without the unnecessary frills. You cannot buy a better car at twice the expenditure.

REO: R. M. Owen—As a reason why one should purchase a Reo in preference to some other companies, the manufacturers offer the left-hand drive, with its attendant safety, comfort and efficiency. It is not possible to go into all of the positive advantages which left-hand control affords over the old. Suffice to say the step is well justified in the rapidly increasing popularity among experienced drivers and owners.

The reasons for the popularity of the left-hand drive at once become obvious when the questions of comfort, safety, economy, convenience and efficiency are carefully considered. Take the instance where the statutes or local ordinances require all vehicles to be so placed and headed in public thoroughfares that the right side of the car is next to the curbing. It will readily be seen that with the levers on the left side the occupants of the front seat may step directly upon the sidewalk. This is of positive advantage to both the driver and owner.

A word as to safety, comfort and efficiency. With the left drive the operator's left hand is free to shift the levers and blow the horn. This permits the exclusive use of the right hand for the steering wheel. The opposite of this prevails under the old method. There the driver must almost invariably make a quick change in handling the steering wheel from his right hand to the left in order to be able to shift the levers. Result: Two movements to do what is now done by one with the left drive. After once experiencing the happy contrast in favor of the left-hand drive very few drivers, if, indeed, any at all, would drop the new for the old.

Further, on narrow roads the driver with the left-hand drive is able to gauge more safely the clearance when passing other vehicles. This is especially true where the roads are narrow, sharply crowned and poorly ditched. Another case of comfort plus safety equalling preference and popularity for the left-hand drive. Then it is claimed by eminent automobile engineers that the running of the vertical motor placed in front tends to depress the right side of the car which is largely overcome by placing the driver on the left side.

Doctors, rear estate men, contractors, farmers, clergymen and other business and professional men, who largely do their own driving, are especially enthusiastic over the Reo left-hand drive. The foregoing convenience, means of added comfort, economy, safety and efficiency, besides the many other practical advantages too numerous to mention herein partially account for its popularity. It may therefore safely be said that the left-hand drive will, in another year, become practically universal.

SCHACHT: Walter H. Sly, Treasurer—The Schacht car should be purchased in preference to any machine offered at a medium price, because it is a car so designed that it can be used for any purpose that might be required of an automobile. The Schacht is fitted virtually with a combination body which can be changed in five minutes from a runabout into a surrey or family car, or a light delivery wagon, by merely rearranging the rear seat. This machine has an extra long wheelbase, which allows plenty of room back of the seat to carry goods of any description, up to a capacity of 800 pounds, and it is a machine which will readily appeal to the merchant, farmer, salesman, or any class which requires a car that must answer every purpose of a general utility machine.

There is also a patented mechanical feature on the Schacht entirely individual to it, and this consists of a double-acting clutch built into the flywheel of the motor. While a planetary transmission is used in this car, every previous objection to this type of transmission is eliminated by the fact that the transmission does not revolve on the jackshaft until the clutch is engaged in the flywheel of the motor and the car moves forward, thereby clamping the bands on the transmission and avoiding all the customary rattle, which is caused on the planetary type when the car is stationary with the motor running.

In other words the transmission is never revolved until the clutch is thrown in when the car will be in motion, and in order for the car to be in motion the bands clamp the transmission, otherwise transmission cannot revolve unless car is moving.

SPEEDWELL: H. A. Wright, Advertising Manager—Any man who drives or wishes to drive a large car should buy a Speedwell because it is superb in line and finish, because it has ample power and speed and is easy riding and extremely flexible and obedient in control.

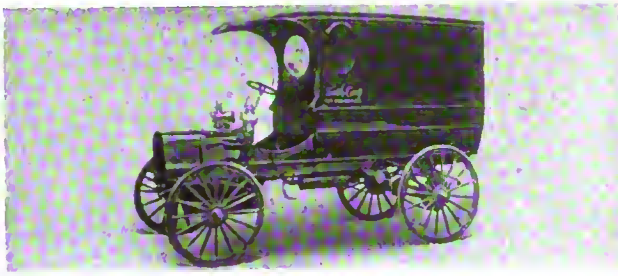
These things granted (a demonstration instantly shows them to be true), then the only thing left to be desired to make this the ideal car is the assurance that it is properly constructed to give long life and minimum of repairs. Because in the Speedwell are found only the highest grades of materials possible to buy, and because the workmanship in the car is the best and most careful; because the car is subjected to most thorough tests and inspection in every particular—because of all these things this car does "stand up" and give most satisfactory service for years.

Now comes the real reason for buying a Speedwell. There are a few other cars approximately on a plane with the Speedwell, but none is sold at the Speedwell price—$2,500. To get equal value in any other car you must pay one to two thousand dollars more. We concentrate all our efforts to one standard chassis with different style of bodies.

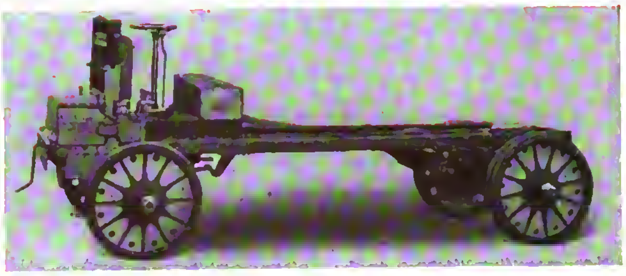
FOREIGN PLEASURE CARS

DE DION-BOUTON: George Ozanne, Manager American Branch—It is our idea that the superiority of the De Dion-Bouton motor car lies in the following facts:

1. Being the oldest manufacturing concern of small and medium cars, it has the lead of experience.
2. Its motor is the prototype of all modern gasoline motors, and it is the only one which has been endorsed by other automobile manufacturers, who have, in such large numbers, adopted the De Dion-Bouton motor for their cars. This constitutes a unique acknowledgment of the superiority of the De Dion motor.
3. Our transmission by cardan shafts is the only one which has all the advantages of the chain, and none of its inconveniences.
4. The automatic lubrication system, under pressure, of the De Dion-Bouton cars has never been equalled, and this has been one of the good reasons why the reputation of "The most durable" has always been synonymous to "De Dion-Bouton."

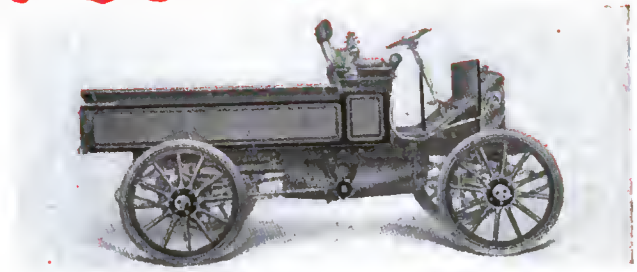


Chase Two-Cycle Three-Cylinder Delivery Wagon



Grabowsky Two-Cylinder 30-Horsepower 3-Ton Truck

Hart-Kraft Two-Cylinder 16-Horsepower Delivery



Martin Two-Cylinder 18-Horsepower Delivery

Rapid F 92C Two-Cylinder 35-Horsepower Truck

PANHARD: A. de Magnin, Assistant Manager American Branch—The Panhard car has always had the reputation of being the most durable and reliable one manufactured; the construction of the chassis is of the completest finish.

In purchasing a car of recent years the buyer knows that he can compare the weight with that of the lightest car made, and at the same time combining strength and comfort. He will get a motor silent, supple, and whose climbing ability is remarkable, as well as having the best in the market as to material, workmanship and design. In addressing himself to the Panhard & Levassor Company the prospective buyer deals with a firm which is the pioneer of the automobile business, and one that has acquired its experience by severest tests.

When buying a car the customer knows that he gets not only the best of automobiles and the most simple and complete chassis, but is also backed by a reliable firm. He knows also that he is buying a car which will last him for years, for, as can be seen in the streets of any city in the world, Panhard cars made ten and twelve years ago are still giving constant service and satisfaction.

Besides, we have reduced the prices of our chassis so as to meet American competition, making very little difference between the cost of a high-class American car and the Panhard, which has always been known as the highest priced automobile manufactured.

RENAULT: Paul Lacroix, Manager American Branch—Chief among the reasons why one should buy a Renault car, that is, an American, for on the other side reasons are not necessary, is the fact that this leader among French constructors has always sought for and catered to the high-class American trade. This tendency is distinctly shown in the list of 1910 cars, this including one special model designed specifically for American roads. It is a four-cylinder touring car with 25-35 horsepower engine. In this engine the long stroke has been particularly emphasized, the motor having a bore of 4 1-2 in., while the stroke is 6 1-2 in. This gives a ratio of 1 to 1.45, and as a result, the power developed by this motor is greater than other motors of similar bore, but lessened stroke. The construction of this special model for American roads is of itself an argument why one should buy this make of car. Other reasons are the unusually complete Renault line, extending from 8 horsepower up to 50-60.

AMERICAN COMMERCIAL CARS

CHASE: A. M. Chase, President—The Chase motor wagons are built for delivery service in all classes of business. The goal of our designers is to eliminate all unnecessary parts and to produce a machine which will operate continuously with the minimum of care and expense.

Chase valveless two-cycle air-cooled motor most nearly approaches the ideal commercial car motor. The only moving parts are the pistons, connectings rods and crankshaft.

Chase motors use a system of mixing the lubricated oil in the gasoline tank and allowing it to feed to the motor in proportion as the engine uses gasoline. This not only insures perfect lubrication of the motor, but eliminates every particle from the mechanism in the lubricated system. The advantages of air cooling are well known. Delivery wagons must operate under all weather conditions, and it is a great advantage not to have any water system to leak and freeze.

Planetary transmission as used on the Chase cars is enclosed in an oil-tight malleable iron case which prevents any dust or dirt getting inside of the gearing and causing wear.

High wheel construction is very economical, as it reduces the tire expense to practically one-third of that of pneumatic tired vehicles doing the same amount of work. The large diameter wheels go over obstructions with less jar than small diameter wheels. The high wheels go over bad roads without injury to the tires and with low power consumption from the motor.

Motor is located in front under the hood, and is easy to get at.

Every progressive business man likes to have his delivery cars have a good appearance and a high-grade finish. The Chase motor answers this demand in every way. In this age many persons purchase their parts and assemble their cars in their own factory. The Chase motor wagons are built entirely in the Chase factory, and visitors to the plant are impressed with the thoroughness which is exhibited in all departments in the manufactory of the various parts which go to make up this successful delivery car.

GRABOWSKY: Grabowsky Power Wagon Company—The power plant in the Grabowsky, for good and sufficient reasons, may be removed and replaced within the fourth part of an hour. The work may be performed by a man of no great skill; the result is, in service, ten wagons, with eleven motors, make it possible to keep the ten wagons on the go constantly, and it is when they are on the go that they pay interest on the investment.

The Grabowsky idea is to build good wagons, and, what is equally important, to so design them that they may be maintained for years. This is brought about by having every bearing so made that it can readily be replaced by the man at the garage, and every time a bearing is replaced that part of the wagon is made as good as new. The replacement may be made at small cost, and the time required is but slight. In all other respects the Grabowsky method takes into account not first cost, but cost of maintenance, which is a matter of knowing how, then doing it that way.

GRAMM-LOGAN: B. A. Gramm, General Manager—We wish to state that in our exhibit in the coming Grand Central Palace Show we believe that the public can very easily see why we claim the world's best in the Gramm-Logan truck chassis. The reason why we make this claim is ten years of painstaking labor day and night by engineers grown up in the business, perfecting these chassis from a point of daily use in all parts of the country; the use of the very finest materials that have been studied to give the best satisfaction in the different parts of the chassis; a factory equipped with machinery built especially for our purpose, and with tools designed only for this work, and with plenty of capital back of us to properly carry out our work.

Our truck has features not to be found on any other, and every one of our customers in the past year reports the very finest of satisfaction. Our output in our present plant was sold up early, and we are rushing our new plant in order to take care of our business. The last reason why we claim the Gramm-Logan to be the best is because it is to-day the most widely copied chassis in point of design and construction on the American market, and is undoubtedly a year in advance of any other make.

RANDOLPH: H. E. Haase, Advertising Manager—The Randolph Motor Car Company has, with careful consideration of modern practice, as well as all innovations and radical tendencies, placed a line of cars upon the market which are evidently a strong combination of reliability, simplicity, strength and attractive appearance.

In accordance with the requirements of "Solid Tire Practice," the car is heavily proportioned throughout, and is designed to withstand all strain and racking effort of commercial usage. Ample power, positive lubrication and the governing of the engine speed are important features which have been given due consideration.

This concern has established agencies in all the important cities in this country, and have cars in the service of the best known concerns in the country.

NOTE—Many absentees will be noticed in the foregoing, Reasons Why One Should Buy, but the Editorial Department of THE AUTOMOBILE takes this opportunity of stating that all had equal opportunities, and those who absented themselves did so from choice or neglect.

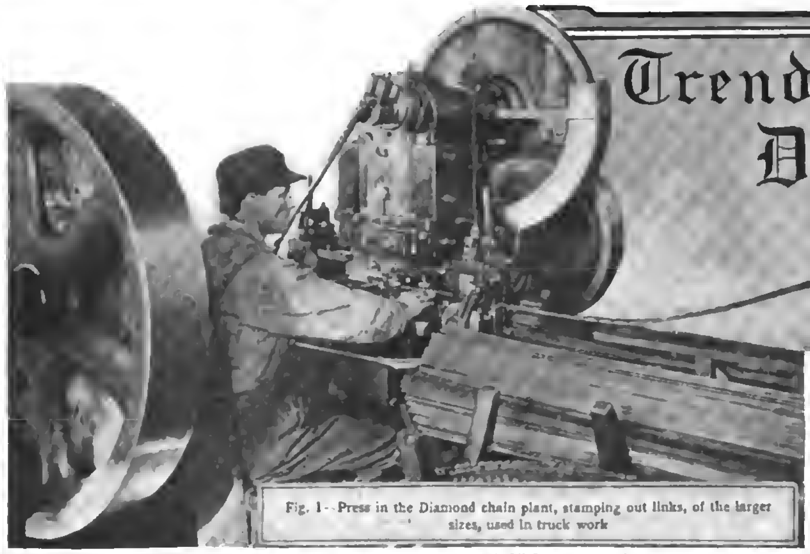


Fig. 1 – Press in the Diamond chain plant, stamping out links, of the larger sizes, used in truck work

Trend in Design and Fashion

By
Thos. J. Fay

FIRST PRINCIPLES are observed in the better plants of the day, and departure from them, if such there is, traces but the incident of the moment, and in plants undergoing organization, rather than in those of the A. M. C. M. A., which for the most part have stood the "acid test" as it were, having developed along pioneer lines, made haste but slowly, scanned the horizon for the sight of breakers ahead, which were rendered impotent by the simple process of steering clear of them.

In the display of automobiles, accessories and parts which is about to be inaugurated, and which will be viewed by a waiting concourse, beginning December 31, at the Grand Central Palace, there will be seven long days at the disposal of interested spectators in which to gorge themselves with imprints of the good points abounding in the products. In this display, however, little will be found which will tell of the processes, and, since a stream must have its headwater, so must this display emanate from a competent source, which is brains, brawn, system and facilities.

Of the brains and brawn little need be said; in America these qualities are indigene. System is but the expression of consolidated experience, there being now a plenty, while for facilities let us make them the gist of this subject and revel in them for a pace, measuring their depth and width and breadth.

Hindrances and Facilities Separated—Makers of automobiles, remembering the hindrances of the older industries, carefully avoided them in the newer work, and in so doing located plants at points of vantage, adjacent to trunk lines, waterways, and in juxtaposition to materials of the desired stamp.

Hindrances, as they relate to labor, come when the class of work to be done is different from the habitual undertakings of a community of laborers, and this phase of the problem has been adequately cared for, which gives to makers of automobiles a class of artisans in sufficient force to render conspicuous services.

Sanitation, light, heat, and pleasant surroundings, while they may be as strangers in certain industrial establishments, have been most carefully utilized in the newer plants, notably those designed for purposes of turning out automobiles, and, strange as it may seem to some, the quality of product increases with the output under such conditions.

Special Machine Tools Developed to Order—In kinetic machines, such as automobiles, alloy steel is necessary in many of the more important parts, and even the components which are fashioned from the more ordinary grades of steel are made from materials of better selections than would be true in many other genera of machines. This advance in the rigidity and dynamic ability of the materials used soon rendered manifest to builders that machine tools as they were formerly made were not rigid enough for the purpose, and rather than slide back into the beaten path of indifferent success, pressure was applied to makers of machine tools, who happily, with ear to ground, measured the impetus of the wave and responded.

It is the advance which has been made in machine tools and methods that holds the real story of the year, and when the patrons of the industry view the product of a twelvemonth at the Palace, the most interesting part of the things to consider will be in the mind's eye of the onlooker who makes himself familiar with the processes involved.

It is this very advance in process which serves as the substantial foundation on which the greatly increased output of this year stands, quantity, in fact, beyond the dreams of the men of a thrice of years ago, yet, with all, quality is on a higher plane than formerly, showing that precise method—in short, system—holds sway, among which the following are conspicuous:

CYLINDERS ARE JIGGED, MILLED AND GROUND

Accuracy, as it is represented by narrow limits of tolerance, is the modern requirement in cylinder-making, and this is accomplished with great certainty by utilizing mahogany patterns of good workmanship after drawings of competence, in which limits of tolerance are properly set forth, and in the foundry such care is given in charging the cupola and otherwise that the castings will be sound, free from surface blemishes, close-grained and of adequate strength. The most recent undertaking in this connection is by way of the introduction of a percentage of steel scrap in the charge, as in Premier practice, with special means of rendering the teeming mass amenable to the process. The castings thus evolved are especially close in texture, are fully 50 per cent stronger than normal cast gray iron, and come out of the moulds in such good fettle that few indeed are the "wasters" to be counted.

MULTIPLE HEAD MILLING PLANER WORK

In many of the most modern shops, in view of desired speed and great accuracy, cylinders are placed on the planer bed, as many as 16 in a row, and having been designed with a view to the multiple milling of all faces (and further provided milling attachments to the planer), the work is conducted on a large scale, much as is depicted in Fig. 2. In this example, in view of other operations and conditions, the valve-cover bosses are left for a separate operation; otherwise all faces are done at one time, and owing to the accuracy of the equipment the process is quick.

JIG METHODS OBTAIN TO A VAST EXTENT

Having provided a suitable multiple drill, which in these days is the easiest equipment to procure, it is at once possible to provide jigs which will take the cylinders, hold them in the correct relation and enable the operator to advance the work with great speed, doing as many as 24 operations at one setting in some in-

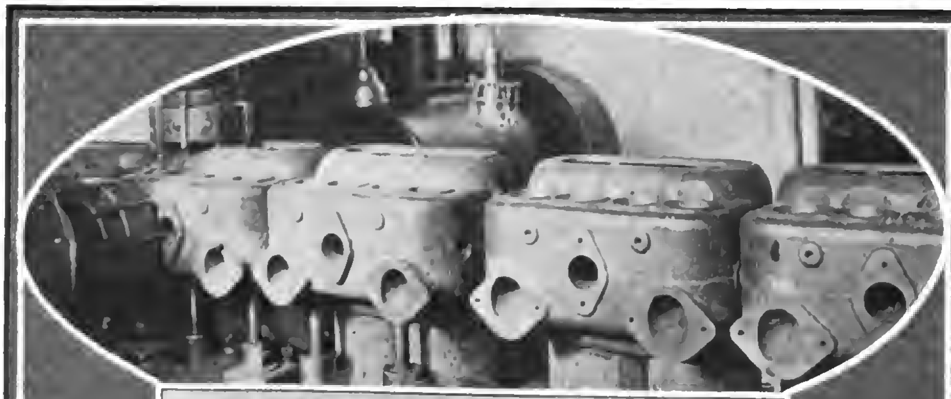


Fig. 2—Facing cylinders on a gang-planer fitted up with multiple milling heads and special fixtures in the Inter-State

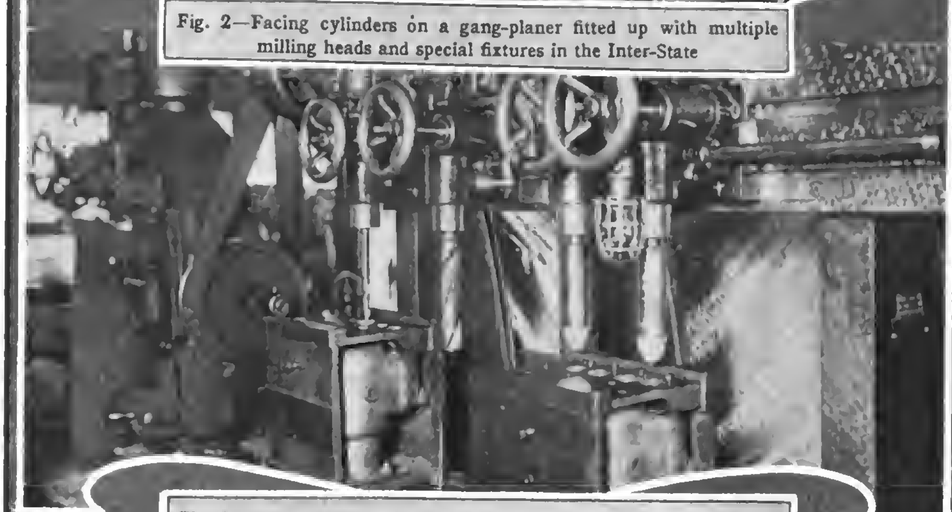


Fig. 3—Special multiple-spindle drill in conjunction with jigs, working on Inter-State cylinders

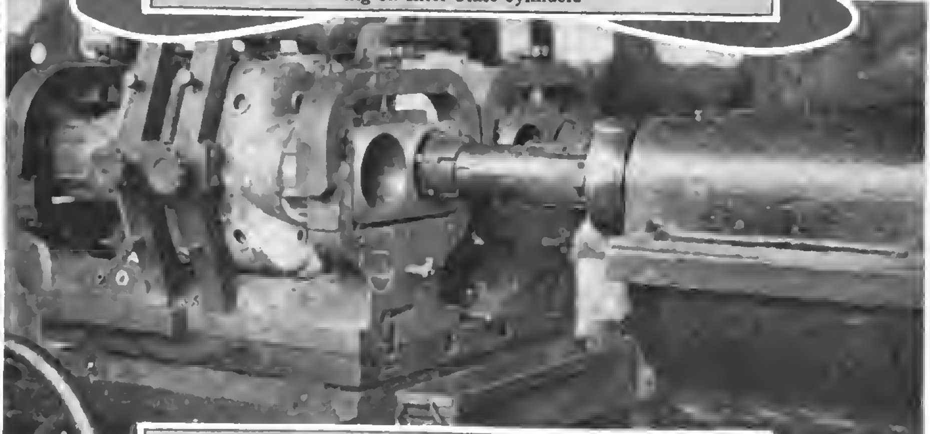


Fig. 4—In the National, boring cylinders on a special tool, holding four sets of twin-cylinders on a turntable

Fig. 5—Heald cylinder grinding machine, as used in connection with National cars, with water jacketing to defeat expansion

stances. Fig. 3 is of a good example of this character of work, and the illustration seems sufficiently comprehensive to show.

BORING DONE AT HIGH SPEED

Referring to Fig. 4, of a twin boring bar used for wroughing out the bores of cylinders, it will be seen that enough cylinders for two motors are placed in the fixtures at one time, and the cutters on the two spindles (having inserted teeth) are of high-speed steel and capable of being pushed to the limit. When two bores are completed the table is feed across and the second set of cylinders are then bored. When these cylinders are finished the table, turning on its axis, is swung around and the cycle of operations is repeated as before. While this work is going on the workman places other cylinders in the fixtures which are idle, and in this way the performance becomes continuous. When the work is pushed very hard, and in the absence of any method of holding a constant temperature, the bores will be distorted quite a little, and in some plants it is the custom to "age" the cylinders and then subject them to a second boring operation.

GRINDING IS ALMOST UNIVERSAL

The Heald grinder, as shown in Fig. 5, is seen in almost every automobile plant in America, and, as the illustration clearly indicates, a fixture is available for holding the cylinders while they are being ground, it being a simple angle-plate, to which they are bolted after the flanging face is finished. Since there is but one spindle, and two bores to be ground, a means is provided for feeding across, in order that the second bore may be ground. While grinding cylinders water is circulated through the jacket and in this way the bore is finished to great accuracy, since expansion due to heat is aborted.

Modern Trend in Cylinder Designing—Cylinder designing may be placed in the classes as follows:

(A) Valves in the head-air and water cooling being in vogue.

(B) T-shapes, noted for symmetry —water cooled.

(C) L-shapes, eliminating the need of one camshaft water cooled.

Valves in the head are much more in vogue than formerly, there being no question of the ability of this type to deliver the maximum power, which accounts for the type being used in racing to a considerable extent.

T-shapes are holding their own; they assure absence of unequal expansion, but demand a somewhat larger radiator in the cooling process, due to a considerable increase in the flame-swept surface.

L-shapes, because they eliminate a camshaft, are favorites, and as respects unequal expansion, they do not give trouble. The flame-swept surface is somewhat more than in the types with valves in the head.

PISTON AND RING DEMANDS

Owing to the demand for higher weight efficiency in motors, and in view of the influence of weight of the reciprocating parts on the secondary moments limiting power by limiting safe speed, it is the most pronounced idea at the present time to employ very superior grades of piston iron, which to be sure are the product of gray iron foundries, but the castings are white in their tendency, taking on, strange to relate, such characteristics as abound in stove castings—the average person laboring under the mistaken notion that stove castings are inferior. As to rings, what is true of pistons also holds good, and to a considerable extent, although for them to be fragile is to reduce the value of them to near zero. As for connecting rods, since they belong to the reciprocating mass, they must be coped with simultaneously, and in the best practice of the day they are made of rather rigid drop-forged steel, in I-sections for the most part.

MACHINED ON SPECIAL TOOLS

Nothing can serve better to illustrate the methods in vogue than the illustration here afforded as Fig. 6, it being a turret lathe, provided with a special tool-post and cutters to suit. The piston is first bored out, and with this bore to go by the piston is fitted over a mandrel, which is screwed onto the lathe spindle, and the grooves, as well as the exterior finish, are done as a single operation. From this tool the pistons are sent to the grinding department, where they are sized and closely finished.

PISTON RINGS DEMAND GREATEST CARE

Piston ring stock comes from the foundry in the form of a cast-iron tube of the required length and thickness of wall to turn out the rings of the right size, and enough of them to complete a motor, there being, as a rule, four rings to the piston, making 16 rings for a four-cylinder motor. After the tube is turned to near size, in as well as outside, it is slipped over a mandrel, as shown in Fig. 7, and the operation of parting is conducted, leaving each ring with grinding "finish."

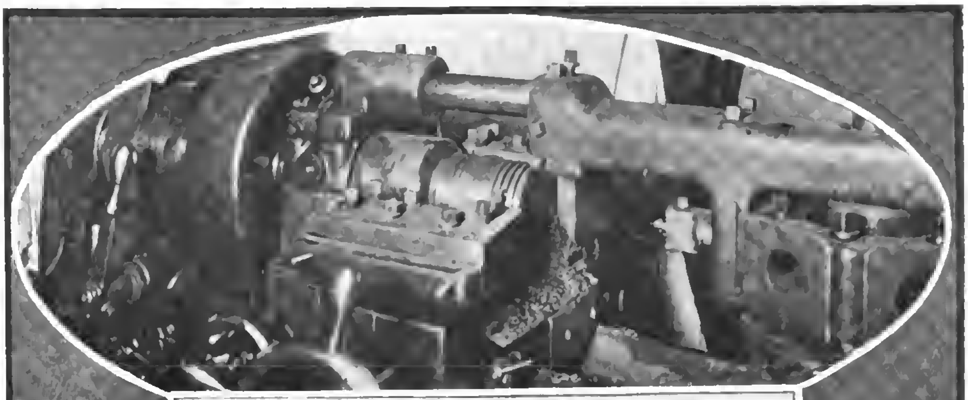


Fig. 6 Special turret lathe, in the Inter-State, working on pistons, turning, grooving, and facing simultaneously

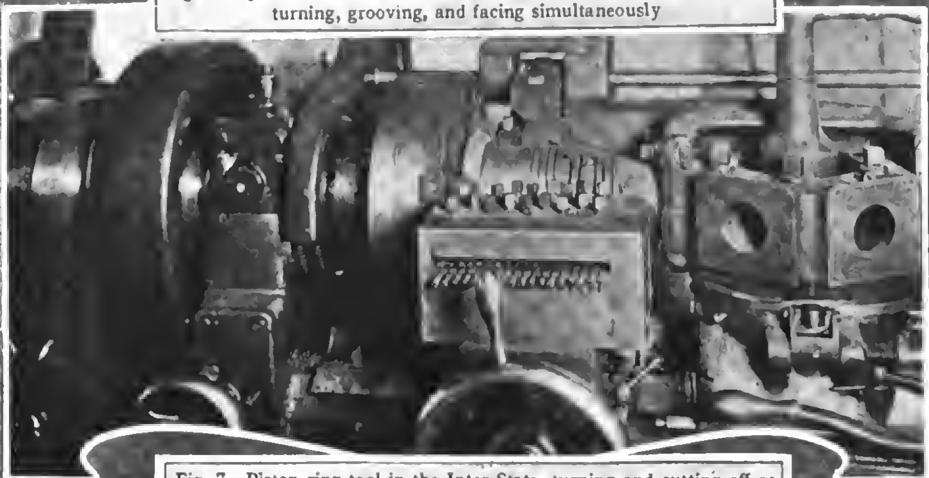


Fig. 7 Piston ring tool in the Inter-State, turning and cutting off as a continuous performance

Fig. 8 Magnetic chucking flat grinder working on piston rings as used in Inter-State cars

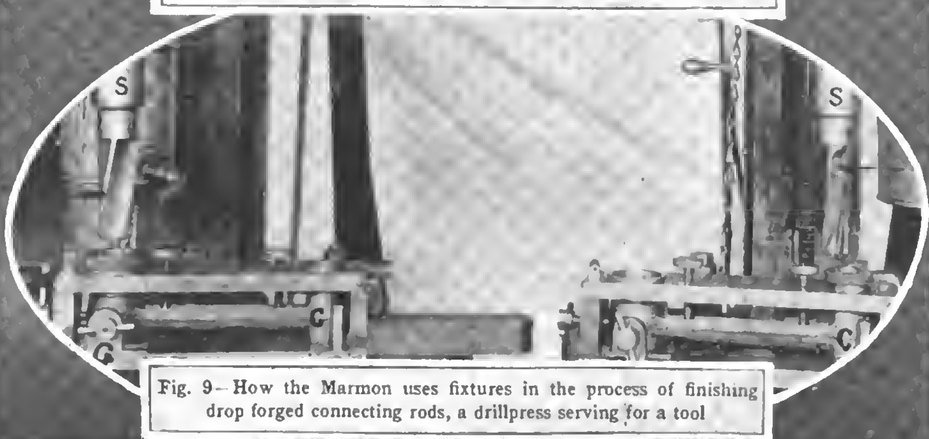


Fig. 9—How the Marmon uses fixtures in the process of finishing drop forged connecting rods, a drillpress serving for a tool

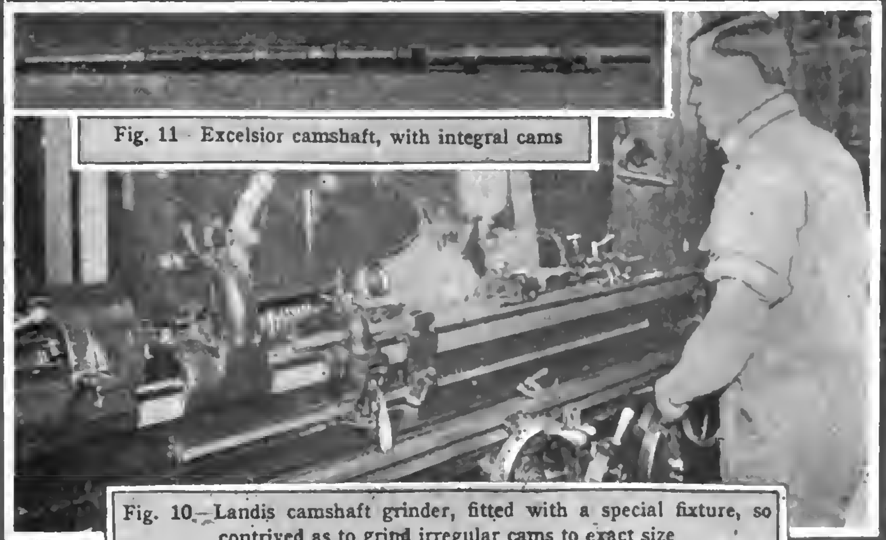


Fig. 11—Excelsior camshaft, with integral cams

Fig. 10—Landis camshaft grinder, fitted with a special fixture, so contrived as to grind irregular cams to exact size

CONNECTING RODS ARE MILLED

Referring to Fig. 9, it will be noted that a straddle mill is set to face off the enlargements, they being clamped in place for the purpose. There are several forms of fixtures in vogue, and in some of them provision is made to turn the connecting rods end for end, thus allowing the work of facing off the enlargements at both ends to be done at a single clamping. In some shops the fixtures contrived for this purpose are very ingenious, being so made that the pistons are locked in and come in the right relation automatically, with relatively small expenditure of time.

ANNEALING IS NECESSARY

Connecting rods, being drop-forged, are not of necessity in good fettle when they come from the forge, and in the better grade of motors they are subjected to a correcting process before they are machined. This is but a matter of annealing at the right temperature for a certain length of time; true, it is desirable to check the grades of material, it being the case that if the carbon is too high the results will not be so good. Sand blasting is resorted to rather than pickeling this year, and the experience is that this process is superior; it takes less time, removes the skin, and discloses the metal to the eye of the inspector, who, after a little skill, is enabled to determine conditions.

RING GRINDING ACCURATE

After the rings are parted they go to the surface grinder, fitted with a magnetic chuck as depicted in Fig. 8, where they are placed on the flat (magnetic) chuck and the grinding disc passes over the surfaces as many times as may be demanded to bring a true, polished surface. When one side is finished the rings are turned over and the same operation is repeated; in this way the rings are brought to within a small fraction of a "thousandth" of dead accuracy, involving a free fit, and with the grooves properly sized in the pistons there is no question of the results; the pistons will hold compression. It is the practice this year to more carefully fit rings than it ever was before, and the power now realized is in a large measure accomplished.

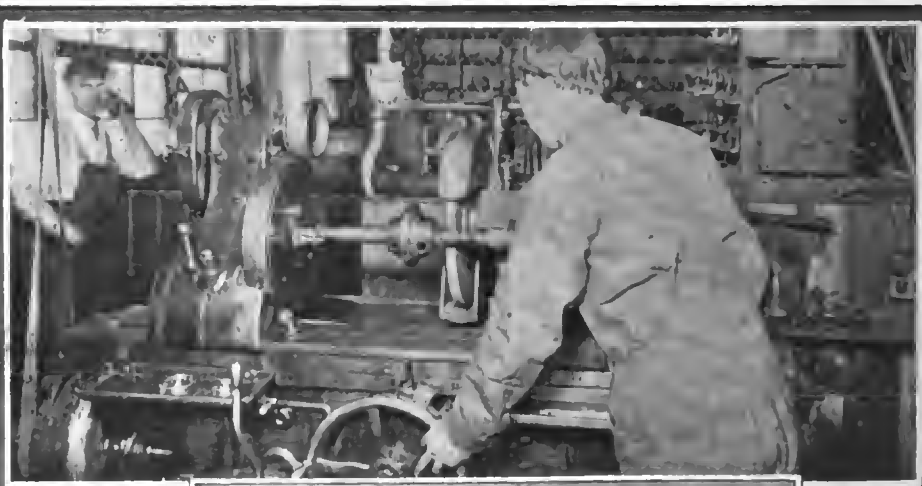


Fig. 12—Grinder used in the Woods plant for work of an exacting character, as fitting ball bearings, etc.

Fig. 13—Grinder used in the Rambler plant for finishing crankshafts to exact size, they having four throws in this case

CAMSHAFTS MAKE ADVANCE

Irregularity in the contour of cams and difficulty involved in accurately shaping them has led to many innovations in the process, and even to this day, for divers reasons, some of the representative builders of motors prefer to use separable cams, which they fasten on in one way or another. Fig. 10 presents the newest and perhaps the most advanced possible way of doing this class of work, in which a special grinding fixture is attached to a regular type of grinding tool. The finished camshaft is as shown in Fig. 11, which was made for a motor with four cylinders, of the L-headed variety, thus requiring eight cams to the shaft. The cams are cut integral—that is to say, with a drop forging to start with in which the cams appear all near size, and after roughing between the cams, which is done in centers on a lathe, the camshafts are hardened and then set up in the grinding attachment on the grinder as shown. In this work the attachment is located eccentric to the fixed centers of the grinder, and by means of master cams, which are just like the cams to be finished (but on a larger scale), the camshaft shifts on its eccentric centers exactly to conform to the surfaces to be ground, thus making it possible to grind the cams, no matter how they may be shaped for the final finish, or how hard they may be. It is of the greatest advantage to thus be able to do the grinding after the camshaft is hardened, for in this way the effect of deformation is not so much of a trouble to cope with. The cams thus made are less expensive, may be of harder material, and the time required in machining and finishing is much reduced. Accuracy in timing is assured since the cams are ground to conform to the master, which master cam can be made to exact size by a toolmaker of skill.

Fig. 14—Flat grinder used in the Inter-State for finishing manifold fittings, also fitted with a magnetic chuck for some jobs

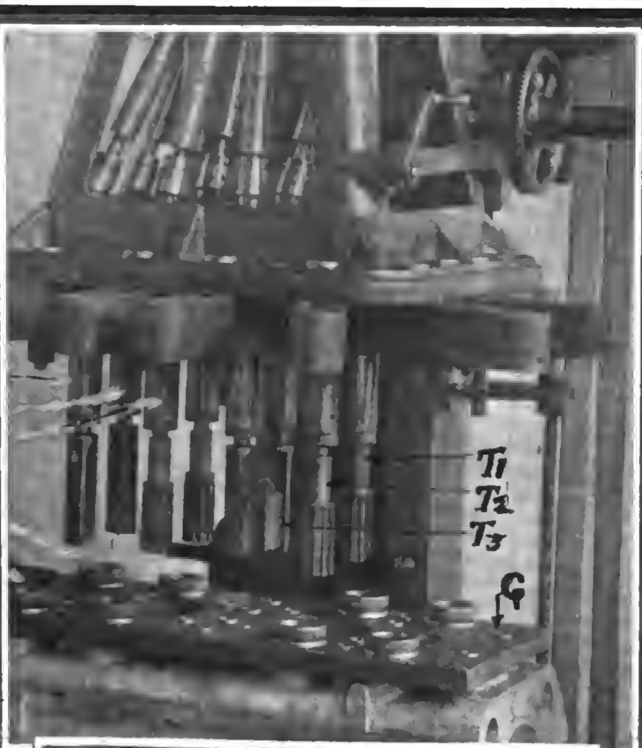


Fig. 15—Multiple-spindle drill as used in the Marmon plant in conjunction with a jig for crankcase work

GRINDING IN GENERAL ON THE INCREASE

In almost every shop, as never before, grinding is resorted to to a vast extent, and Fig. 12 is indicative of the advantages to be derived, in which a differential housing is being trued up by the grinding process after it is finished. This truing up process, as well as assuring concentricity, has the advantage of affording a "sucking fit" for the annular ball bearings used in this product. It must be well understood that ball bearings, however good they may be, will not afford complete satisfaction unless they are nicely mounted, and in the products of the year, in view of advances made in machine tools (especially in grinding processes), this phase of the work is being done to a nicety.

Crankshafts Almost Invariably Ground—These important members in motors are machined to within about ten-thousandths of the final size, both at the main bearings and the pins. They are then set up in centers on grinding machines, as illustrated in Fig. 13, where they are reduced to exact diameter, less a fraction of a thousandth of an inch above size. The result is that the sizes are not only neat, but elliptical formations are aborted. It will readily be appreciated that an elliptic journal is scarcely likely to improve the journal-box in which it must run.

Surface Grinding Now a Settled Method—There are many operations of an important nature, connected with motors in particular, which can best be performed on a surface grinder of a type as depicted in Fig. 14, and in some instances a magnetic chuck is added, in order to save time in the setting up of the work. The particular job being done does not demand the use of the magnetic chuck, and it is eliminated in this case. The grinder is facing off the fittings of a manifold for a motor, and when such nice work is done it is then that "packing" may be omitted, and few indeed will fail to rejoice at the omission.

Internal Grinding Just as Handy—Besides the several classes of grinding to which specific reference were made, there are the several kinds of internal grinding done, and the little grinders which do this work are largely responsible for the lack of noise that makes cars of this time so conspicuous when they run as companions down the roadway alongside of some of the older but more noisy models of a year or two ago.

USES OF MULTIPLE SPINDLE DRILLS

Expensive special machine tools in many of the shops account for the quality of the work done, but it is not absolutely neces-

Fig. 16—At the National, showing a special application of a radial drill, with a special fixture, boring three rows of bearing holes at one time

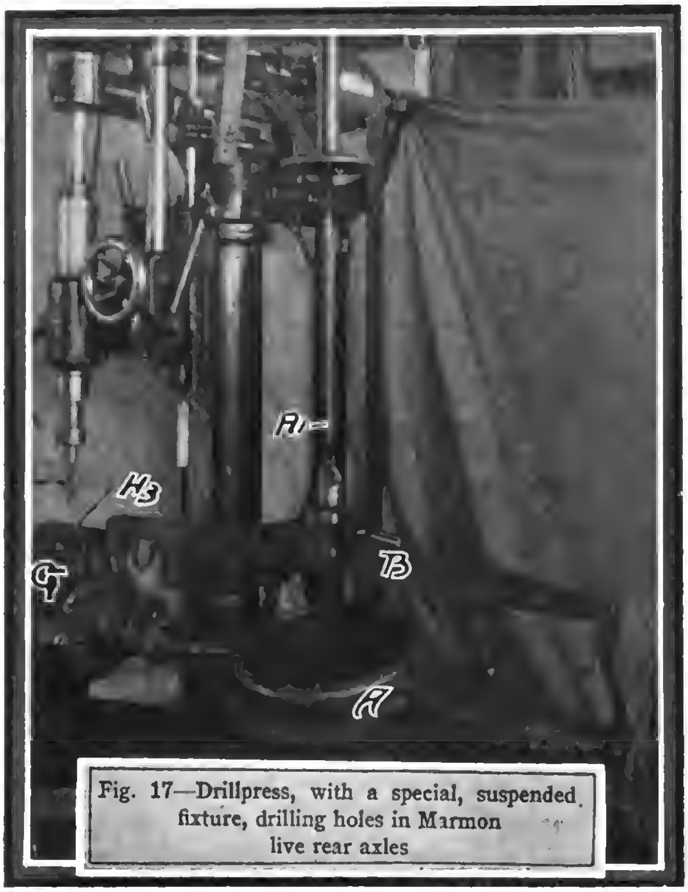


Fig. 17—Drillpress, with a special, suspended fixture, drilling holes in Marmon live rear axles

sary to use them, nor will the quality of the work done fall below a desirable standard in the absence of them—in fact, in the shop it is true that "fine feathers do not necessarily make fine birds," so to speak, referring to machining processes.

Multiple-spindle drills, in conjunction with accurately made jigs, are of the greatest utility, the quality of the work done being as accurate as drilling and reaming can make it, and that the holes, bores and finishes will come right is assured by the accuracy of the jigs used to guide the cutting tools. Fig. 15 is of a multiple-spindle drill of the latest and most useful type, in which the reamers T1, T2, T3, etc., are guided by the jig G1 into the proper places in the crankcase C1 and the work is quickly and accurately done. Universal joints, J1, J2, J3, etc., are responsible for the manner of transmitting the power to the respective tools; compactness is prominent, and toolroom accuracy is self-evident.

Radial drills come in very handy in many undertakings, and under the guidance of men who understand the jig and fixture requirement the result is on a high plane. Fig. 16 is indicative of the highest attainable result, in which a radial drill is used in connection with a fixture which carries three boring bars, they being so geared and related as to serve to bore the bearing holes all at one time with great accuracy, in a crankcase, at small loss in time.

Perhaps Fig. 17 is the most ingenious of all; it is of a drill press of the conventional sort, in which the work is a live rear axle A, suspended by the balancing arm B, and the jig G guides the drill D through the bushed hole H, the balancing arm B being suspended by the rod R. It will be noted that the axle is held in the jig by the spindle, which fits in the round of the jig.

What the automobile has done for machine tools is more than will be fully appreciated, and at the present time, in view of the demand for men of great skill, the industry has absorbed every available toolmaker, especially of the class capable of coping with the very problems as referred to in connection with the fullest use of standard machine tools as the drill presses as here presented.

APPRENTICE SYSTEM BEING REVIVED AND EXTENDED

Owing to a growing scarcity of competent labor and with a view to training up a special class of men, they to be skilled in automobile work, the various systems of apprenticeship are being investigated and some of them are being tried out at length. One of the best possibilities lies in the co-operation of the companies with trade schools, in which it is the aim to take the boys on part time and pay them for the work they do, thus helping them to go through school and at the same time learn a trade. That these boys will fill a useful part in the building of automobiles in the near future is fully believed by all who take an interest in this phase of the problem.

PRESSED STEEL PLAYS AN IMPORTANT PART

Looking backward for several years discloses no such advance over any other year made during the past twelve months when reference is had to pressed steel work, as sidebars, crossbars and other parts as used in chassis frames, and in other important parts, namely, brakedrums, brackets, shields, etc.

In the production of sidebars, especially those of the kickup design, and when they are spread as well, the presses are required to be very large and substantial, one of which is here portrayed as Fig. 18, in operation, pressing a sidebar of the character as employed in the manufacture of chassis frames.

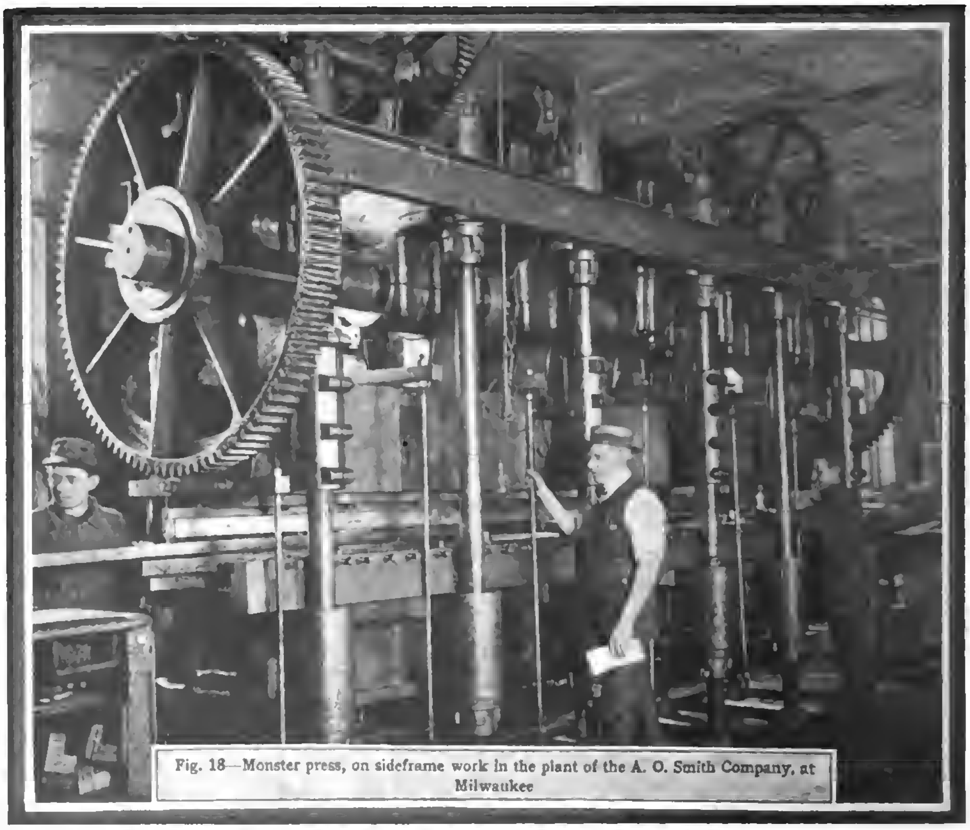


Fig. 18—Monster press, on sideframe work in the plant of the A. O. Smith Company, at Milwaukee

Fig. 19—Bulldozer, as used in the Rambler plant for pressing crossbars and other parts of flat steel

Bulldozers Coldpress Crossbars—Unless chassis-frame crossbars are very intricate in shape they are coldpressed in bulldozers, one of which is here presented as Fig. 19, and, as will be observed, half of a die placed against an abutment, the latter formed from the mass of metal in the frame, and the pressure needed is obtained by double sidecranks, which connect to a crossmember which carries the other half of the forming die. Power is utilized in driving the bulldozer on a considerably less scale than might be supposed, due to the work coming on for a part of the revolution only, and flywheel effect is taken advantage of to accumulate energy, the same to be expended when the work is being pressed. When the shapes are very intricate, or if the material used is alloy steel, as it is in some crossbars, the work is done hot. The bulldozer in the shop is responsible for the elimination of castings in automobiles to a considerable extent, and this particular size, besides pressing crossbars, is used for many other purposes as well, one of which may be seen in the figure, in which the particular operation consists of bending a piece of drawn steel tubing for use in fitting up a motor.

Vertical Types of Presses Lend Facility—Perhaps there is no better application of a vertical type of press to be had than the one shown in Fig. 20, which is doing broaching work; broaching a square hole by pressing a broaching tool through the round hole in a part to be so fashioned. Broaching square holes to any great extent is a modern idea brought about by the coming of the automobile, in which there are several square shafts, notably in the transmission, in connection with the sliding gears. In this particular case, owing to the power of the press the broaching is done with great speed, and by the use of special high speed steel in the broaching tool it is made to sustain, even though the tool is pressed through a considerable mass of material to be removed, and at a rapid rate.

Hydraulic Press Has Many Advantages—The hydraulic press shown in Fig. 21 is operated on flywheels pressing one on to the crankshaft, the shaft being tapered to receive the flywheel, and in the process the press applies a force of some fifteen tons, the exact pressure depending upon the accuracy displayed in the machining process. In this class of work the press is the best inspector possible to employ, for if the pressure falls below a certain point it will be appreciated that the fit is below the requirement; likewise, if the pressure goes up too much there is danger of splitting the hub of the flywheel, so that in all truth the man at the press is one of more than a little intelligence in the shops that do the better class of work. This is an excellent illustration of working on a large scale.

HEAT TREATMENT AUGMENTS KINETIC QUALITIES

In visiting the plant of the Diamond Chain Company, at Indianapolis, Ind., opportunity was afforded to note something of the extent to which qualities in steel were accentuated in heat treating. In side chain drives, which are on the increase, by the way, due to the large number of the better class of runabouts and other small cars, which are being put out with chain drives, not forgetting that trucks, now being built in quantities, almost invariably use chains, opportunity is afforded to bring the material used up to the highest possible state, partly due to the necessity of using high kinetic material, and again in view of the shapes of the parts, which lend facility in the process.

In this work, as it is conducted at the plant above named, the process of heat treatment is carried on in a large way, and Fig. 22 presents a corner of the room showing a battery of "salt" furnaces, they being used for the better grade of work, especially in annealing. Fig. 23 shows cementing furnaces, of which there are a large number, they being used to give a depth of carbon, the same having the facility of rendering the surfaces glass hard, leaving the core soft—so soft, in fact, that it is highly kinetic and acts as a cushion for the shell.

Instruments of Precision Guide the Artisans—Referring to Fig. 24, P1 is a pyrometer, used to determine the temperature prevailing in the respective furnaces, S1 is the electric switch used to connect up the pyrometer, R1 and R2 are rheostats used to regulate the voltage of the circuit in calibrating the pyrometer, T1 is a thermometer used to determine the temperature of the baths, T2 is a thermometer which gives the surrounding temperature, and P1 is a pressure gauge which reads pressure of the circulating air, which is of the greatest advantage in refrigerating and mechanically agitating the quenching baths, they being heated up by the heated parts when quenching is being done and it being necessary to maintain the temperature at a constant level, it being also desirable to brush off the globules of steam or vapor of oil, as they adhere to the parts; this desirable operation is brought about by agitation of the liquid, which transpires when the compressed air is liberated below the surfaces of the bath.

ECONOMIES FROM TWO POINTS OF VIEW

Instead of economizing by purchasing inferior materials for use in parts, it is now the practice in the plants of note to

Fig. 20—In the Rambler, broaching square holes, using broaching cutters in a vertical press, working at high speed

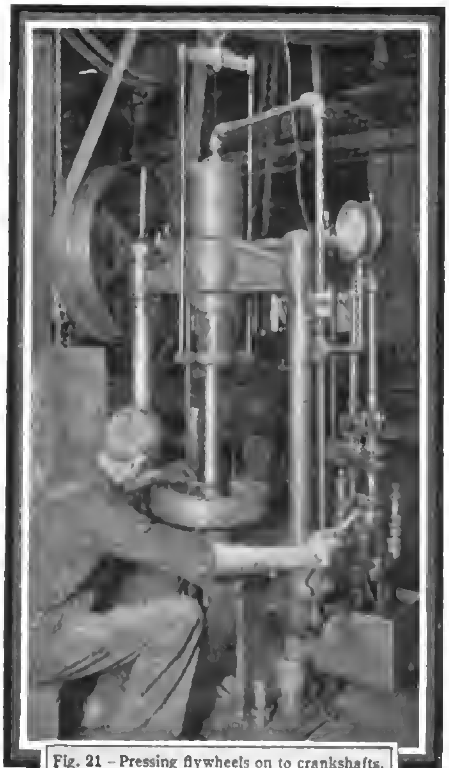


Fig. 21 – Pressing flywheels on to crankshafts, using about fifteen tons pressure and a hydraulic press

economize in divers other ways, as in the use of material and by stopping of wastages. Fig. 25 presents a corner in the plant of the Diamond Chain Company where product is weighed, the platform scales S1 being used for the purpose, and as the chips and turnings accumulate they are put in the separator O1 if they are small, O2 for other grades, and the large turnings go into the separator S2, where the entrained small parts are separated out and all lubricating oil is taken away, leaving the turnings dry and delivering them into a bin which is placed outside the building adjacent to the roadway, so that the delivery of this product is cheaply and promptly made. The recovered oil from these separators is used over and over; it represents a large item, and the value of the turnings, chips, etc., is reduced to the right level.

MULTIPLE WORKING OF OPERATIONS

One of the very distinct ways by which quantity is being turned out without reducing quality lies in the utilization of machine tools which have been so contrived that a plurality of parts are finished at one time. Fig. 26 of a multiple operation shows a gang of saws cutting off "blocks" as used in block forms of Diamond chains, delivers 27 blocks from the bar at one time and in about three minutes; this is certainly high speed, especially considering the dense quality of the material used in these chains.

Continuous feeding makes for output, and the quality, if anything, is improved. Fig. 27 shows a specimen of this class of work, in which a hopper H1 is loaded with links which feed down on to the revolving platen P1, on which the operator places the rivets from the tote pan R1 and the process of assembling is continuous; this is one of the many tools of this character which makes sprocket chains possible, it having been worked out in the plant of the Diamond Chain Company in the manner as here shown.

FEMALE LABOR IS NOW BEING UTILIZED

To a greater extent perhaps than is generally realized female labor is taken advantage of in the several plants. There seems to be no limit to the work that can be placed in the hands of competent working women, and Fig. 28 is illustrative of the point to be made. In this instance a long line of buffing and polishing machines (only one shows) are doing the fine finishing work on chain parts in the Diamond plant, and from information at hand it is apparent that this venture is an entire success. In almost every automobile plant, especially where tops and upholstering is done, women take a hand, doing much of the better class of work to be seen in the artistic creations of the present day.

MACHINE MADE WHEELS MUCH ADVANCED

In the earlier attempts to make wheels of wood by machinery they fell below a certain standard, partly due to lack of completeness of method, and again in view of a certain hostility on the part of wheelwrights, they having the erroneous impression that the growth of machinery for this class of work would belittle their efforts. Fig. 29 depicts the process employed in truing up wheels, in which W1 is the wheel on the vertical spindle S1, and the abrading disc D1, being rotated by means of power furnished by the belt B1, sands off the high spots, bringing the felloes down to the right diameter for the rim. If the wheel is out of true, a point now regarded as fatal to good results, the plate S2 will show, and the operator governs himself accordingly.

Fig. 22—Salt furnaces, used in heat treating work at the plant where Diamond chains are made

NOISELESSNESS IN GEARS NOW DEMANDED

In former times it was the rule to reduce noise produced from gears as much as possible and then explain to the purchaser that noise, to some extent, was to be expected. This year things are different; noise is eliminated and silence reigns. How this was brought about is a long story to be sure, but it is worth a moment here to intimate something of it.

In some plants, and in dealing with bevel drives in order to eliminate noise, they are annealed between every forging operation, machined exactly to size, then copper-plated before being gashed and very carefully cut, using the Hugo Bilgrim or other refined methods, by which the teeth are accurately planed to the theoretical right shape. The copper plating which is done before the teeth are cut serves as a shield, preventing the carbon from penetrating below the surface in the cementing process, excepting where the copper plating is afterwards cut away, and as a result the cementation is limited to the very surfaces which are to be rendered hard. The advantage in this is noticed in subsequent treatment, when it is the aim to harden the teeth and at the same time prevent warping. Deformation is but slight, if any, under these conditions, and noiselessness is the result.

When the gears are all made for any given lot they are then measured and a process of matching up is entered into, it being the desire to ascertain by actual trial in a measuring machine the most noiseless condition, and by matching up this condition is arrived at.

While it is true that noise is reduced to almost a mere suspicion when the gears are well cut, provided the spiral-tooth formation is used, and especially when the "herringbone" idea is incorporated in, even so, no matter how well the work is done, or what the shape of the teeth may be, if the pitchline velocity is beyond a certain speed, noise is likely to be generated, and under such conditions, in order to eliminate the noise, the gears are "leaded."

The process of leading is best carried out when the flange (below the roots of teeth) are undercut and then filled in by casting a rib of Babbitt around the inner periphery of the gears. This layer of Babbitt, even though it may not be so very thick, will kill noise most effectually. To show something of how this work is carried on, reference will be had to Fig. 30, of a battery of gear cutters, and Fig. 31 is assembled transmission units, as taken for the author at the plant of the Warner Gear Company.

In going through the several plants and in discussing the matters with makers of machine tools, the conclusion is reached that the automobile has modernized processes to a vast extent, and among the builders of note, principles are very much alike. Fig. 32, for illustration, presents a method of broaching square holes in sleeve gears, the process being rapid and accurate. In spiral half-time gear making, the idea being to eliminate noise, the gear cutters are of the highest order of merit, one of the finest examples being that as shown in Fig. 33, as used in the plant of the National Motor Vehicle Company at Indianapolis, Ind.

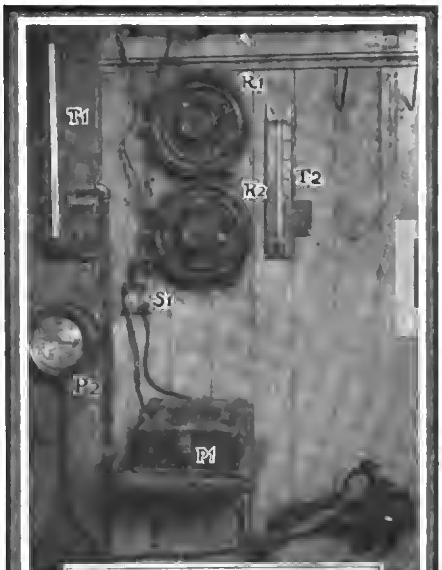


Fig. 21 Pyrometer, thermometers, rheostats, pressure-gauge, and other equipment used in heat treating Diamond chains

SHOP TRANSPORTATION BEING LOOKED AFTER

While traveling cranes are used to some extent, especially in the plants devoted to the manufacture of high-powered motors, even so, considering the run of automobile plants and the fact that the largest units weigh less than 1,000 pounds as an outside figure, other methods obtain for the most part. Industrial railway systems using the "Hunt" narrow-gauge standard of track building, which is 21 inches, with a scheme by which the longest cars are capable of rolling around a curve of 12 feet radius as easy, according to C. W. Hunt, "as a wagon rolls around a corner."

These tracks come made up, and are laid flush in the concrete floor, hence serving their useful purpose without impediment of

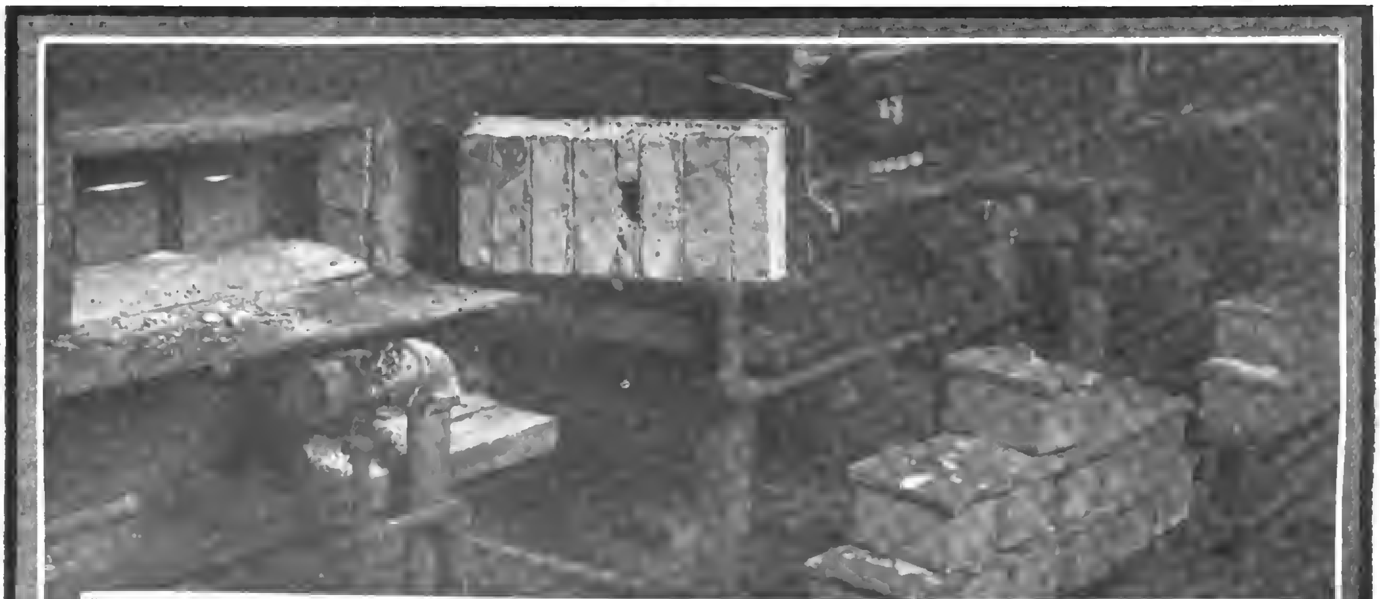


Fig. 23—Cementing furnaces, as used in the manufacture of Diamond chains, to make surfaces glass hard, leaving cores soft

Fig. 26—Special gang-saw, cutting off 28 blocks at one time, as used in Diamond block chain

any kind, and the cars, as usually made, come in several lengths, ranging from 6 to 14 feet over the platform. The cars, being designed for easy pushing when loaded, are mobile in the extreme, even when being pushed with a full load by a single laborer. Tote pans made of pressed steel are used to keep the work separate, especially the small parts, and these pans are loaded on to the cars as the operations are completed, when the laborer pushes the cars along to the point of delivery. Small electric locomotives are also available for use in the larger shops.

Other Methods of Transportation in Vogue—Besides tracks and cars, there are systems of overhead trolleys by means of which motors are picked up and whisked along, one of which is being used extensively in the Rambler plant at Kenosha, Wis. Then there are portable pulley block cranes which do excellent work in motor assembly rooms, one of which is illustrated in Fig. 34, which is a type as made by the Cameron Engineering Company, New York City.

In some of the larger plants, adjacent to sidings, tracks are laid right into the shipping departments, and as a general rule the siding passes by the receiving room. This is a positive advantage in that materials may be landed on the floor, under the crane, or beside the equipment used for moving materials in the shop. The overhead charges, which must go against the output cost, whether it be automobiles, parts, or accessories, will be less in the plants which are fitted out for good transportation than will be true of the remaining plants, and this year, if signs count, every effort is being made to keep down overhead charges and put additional quality into automobiles. The cost of selling an automobile is lower when the quality is superior, and it is in the cost of selling that economies will have to be made.

SANDBLAST TAKES PROMINENT PART

In former times, owing to the habit of keeping in a groove, which according to competent authority differs only from a grave in that it is longer, pickeling was practised almost to the entire exclusion of sand blasting and drop forgings, for illustration, were frequently neglected. In the course of time, due to protracted investigation, it has been found that even the very best drop forgings may not be relied upon unless they are given a critical examination, even when annealed, and in the absence of annealing they lacked requisite qualities to a marked degree.

This year as never before drop forgings are in vogue, and, they being turned out in vast quantities, the question of annealing became of even more importance. Nearly every up-to-date maker of automobiles therefore, besides installing an annealing battery, added a sand blast in order to be able to quickly remove the skin of the forgings, thus enabling the inspector to see the surfaces and to note if they are free from blemishes. There are other important advantages to be attached to this question of sand blasting, as, for illustration, the parts anneal better and surface strains are thus removed more readily.

ANNEALING DONE IN DIVERS WAYS

When parts are at a high heat, if they are then exposed to the atmosphere they will oxidize, and in order to avoid this when annealing, in some of the well-equipped plants, the parts are placed in a "gas" annealing oven, in which illuminating gas is allowed to enter, thus driving out the atmospheric air, with its oxygen, hence oxidization is prevented and as a result the forgings are less troublesome to finish, and, besides, they have a better look. In sidebars, as used in chassis frames, this is an important matter owing to the thin metal used in them, thus making it undesirable to have any of the metal oxided away, as it would be were the annealing conducted in the open air.

In quenching baths, in order to maintain them at a constant temperature, which is desirable, they are cooled by allowing compressed air to enter, having the compression up to the refrigerating point, which is above 60 degrees Fahrenheit, and the same air, since it agitates the liquid, drives all bubbles of vapor from the surfaces of the parts undergoing quenching, and the results are far more uniform. This method is used to excellent advantage in the plant of A. O. Smith Company, at Milwaukee, Wis., in the process of making chassis members, which class of work is done on a tremendous scale at this plant.

PRODUCES GAS PLANTS USED

Power to run the large plants devoted to the manufacture of automobiles represents a large item in the overhead costs, and in the West in particular producer gas plants. utilizing gas engines, are rapidly taking the place of steam engines, boilers and their accessories. The plant of Wheeler & Schebler, makers of Schebler carbureters, at Indianapolis, Ind., is run in this way, and with the new addition, which is now well under way, a large pro-

Fig. 25—Economy inducing equipment, used at the plant of the Diamond chain to recover oil and dispose of turnings

ducer extension is being made, which is evidence of satisfaction given by the old plant. At the new plant of A. O. Smith Company at Milwaukee a very extensive producer battery is being installed, the entire and only source of power being from a producer system. Power of this sort is also used at the extensive plant of the Rambler, at Kenosha, and as a matter of fact there are divers other illustrations of this growing method of supplying power, in which the space required, labor of maintenance and fuel consumption seems to be lower than that possible when conventional steam methods obtain.

INSTRUMENTS OF PRECISION DEPENDED UPON

Interchangeability of parts, being the far cry, demands precision of method, and this in turn must be at the expense of instruments, facilities and the class of men who appreciate their proper use. Makers of measuring instruments, appreciating this, have produced for such use divers instruments, all of micrometer characteristics, and in many instances the principle of the "extensometer" is embodied by means of which the ten-thousandth of an inch may be read off as readily as it was before to read to thousandths. These instruments, in conjunction with jigs, fixtures and method, such as illustrated in this article. has done more to make automobile parts interchangeable than any one thing excepting the demand of the American autoist for first-rate automobiles.

Fig. 28—Women, occupy a place of worth, performing responsible operations, in the manufacture of Diamond chains

ROAD TESTING VALUE

Some of the companies give the cars made an actual road test of approximately 100 miles, and in this test it is the aim to abuse the cars, thereby breaking any parts which may not be up to the required strength. This test is in addition to such shop tests as are required to render the product uniform in character. In other plants, due, in a large measure, to a difference of opinion as to the value of a road test, this abuse test is dispensed with and every effort is made, in the shop, to fix the standard of quality, even to the extent of testing every lot of material used, to quite some extent, in the laboratory.

The mere fact that an abuse test is given is not, insofar as can be seen, reason for slighting the shop tests, nor is it believed that the companies who do resort to the abuse test slight the other methods. Of the plants visited, those which practiced the road test of all cars made, also run a laboratory, and that laboratory methods obtained to a vast extent was seen. Whether or not the road test is desirable is a matter that must be settled in time, yet even so, it does seem as if trouble, if such there is, should fall to the makers, which it probably will if a rigorous test of 100 miles is actually made under severe road conditions.

ELECTRICAL TRANSMISSION OF POWER

As never before, the transmission and distribution of power, in the shops, to the respective machines is being accomplished by utilizing electric motors, and in many of the most important cases individual motors are being much used. As a rule, how-

Fig. 27—Special assembling tool, fitted with a hopper, by means of which the work is fed continuously in assembling Diamond chains

ever, with a view of realizing a good average efficiency, at a reasonable first cost, mixed systems of distribution prevail, in which groups of kindred machine tools, as drill presses, for illustration, are run from a countershaft, and this shaft, in turn, takes its power from a single electric motor.

The power house, for divers reasons, should be placed at a

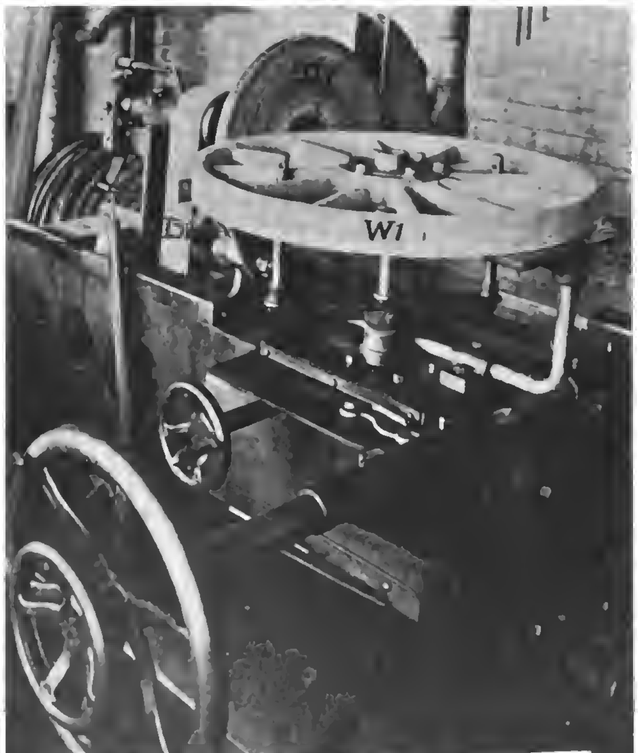


Fig. 29 Modern wheels to be true, and to size, are trued up in a machine as here illustrated

Fig. 30—Bank of gear cutting machines in the plant of the Warner Gear Company, of which there are many

distance from the main buildings, and this is rendered possible when electric methods of transmission are taken advantage of. With the power house at a distance the fire hazard is eliminated to the extent that if a wing of the main buildings is lost, the power plant will be intact.

In the power plants, as they are being fashioned, if steam is used, coal is handled economically by means of stokers, and the labor item, as well as certain labor complications are placed below a shut down for lack of power. The electric wiring systems, to the greatest possible extent, are run free of the buildings, it being the idea to abort an interruption of service in the balance of a plant if, perchance, a wing should take fire.

Direct Current Most Used—In the distribution of electrical energy for power purposes, the several electrical problems have been worked out to a high state of efficiency, and, while alternating-current work is, to some extent, to be seen, yet even so, users seem still to have a strong preference for direct-current motors. If the power is taken from a central station, which, in some cases, is true, the source may be alternating, but, in the shop, rotary transformers are then employed and the motors remain direct current.

The power actually used by a considerable number of motors, as distributed in a shop, is far below the total of the motor ratings. It has been found that the source of electrical energy, as the dynamo equipment, will scarcely have to be more than about 25 per cent of the sum of the ratings of the motors used in the plant, even assuming that each motor is loaded to its full capacity at times during the day. This is an important point well worth taking into account when plants are being installed, and, while 25 per cent is not exactly right, yet even so, the worst condition is scarcely above 33 per cent; the exact percentage depends upon the number of motors and the total power capacity of them.

In determining upon the extent to which individual drives should be indulged in, the several automobile builders consulted their pocketbook to the extent that the first cost is higher, and, having satisfied this phase of the problem, they then considered that a machine, if it requires less than one horsepower, maximum, to run it, might well be grouped, as a rule. The commercial efficiency of a motor, if it is wound for less than one horsepower, is considerably below 75 per cent, and, economy being the great factor, the commercial efficiency of the motors must be considered.

How Fire Risk Effects Parts Plants—When an automobile maker places an order for parts he is much concerned about deliveries, and since all contracts terminate with a fire, it is up to the purchaser to place his orders with the class of parts makers best protected against fire. Some companies, when considering the placing of orders for parts or accessories, indicate a willingness to pay more if the fire risk is reduced to near zero, as it is in many cases. In other cases it is the settled policy of the companies not to place an order unless the building in which the work is to be done is absolutely fireproof. The Timken Roller Bearing Company, for illustration, is authority for the statement that none of its materials, as used in its products, is purchased from any source unless the building in which it is made is absolutely fireproof and a sprinkler system is installed.

Saw-tooth Buildings are Fireproof and Light—Many of the most modern plants devoted to the making of automobiles are of the saw-tooth variety, or variations thereof, and modern cement construction. Good examples of these types of building will be found at the Inter-State, Hupmobile, Rambler, Mitchell, National, Oakland, Pierce, Premier, and others. One of the very largest,

Fig. 31—Lot of transmission gears ready to box and ship from the plant of the Warner Gear Company

and perhaps, the most imposing of the newer buildings of the year, is that of the A. O. Smith Company, at Milwaukee, which is about ready for occupancy, and will be devoted to the production of chassis frames and parts, also transmissions, steering gear, brake drums, and, in fine, everything that pressed steel will shape up to as used in automobiles.

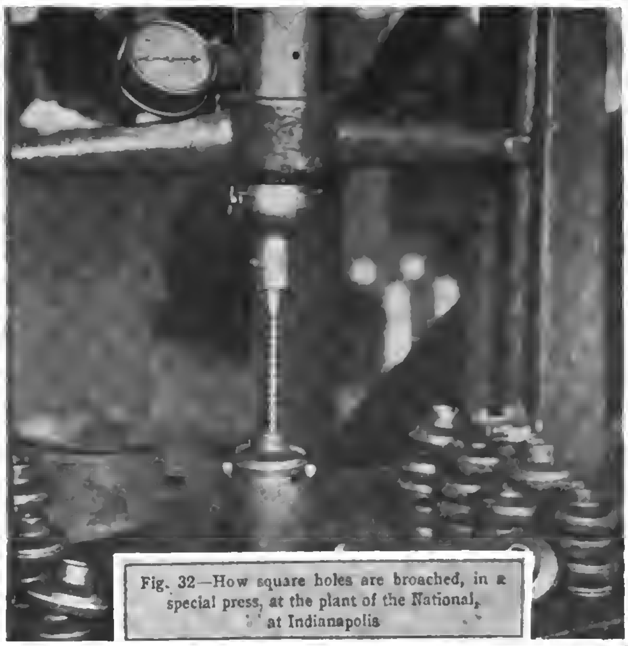


Fig. 32—How square holes are broached, in a special press, at the plant of the National, at Indianapolis

USES OF AUTOMOBILE TYPES OF MOTORS

Besides the regular use to which the automobile motor is put, in propelling automobiles, and, not mentioning aerial propulsion, there is still another zone of activity which it is expanding at a very rapid rate. Prior to the advent of the automobile, attempts were made to run plants and do electric lighting, using gas and gasoline types of internal combustion motors in the process. The motors, while they run with a certain ratio of facility, failed, for the most part, owing to interruptions in service, which seemed unavoidable, owing to the lack of good control of the motors.

This last year, as it seems, particular advances were made; motors, for stationary work, are more nearly in accord with practices in automobile engineering, and in many of the plants devoted to the manufacture of automobiles or accessories, internal combustion motors are employed, in some cases for power in general, and in many instances for lighting, in which the lighting dynamo is driven by a four-cylinder automobile type of gasoline motor. True, in the better examples, as at the plant of Wheeler & Schebler, at Indianapolis, the gasoline is eliminated and a suction producer system of gas making is used instead.

In view of what has already been done, and considering the extent of activity now to be noticed, it comes as a pleasant duty to report something of the progress which is being made, progress, in fact, which assures that internal combustion types of motors are now claiming a fair share of the attention of the most advanced engineers who make a specialty of power transmission, considering carefully the thermal efficiency of the power plant proper.

Gasoline-Electric Generator Sets—Perhaps the most notable advance, which will count in the long run, is in connection with the relatively new attempts, on the part of manufacturers of electrical machinery, to build gasoline-electric generator sets, they being in the several sizes, ranging from a generator used to furnish power for a searchlight to the largest sizes, as required for lighting and power, in plants of pretense. Among the particular advances which were made in this field the generator sets now being offered by the General Electric Company, Schenectady, N. Y., are worthy of particular notice. These sets are made in several sizes, one of which having an output of 25 kilowatts, with an overload capacity of 25 per cent.

Compactness is a striking feature in these sets, and in plants where space is valuable, this phase of the situation becomes of more than a little moment. The labor problem is much simplified; it takes but a few moments per day for a man of just a little skill to keep this class of equipment in working order.

Charging Storage Batteries Considered—In these days, when electric vehicles are becoming more numerous than flies, as it were, the question of charging stations, at well regulated points all over the land, is being taken up and struggled with. The method of driving the charging dynamos has to be reduced to finality in the long run, and there is probably no better way from any point of view than to employ just such a set as is here referred to. A licensed engineer will not have to be placed in charge of the plant; space required is much restricted; efficiency is favorable, and the regulation is all that this class of work requires.

A 25-kilowatt generator set will easily handle 12 batteries at one time, and charging 24 hours per day, which is the most economical way to do this class of work, makes it possible to charge fully 36 vehicle batteries at one time, even if each battery must be on charge for eight consecutive hours, which is not usually the case. Just how many batteries would have to be fully charged each day is difficult to state, owing to the influence of locality, character of service, and other details. In private service, as with cars owned by individuals, a 25-kilowatt generator set would be ample for fully 100 electrics. In cab

Fig. 33 Spiral half-time gears, made noiseless in operation by the method, as shown, at the National

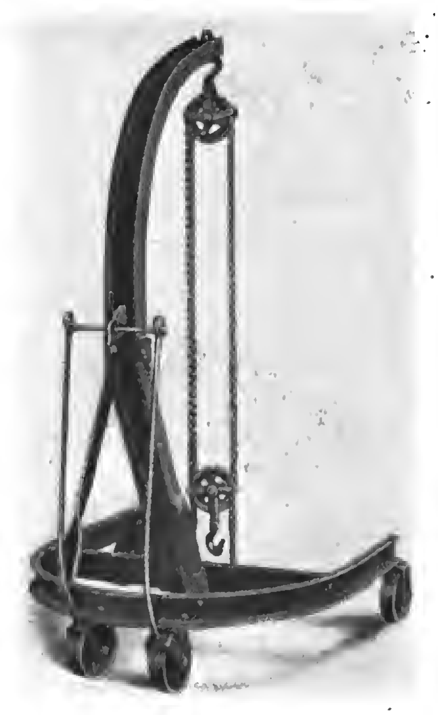


Fig. 34—Portable pulley block crane, made by Cammeron Engineering Company, used in shops for handling motors, etc.

service, owing to a peak load as night approaches, not more than 40 cabs could be handled, unless, in connection with the generator set, a storage battery is employed, the same being used to absorb the excesses from the generator set, during the hours of each day when the vehicle batteries, on charge, might fall below the capacity of the set.

In running a generator set 24 hours per day, it would be feasible to take advantage of the presence of a night watchman, who, in view of insurance requirements, must be present, in any event. The skill demanded would not be beyond that of a man of fair intelligence, as a watchman, if he is worth relying upon at all.

GENERAL ELECTRIC PORTABLE DRILLS

Besides the types of direct-current portable drills that have long served in shops, especially in the department in which chassis frame and assembling work is done, there is now to be had, when the conditions require, types of alternating-current portable drills, which are efficient and capable. In some plants, owing to taking current from the central power companies, direct current is not available, and while electric motors may be run with good facility, and lighting may be accomplished, using alternating current, even so, in the past, the question of portable drilling was not in such good shape, and, in view of recent advances made in this field, it is pleasurable to note that this phase of the industrial problem is now well in hand.

Electrical Energy Required in Drilling—Considering machine steel, which is about the hardness of chassis frames and like work, the electrical current required is about as follows:

CONSIDERING THE SEVERAL SIZES OF DRILLS

Size of Drill	Time Required	Watts Taken	Current in Amperes
1-8"	30 sec.	110	1.3
1-4"	28 sec.	150	1.7
3-8"	95 sec.	200	2.15

Motors are regularly wound for a 60-cycle circuit and are capable of delivering something over 1-5 of a horsepower. The line current and input in watts are nearly parallel, and the power factor increases to slightly better than 90 per cent. at a little over half load. It is about half load that the motor must work in the average undertaking, and, under such conditions, the motor has an ample reserve of ability, heating is well in hand, and the power factor is at a favorable point.

Electro-dynamometers Much Used—In testing motors, in the respective shops, electro-dynamometers are now almost standard, they being, in principle, as shown in Fig. 35, in which A is the armature of the electric machine, B is the separately excited field winding over the pole-piece, of which there may be any even number (four, six, or eight being common), C is the field, and serves also for the frame. D represents one of the pedestals of the cradle, there being one at each end with bearings for the armature spindle, E represents counter weights, F is the arm, G is the platform of the scales, H is the beam of the scales, I is the field rheostat by means of which the strength of the field is altered to suit the requirement, and J is the rheostat, or other suitable means, by which the energy of the dynamo is disposed of. A bank of lamps, or water rheostat, usually takes the place of J. The armature must be wound, and of a size, to deliver about 600 watts per horsepower of the motor to be tested, but the voltage may be any desired value within practical limits. The figure is merely diagrammatic, and, in practice, there are several compact forms of electric-dynamometers to be had, and at reasonable prices, considering the value of the method. At the Rambler plant, a somewhat different method is in vogue, which was described in THE AUTOMOBILE, issue of December 23, 1909.

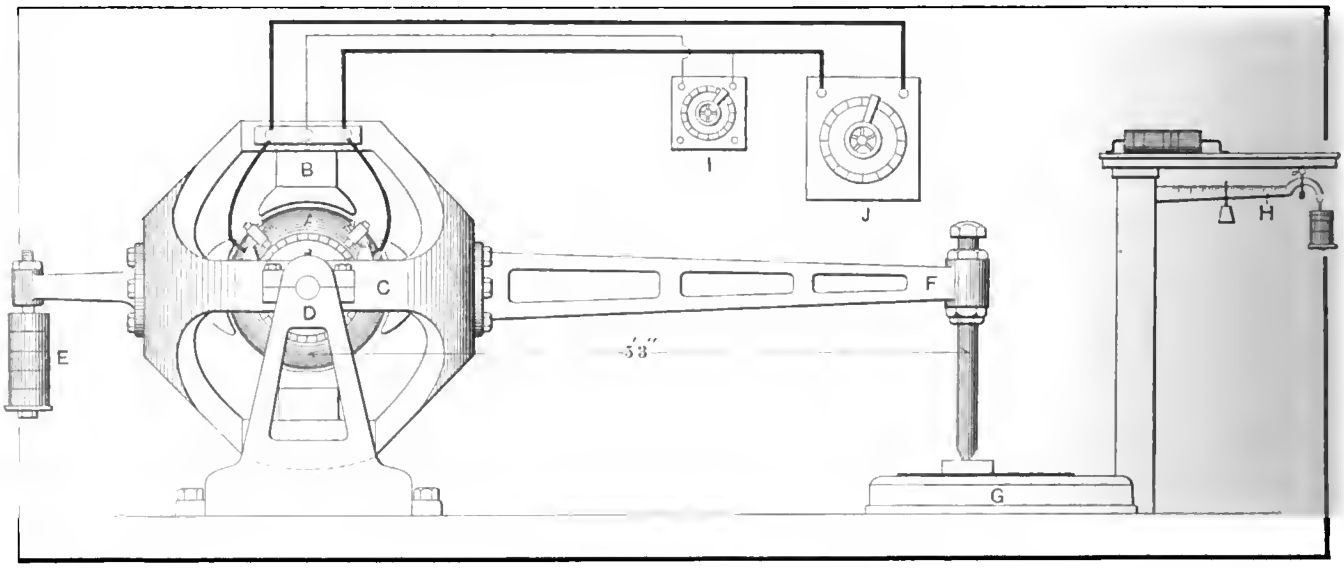


Fig. 35—Diagrammatic representation of an electro-dynamometer, as used for testing automobile motors, of which there are divers modifications

Advanced Mechanical Features That Prevail

By Thos. J. Fay

TAKEN at random, some actual working drawings from which the automobiles as they are to be displayed at the Grand Central Palace were made, these drawings having been placed at the disposal of the author for publication, it will be possible to make a definite showing, much more so, in fine, than in any other way, particularly since the very cars on exhibition were examined during process of manufacture by the author, and at some length. Unfortunately, it will be impossible to reproduce more than a fraction of them, nor is it true that those reproduced make for more than representation of the situation in general, which it is the purpose here to reflect.

Safety Has a Large Share in Present Practice—It will be the purpose here to reflect, by illustrations and otherwise, the extent to which safety is uppermost in the minds of designers, and it is just this safety that accounts for the diminished list of accidents which statistics indicate. While the number of automobiles actually in commission have increased this last year to an enormous extent, the list of accidents has gone up but slightly considering the increase in the number of automobiles running.

Better brakes, superior clutches, advances in materials and a closer relation of the designer to the product account for improvement in this direction, and, considering the advances made, legislation of the rabid sort will soon be out of place. In many ways racing has played an important part, this method of testing out cars having the faculty of locating the little as well as the prominent weaknesses in automobiles.

While it is true that cars are this year more than ever the product of parts establishments, it is equally true that parts makers are more inclined to have their own way when reference is had to quality. It is now the settled policy of parts makers to grow a reputation which will serve as an asset in future, and they recognize the utter impossibility of doing so if they merely follow specifications, provided they reach the conclusion that the specifications are for inferior products.

Facings Used in Clutch Work—This year, in view of improvements in materials for facing clutches, there has been a distinct movement in the direction of dry-disc clutches, using but a limited number of discs and either cork inserts or asbestos fabric in the facing. Of the cork insert types nothing more will be said at this time, but of the asbestos fabric it may be well to refer to it in somewhat definite terms, giving results of a test or two, which will show that the claim for lasting qualities under heat and pressure is well founded.

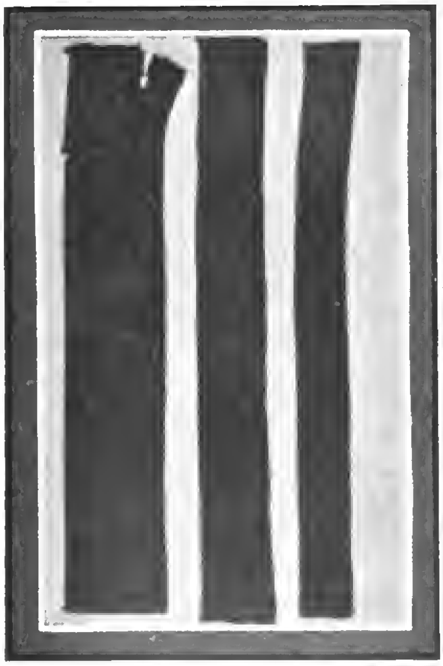


Fig. 1—Physical test of Raybestos, proving tensile strength

Fig. 1 is of some of this fabric, which was pulled in a testing machine at the large plant of the Pierce-Arrow Motor Car Company, with results as follows:

Thickness in inches.	Width in inches.	Ultimate Strength in pounds.	Thickness in inches.	Width in inches.	Ultimate Strength in pounds.
7.32	1½	900	7.32	2	1,280
7.32	1½	960	7.32	2	1,360
7.32	1½	840	7.32	2	1,200
7.32	1½	990	7.32	2	1,480
Approximate average ultimate strength, 2,743 pounds per square inch.			Approximate average ultimate strength, 2,876 pounds per square inch.		

Fig. 2 is of the same material after it was "fired" to determine its heat-resisting qualities, which proved to be satisfactory up to 1,110 degrees Fahrenheit; the material was still strong.

Fabric, taking advantage of the heat qualities of asbestos, is rendered strong by having the asbestos interwoven with copper or other suitable wire mesh, and it has been determined that the coefficient of friction of this material is not far from 0.25, which is considerably better than that of any of the higher grades of leather used in this class of work.

In some cases, to afford immunity from the ills of excesses of lubricating oil, cork inserts are used in conjunction with asbestos fabric, and when the design is happy the results are of a permanent character. Leather alone in cone clutches, if it is properly backed up by means of springs, seems to be entirely feasible, and many of the cars adhere to this plan. As it stands, then, for this year, clutch facings are quite well divided between:

(A) Leather, in cone clutch work.
(B) "Cork Inserts" alone, and with leather or asbestos fabric.
(C) Asbestos fabric.
(D) Steel on steel, lubricated or dry.
(E) Steel on bronze, to some extent.
(F) Steel on cast gray iron.

Clutch spiders are largely of aluminum, but the metal used is on a better footing than formerly, it being the settled policy to avoid the use of "scrap" in the process and demand ingots of far greater purity than formerly. The shapes of the spiders, as the illustrations herein given will show, are for strength, in the absence of great weight, and in sliding gears the effect of inertia is not so much to be noticed as on former occasions, when the weight of the spider was far greater than now.

Refinements in Clutches Noted—Tried methods seem to be in favor, and few indeed are the absolutely new clutches to be seen. It is very likely that the clutch, Fig. 3, just brought out by the Elkhart Motor Car Company and applied to "Sterling" automobiles, is the latest idea, in which driving is done through the shell A. in conjunction with its mate B, and in operation the wedge shaped member C,

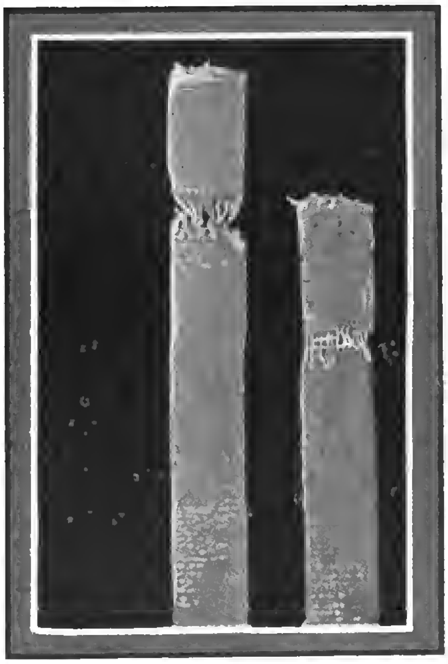


Fig. 2—Heat test of Raybestos, indicating heat-resisting qualities

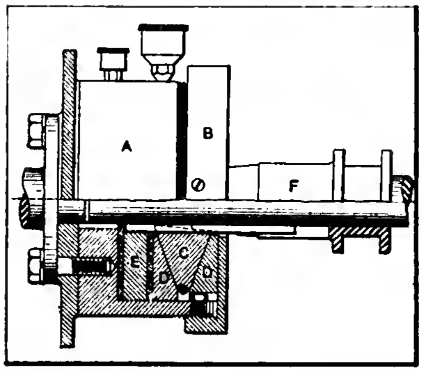


Fig. 3—New form of clutch, which is reported to perform with great precision

which embraces 90 degrees of arc, is moved toward the periphery of the adjacent disc by travel of the tapered sleeve F, thereby expanding the discs E, binding it between the base of the clutch and the member D. Red fiber is used as the friction material, this being a detail which may be altered to suit the individual.

Multiple Disc Clutches Being Improved—The best indication, perhaps, of improvements being made in multiple disc clutches is that as presented in Fig. 4, which is a driving member in Premier practice, the disc being of sawblade steel, properly heat treated and so contrived that the lubricant, if such is used, will be scraped away from between the discs at a rapid rate and the discs will spring apart when the tension of the spring is relieved. In actual practice in almost every instance oil, for purposes of lubrication, is not used, and the Premier Motor Manufacturing Company, Indianapolis, Ind., is authority for the statement that lubricating is not particularly desired; the clutch works dry usually for a longer time without attention of any sort. Fig. 5 is of a driven disc in Premier practice, in which it will be observed that the driving faces are liberal; this disc is also of steel, so that the drive is steel on steel, preferably not lubricated.

Clutch and Transmission Combined—Multiple disc clutches lend facility to the process when it is desired to place the clutch within the gearcase, as is done in the Inter-State Model 40, as shown in Fig. 6, and since the whole case is substantially cylindrical, strength is assured. The discs are lubricated in a very simple fashion, assurance being present of no lack of oil, since it is held in the case in excess. The service rendered by this system is sufficiently conspicuous to warrant one in predicting that it is one of the types that will survive for all time.

Brush Runabout Has Compact Clutch—The idea worked out in the Brush Runabout is to be commended, for this clutch, while it is of the multiple disc type and within the transmission case, is really a set of discs clamped between a set of vise-like jaws when the clutch is "in." The excellent work this type of clutch is doing rather goes to show that it is quite capable enough for general exploitation, and it is one of the features which has made the Brush Runabout all that it has proven to be.

Jackson Multiple Disc Clutch Simple—Referring to Fig. 7 it will be observed that the clutch in the Jackson, made by the Jackson Automobile Company, of Jackson, Mich., has three plates, they being of large diameter, actuated by a toggle motion in which pressure to the maximum is exerted at will by the operator, and lost motion, if it is generated in time, due to wear, is readily taken up by the means provided. In this clutch the plates are separated by the springs B, and the discs are prevented from rotating by the torque bolts A A A. For taking up lost motion all that is necessary is to undo the capscrew D, screw up on the shell enough for the purpose, and tighten up the capscrew again to lock the system in place. The toggle system C will require no discussion, it being exactly the same as has worked for years on the best types of locomotives in connection with the very powerful brakes demanded in express service.

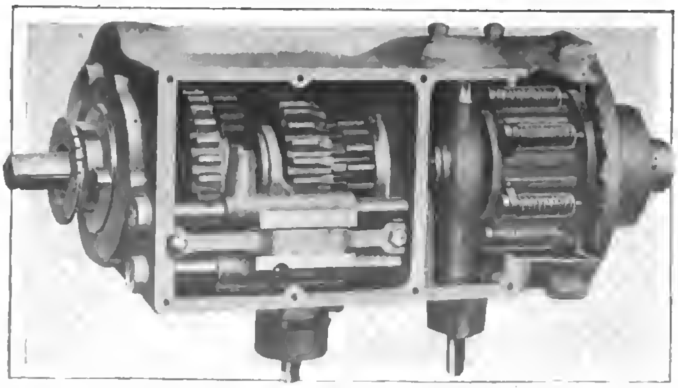


Fig. 6—Inter-State type of multiple disc clutch, housed in transmission case and profusely lubricated

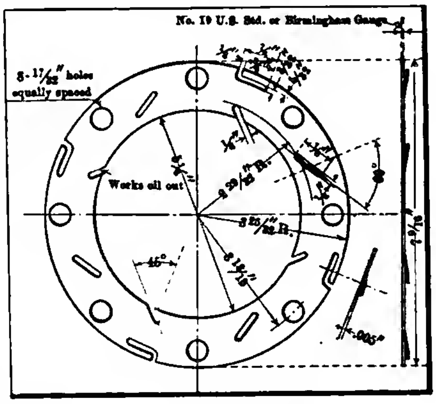


Fig. 4—Premier form of disc, designed to work well with or without lubrication

National Cone Clutch of Great Simplicity—Fig. 8 is a section of the cone clutch with a leather facing, L1, and flat springs are placed under the leather around the periphery for the purpose of pressing the leather into proper engagement. The clutch is flanged, F1, and a long bearing, B1, serves to maintain concentric relations. The square spring S1 presses the clutch into engagement, and adjustment is secured by pressing the thrust block of the ball type up against the other end of the spring. Thrust is equalized by means of the ball thrust-block T1, and the universal joint back of the clutch J1 occupies a dual capacity, in that it compensates for flexure and takes up endwise motion.

Cork Inserts Found Beneficial—In many cases, especially in cone clutches, but not limited to them, cork inserts are used in the manner as shown in Fig. 9, which is a type of cone clutch as made by the General Manufacturing Company for several of the well-known makers of automobiles. The clutch in a general way is of the conventional sort, the only difference being that the periphery, as well as being provided with the leather facing, has cork inserts, as patented by the National Brake & Clutch Company, of Boston, Mass., spaced in sockets around the periphery. The cork affords a better coefficient of friction, works in oil as well as dry, lasts for a long time, as is proven in Premier brakes, and prevents the leather from burning out.

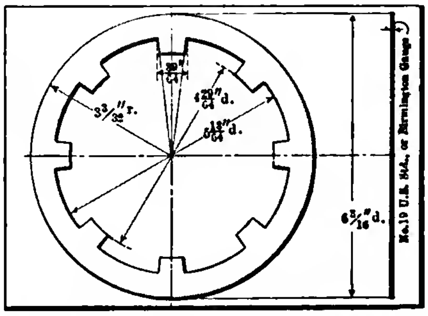


Fig. 5—Premier disc, mate of that shown in Fig. 4, designed to afford well-regulated surface

Marmon Idea Has Special Virtue—That there are divers ways of delivering satisfaction is shown by Fig. 10 of the Marmon, which is a leather-faced cone clutch, but, unlike other forms of cone clutches, the leather is pressed into engagement by means of spiral springs, which are placed in sockets around the periphery, and by means of a mushroom which engages above and interprets the spring pressure, the leather is maintained in good relation with the friction surfaces at all times. This type of clutch has proven of the greatest value, and is a fine illustration of the extent to which engineers may follow their own bent if only they confine themselves to good work, maintaining friendly relation with the laws which control.

Regal 30 Represents Correct Assembly—In the Regal 30, as offered in Fig. 11, the cone clutch is pressed into engagement against a truncated cone of conventional angle, and the leather face is pressed into intimate relation by flat springs. The female member of the clutch is integral with the flywheel, and a universal joint is placed just back of the clutch sleeve, with a bearing intervening between it and the universal joint which serves as the termination of the torsion tube, which is concentric with the propeller shaft. The bearing, which is a Hyatt, is made of special nickel steel, and the work which the torsion tube lends at this junction is taken care of, so that it is not transmitted to the clutching members.

Connecting Rods Are of Special Steel—I-section drop forgings of a special grade of steel is used for connecting rods, it being the idea to limit the weight of the reciprocating parts to the utmost, and Fig. 12, of a Premier, is a good example of present practice. In this work, owing to the kinetic requirement, the material must be with well regulated carbon and metalloids; when the forgings are made they are also annealed, and a certain rigidity is catered to in the process. This connecting rod is for the 40-horsepower motor, and since all dimensions are given it will not be necessary to prolong discussion.

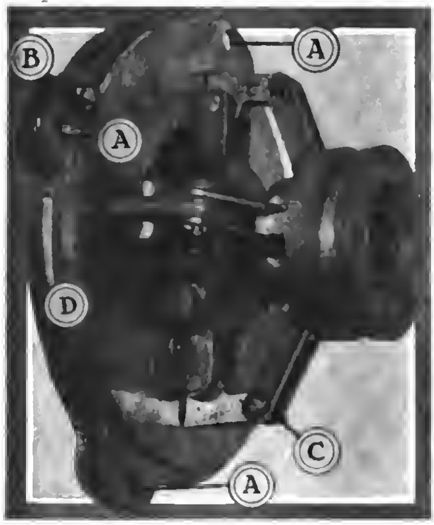


Fig. 7—Jackson plate clutch, engages through a toggle motion, with soft but positive action and easy adjustment

Still another connecting rod is that of the Moon, as presented in Fig. 13, for use in the Model 30, in which it will be observed that the metal is nicely distributed. The drop forging is of a selected grade of steel, annealed and otherwise rendered fit.

Cylinders Show Much Improvement—Fig. 14, of a Premier, is given complete, to indicate the extent to which drawings have to be made in order to assure good and uniform pattern, as well as in machining. In this example there is evidence of certain refinement in that the walls are of great uniformity, the cylinders being cast in pairs, and at A in the section it will be observed that the oilway is drilled in two diagonal directions, in order that the oil will reach the piston pin when the piston is at the bottom dwell point, and in order to be able to accomplish this, considering twins, it is necessary to drill in in the manner as shown. This is a fine example of care in design and construction as it obtains in the better cars of the year.

Referring to Fig. 15, of a Moon Model 30, which is the new Moon example, it will be observed that it represents a T-type of cylinder of extremely good design, and is a little more noteworthy in this case, due to the former practice of the Moon, which was to build with valves in the head. It is the claim of the Moon Motor Car Company that for the smaller car, as here represented, there is a little, by way of flexibility, to be taken advantage of in thus designing.

Fig. 16, which is a Rambler, differs materially from some of the other designs, it being of the individual cylinder genera, with well-regulated thicknesses of walls, special material as put out in

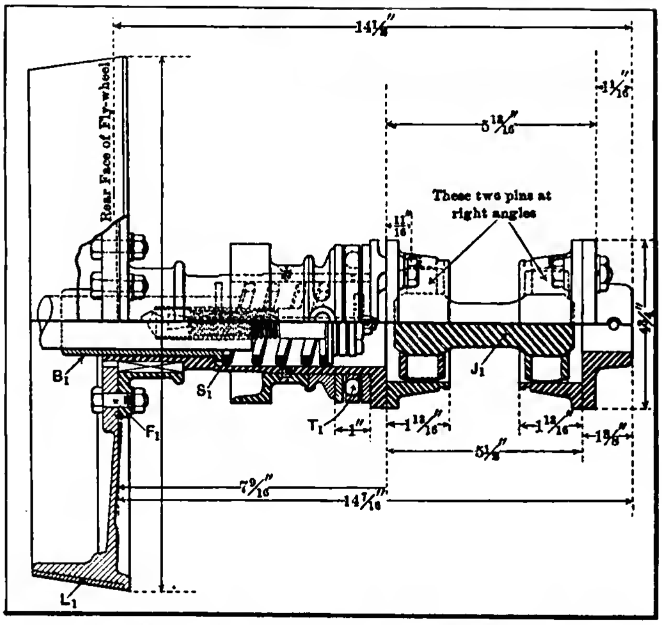


Fig. 8—National cone type of clutch with leather facing and flat springs to press leather out when square spring is free

the Rambler foundry, and so shaped as respects the frame-swept surfaces that cooling is efficient and easily accomplished.

In the smaller motors, as used in many cars of the year, cylinders are cast "en bloc," considering four-cylinder motors, and insofar as practice has shown they are very efficient indeed, rather going to indicate that practice in the foundry is up to a high standard.

Crankshafts Have Plain Bearings Mostly—Ball-bearing crankshafts, in spite of their good qualities, have made but little headway, although abroad there is some evidence of a revival of this excellent form. For the cars as they are to be seen at the Palace the best practice may be reflected by presenting a few of them, among which the Premier as presented in Fig. 17 will be mentioned, and, as will be observed, the flywheel is flanged on, bearings are liberal, and the proportions of the throws are in good keeping with the best requirements.

The National, as used in the motor of the Model 40, has all dimensions, given in Fig. 18, in which there is evidence of reserve strength, and the fine Italian hand of the designer left indelible finger prints. The throws are designed for strength, and considering the power of this motor at higher speeds, the section of the main bearings is made ample for the purpose; this motor speeds up to nearly two thousand revolutions per minute within the "stability" range of performance, and the crankshaft is balanced on this account.

In the little Brush runabout, while the car is sold at a very low price it has been possible to employ a crankshaft of splendid design, as shown in Fig. 19, and the material, which is a selected grade of crankshaft steel, is quite up to the standard set for the higher priced cars. This crankshaft is provided with means for attaching balancing arms,

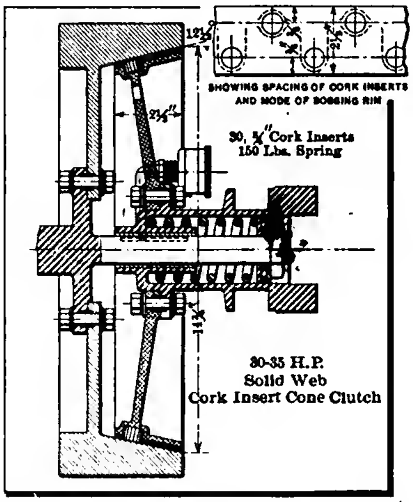


Fig. 9—"Cork Insert" clutch, of the cone type, made by General Manufacturing Company for many car makers

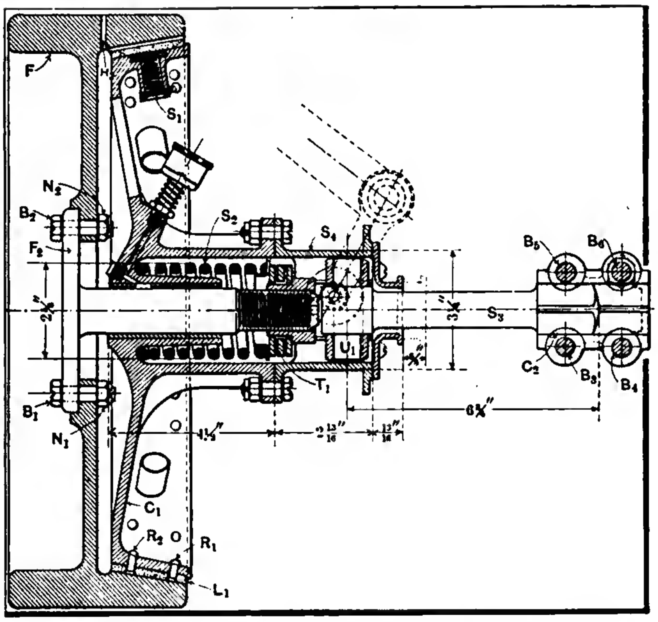


Fig. 10—Marmon clutch with leather facing and spiral springs placed to press leather into good engagement.

which are used in conjunction with a secondary balancing member consisting of a weighted gear, meshing with a pinion on the crankshaft, much as described in THE AUTOMOBILE, issue of October 14, 1909.

Transmission Gears Spell Finality—Selective types of transmission gears are used to the greatest possible extent, it being the case that the planetary types are limited to a very few of the smaller cars, barring one or two special examples. In the sliding gear systems, while there are some with four forward speeds and reverse, even so, three forward speeds prevail in the majority of cases. In one instance, the Hupmobile, a two (forward) speed sliding gear is used, the reverse being included, of course.

Fig. 20, of a Premier, will serve as a good example, it being for three speeds, selective, with reverse, and annular type of ball bearings are used throughout. The shafts and the gears, are made of a superior grade of alloy steel, are also relatively short, of liberal cross-section, hence free from any tendency to deflect under the load. The annular ball bearings are properly placed, the inner raceway being locked on, besides being a "sucking fit." The racks by means of which the sliding gears are shifted are of good diameter, reciprocate in long bearings, and the fork-arms are shaped for the work to be imposed upon them.

Unit Type of Transmission Interesting—In the American Simplex, made at Mishewaka, Ind., the unit type of axle and transmission is elaborately worked out with the lay shaft on the side, and the section shown in Fig. 21 is in the vertical plane, showing the location of the reverse pinion, laying in a depression in the bottom of the case in the same plane as the main shaft. This pinion rolls on an annular ball bearing, and the spindle is prevented from rotating by a through bolt at one end. Fig. 22 is the other view of this system, in which the relation of the lay shaft is clearly depicted and annular type ball bearings show at all points. This view also presents the jackshaft, one wheel, and shows the method of joining the wheel to the shaft, using taper fits and a hubnut of competence. The bevel pinion rotates on a pair of annular type ball bearings, thus taking the load in such a way as to prevent bending of the spindle. The differential gears are of the bevel type, and the housing rolls on ball bearings too. The gear is of the three speed and reverse, selective type, and while the whole looks a little heavy, yet even so, experience has shown that the weight is well distributed, the road performance being thoroughly good in every way. The materials used in the gears, shafts and other parts are alloy steel, excepting the case, which is of aluminum.

Marmon Presents Evidences of Refinement—As shown in Fig. 23, the unit system prevails. The transmission gear is of the selective type, with three forward speeds and reverse, and direct drive on high speed is brought about by sliding the internal gear G1 into mesh with the teeth of the pinion G2. Hill-climbing gear is let in by meshing the external teeth of gear G1 with the teeth of G3, when the gear ratio is unity, due to the fact that both gears have the same number of teeth; this leaves the bevel drive as the only means of gear reduction in intermediate speed, which reduction is that due to 53 teeth in the bevel gear and 16 teeth on the mating pinion, and 53/16 = 3.31. Low gear, used for accelerating, is let in by meshing G4 with G5, and the reverse requires that G6 and G7 engage with G4.

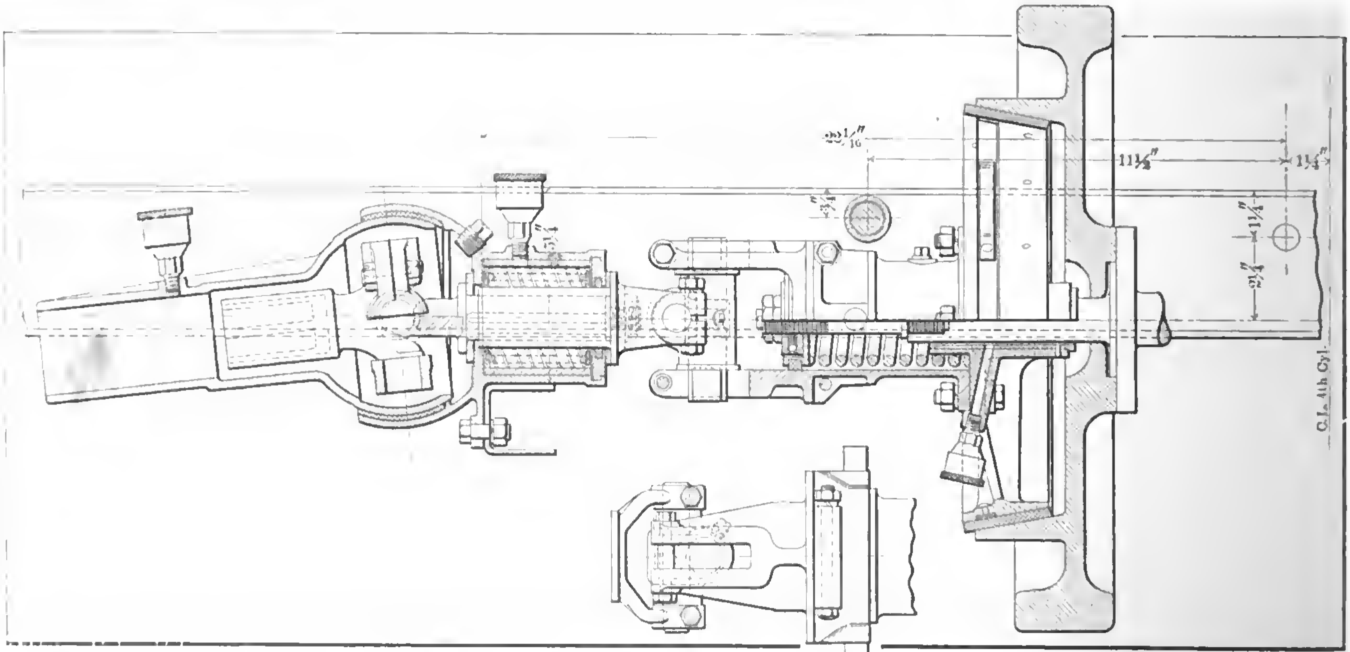


Fig. 11—Regal clutch, universal joints, torsion tube termination, and Hyatt roller bearing to resist load

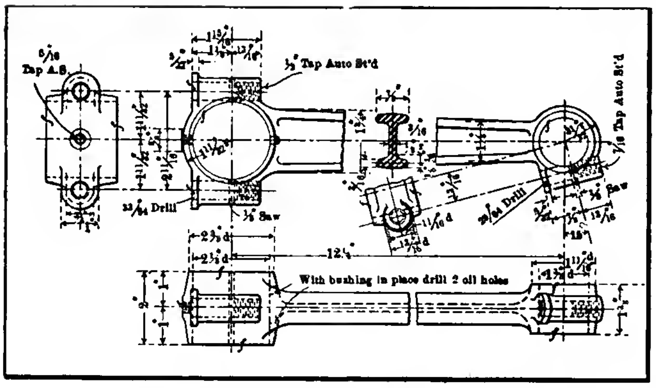


Fig. 12—Premier connecting rod, die forged, of steel, and designed for strength and low secondary moments

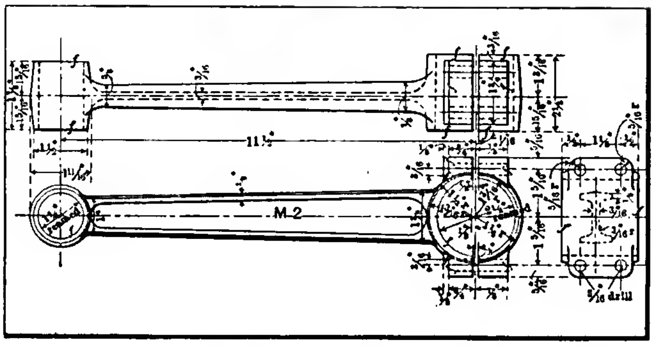


Fig. 13—Moon connecting rod, die forged, of steel, rendered light, yet strong, to eliminate inertia

The bevel drive, involving B1 and B2, with the latter flanged to the differential housing by bolts B3, B4, etc., is held in rigid relation by the large diameter shaft S1 and the large annular ball bearing B3, which is a sucking fit, and presses against the shoulder S2, is held on by pressure of the bevel pinion B1, and the end of the shaft is threaded, T1, so that the nut N1 is screwed up against the washer W1, locking the whole system in place. The pinion is prevented from turning by a key, K1, and the nut N1 is locked on by means of a wire in a groove, L1.

The lay shaft S2 is of large diameter, relatively short, hence rigid in the extreme. The gears are keyed on at K2 and K3, are of hardened special steel and of a shape to resist deformation in the process. The prime shaft S3 is a square, and the sliding gears are, like the fixed gears, hardened and of a shape to stay put. At the telescoping joint the gear G2 serves as a sleeve, and annular ball bearings B4 and B5 carry the load. Dirt is excluded by means of the housing H1, which engages the torsion tube T2, which is in concentric relation with the propeller shaft P1, and encloses it completely.

Novelty and the Rear Axle Are Companions—In Fig. 24 the jack shaft S1 is flanged at its end F1, and a supplementary flange, F2, bolted to the flange of the jack shaft, is faced off and fits against a face on the hub member, H1, of the rear wheel on each side of the car. The hub H1 is bored out to take a single annular ball bearing, B1, and this bearing, while it does all the work, is dead on the center line of the wheel, so that it is in a position to assume all the responsibility. The ball bearing is a sucking fit on the reduced diameter of the bronze sleeve S2, and this sleeve fits over the drawn steel tube T1, which is concentric with the jack shaft.

The ball bearing is held securely in place in the most approved manner by means of a locked threaded shell, S3, and the jack shaft, which is of the semi-floating type, is prevented from floating off by the interference of the petticoat P1 of the hub member H1, acting in conjunction with the flanges F1 and F2, they, in turn, being secured in place by means of the hub flange bolts B1, B2, etc., and the rivets R1, R2, etc. The hub cap C1 fits over the flange F2, and is held in place by cap nuts N1, N2, N3, etc., and the appearance of the wheel is somewhat unusual, due to the elimination of the conventional hub.

The brake drum D1 is fastened to the spokes S3, S4, etc., and the drum, while it is of unusual diameter, is also very wide, there being room, side by side, for the two sets of brake shoes S5 and S6. The shoes are faced with asbestos fabric, F3 and F4, which is heatproof and possesses a high coefficient of friction. The shoes are prevented from dragging by the springs S7 and S8, and when it is desired to apply the brakes it requires but a torsional effort on the brakeshaft S9 or the concentric tube T2 for the other set of brakes; this torsion, applied to either set

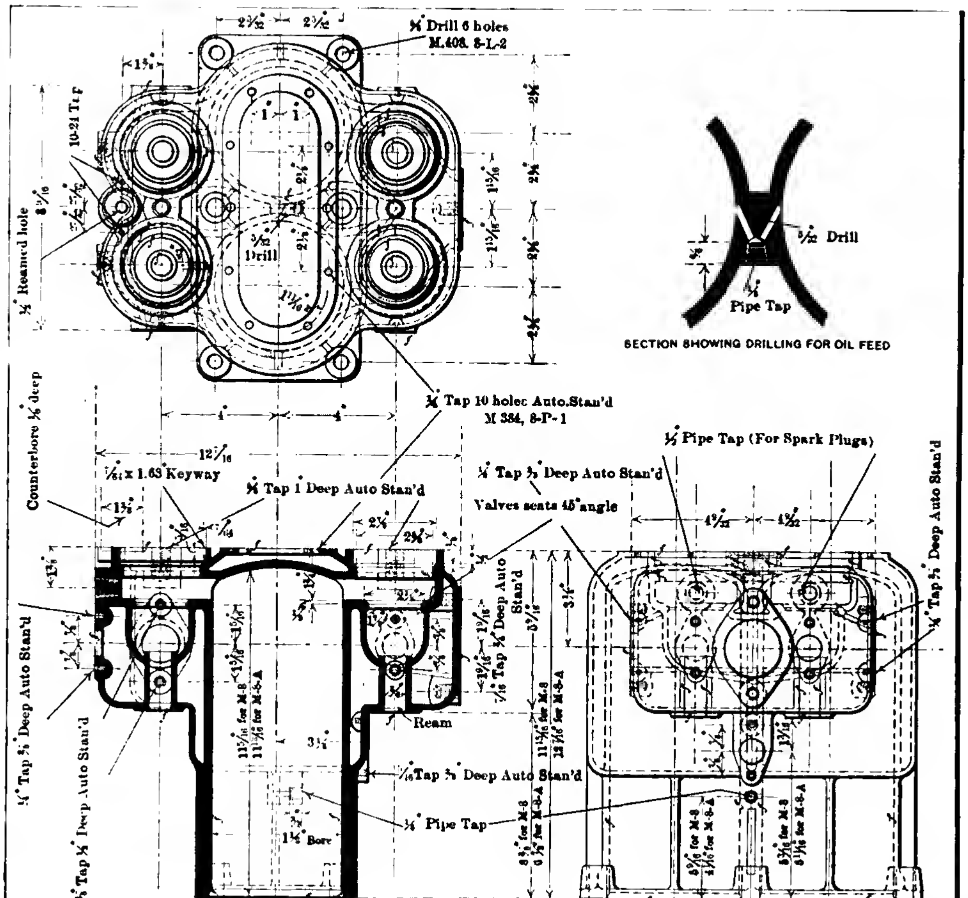


Fig. 14—Premier cylinder design, showing completeness of undertaking, uniform walls and efficiency of scheme

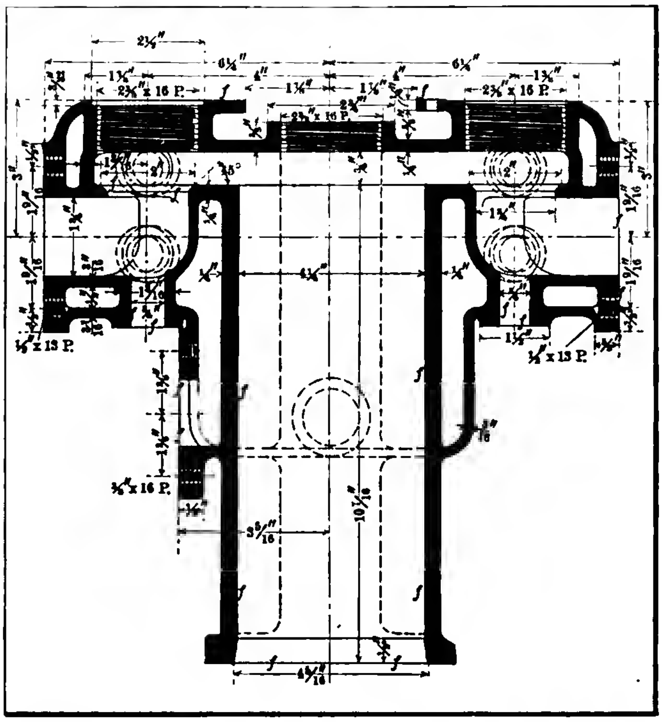


Fig. 15—T-type of Moon cylinder, which is the latest idea in Moon practice, depicting excellence in design

of members, will actuate the respective cams C2 or C3, expanding the bands and applying the necessary pressure to arrest the motion of the car. The brakes are powerful, and, all told, the area of contact of brake shoes is close to 352 square inches, and while the area of surface is not the main factor when effectiveness of brakes is to be determined, it is true, nevertheless, that the life of the brakes will depend upon this area of shoe contact.

Compactness is a Desirable Feature—The Regal, Fig. 25, is a type of unit transmission which for compactness and utility represents an advance, and the nickel-steel Hyatt roller bearings have the virtue of serving well the intended purpose, besides accentuating the compactness noted. This transmission is of the three-speed selective, with reverse, and, being carried by the rear axle below the spring suspension, takes up but little room, which counts as an advantage, as was shown by the Regal "Plugger" on its trip across the continent.

Live Rear Axles Much Improved—Taking the Premier as a type, the tube is of substantial design, but light, flaring out to a spherical bulb at the middle, as in Fig. 26. Timken roller bearings, R1, are placed on each side of the differential housing D1, which supports the differential member in the tube just at the enlargement, and the differential shafts are provided with liberal bearings, B1, at a point just before the square S1 engages the differential pinions. The most interesting point, perhaps, is in the detail of the propeller shaft just as it enters the housing, showing bearings B2 and B3, of the annular type, taking the load imposed by the bevel pinion and the bearing B2, supported by the dished member D2, which is made of steel.

Out at the wheel, Fig. 26, the brake drum D3, which is of large diameter with a brake-shoe area (total) of over five hundred square inches, which drum supplants the hub flange, being bolted directly to the wood, this being possible since the drum is integral with the hub. The driving jaws J1 are inside and the ball bearing B4 is just where it is in a position to take the load due to the jaw connection. The hub H1 of the wheel is fitted at A1 and A2, and a nut, N1, inside of the hub cap, keeps the wheel on the jackshaft. This axle, in view of the good service it has rendered, may be looked upon as representing permanence and one of the earmarks of automobile engineering.

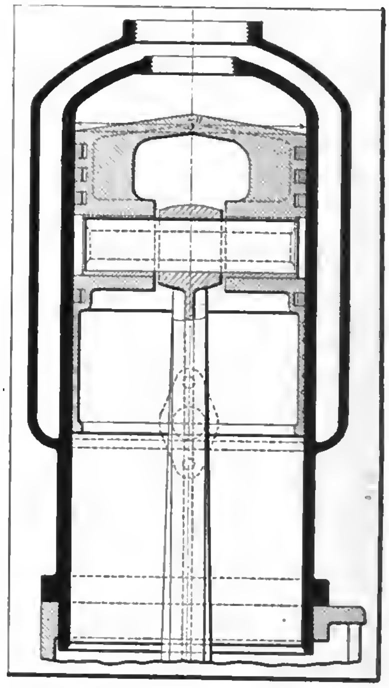


Fig. 16—Rambler cylinder, in section, cast individual, of great uniformity, and conforming to best requirements

Automobile Wheels Are Stout and True—As an illustration of present practice in wheelmaking, Fig. 27, of an American Simplex, is here offered, it being the case that the woodwork is especially well fashioned and the hub, which is of a good grade of steel, has excellent flanges for the purpose. In all respects the wheel is so clearly shown that further space will not be taken in discussing the details.

Lubrication Makes for Long Life—Noiselessness, which is the cry of the autoist, and which causes more annoyance this year to builders of cars than any other one point, will not for long re-

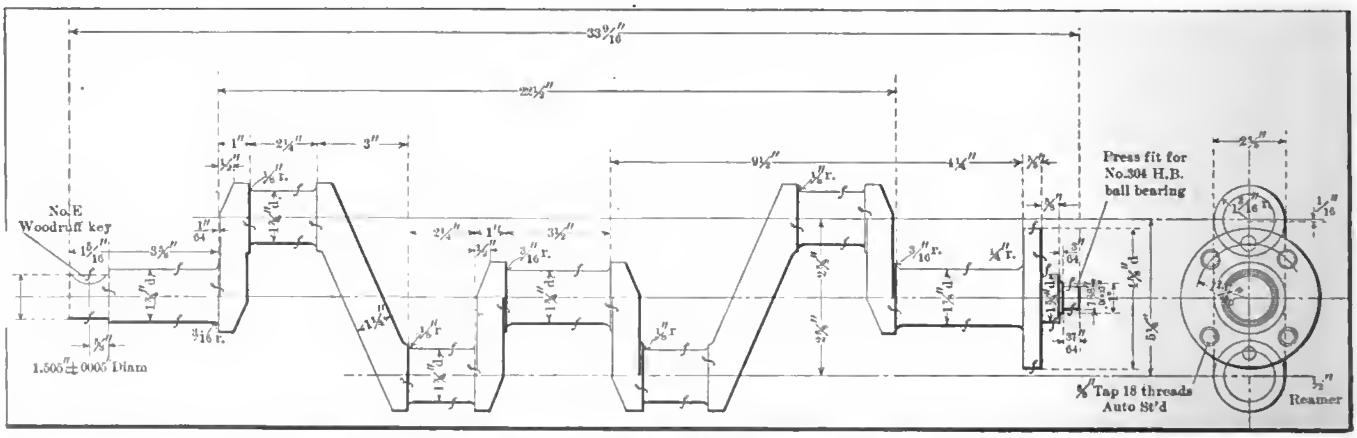


Fig. 17—Premier crankshaft, with flange for flywheel, using fine material and shaped for long life in rigorous service

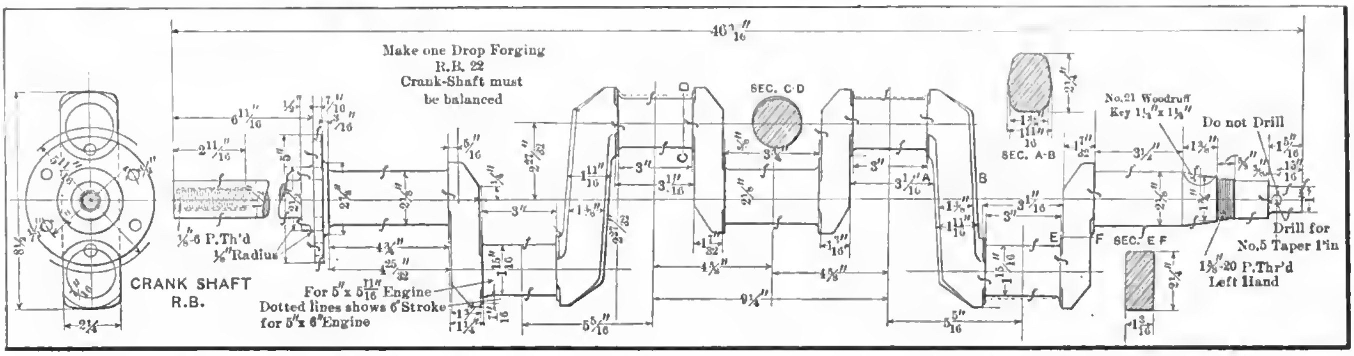


Fig. 18—National crankshaft, made of best crankshaft steel, with stout throws and perfectly balanced for high speed

main a fair claim for a car, no matter how well it is made, unless lubrication is absolutely effective. Grease cups serve a very important purpose in the cars of the year, they being placed at every point of vantage around the chassis where profuse lubrication by other means cannot be induced.

Fig. 28, representing an end bearing of a Rambler motor, shows how carefully details are cared for when reference is had to lubrication in which the oil is returned to the crankcase through the way W1 after it has served its purpose, which is to lubricate the bearing and keep the silt of the road out.

Fig. 29, of a Moon Model 45, is representative of the best practice, in which the oil is fed through oilways O1 in the crankshaft through spaces enclosed by plates B1, which rotate with the crankshaft, and the oil is thrown out to the right point by centrifugal force. The oil enters the spaces from the bearings, and the original feed is from a pump which brings the oil to the openings, one of which is shown at O2.

Regal Lubrication Is Positive—While the positive system of lubrication is used, it will be worth while to note that in this motor the oil level is maintained by means of an overflow system to a "sump" which shows in the bottom half of the crankcase, to the right. When the oil enters this space it is lifted by a gear pump of excess capacity, passes up through passageways in the case, and is shot out against the bearings to be lubricated, which bearings are suitably provided with channels for the purpose. The result is, the lubrication is profuse. Since it is important to know how much lubricating oil there may be in a system, the motor is provided with a tell-tale so located that it may be readily seen, and is actuated by means of a float in the oil well, but it is so arranged that the glass will not coat over and hide the readings. The float is of cork, and operates much the same as the float of a carbureter. This is fixed at the lower end of a vertical rod, upon the upper extremity of which is attached the indicating disc. The latter thus moves up and down, with the float which marks the oil level, and registers the same on the gauge glass, the same being visible to the driver from the exterior.

How National Lubrication Is Coped With—By referring to Fig. 30, which is a section of the crankcase, longitudinal at A and cross-sectioned at B, the lubricating oil is held in a basin, B1, which in section looks as in B2. In the same sectional view the filter F1 is placed, and the arrows show that the oil flows in, it being cleaned at this point. The crankcase is scooped out, or, better yet, it is contrived with a false bottom, B3, with well-holes, W1 and W2, leading into a passageway, P1, connecting the two, and at the mid-position of this passageway a third well-hole, W3, is placed, the purpose being to equalize the flow of oil, preventing it from piling up when the car is negotiating a grade, and in this way the cylinders are prevented from becoming fouled.

Referring to the cross-section B, Fig. 30 again, the oil-pump P2 is located in the bottom part, is driven by the vertical shaft S1 and Oldham coupling, O1, prevents the shaft from being cramped and allows the gear-pump entire freedom, so that the members are free in the housing.

How the Lubricating Problem Is Generally Handled—In the Paterson Model 30, which is made at Flint, Mich., is a unit power plant, with four cylinders cast in pairs, lubrication is by constant level splash, and means are afforded for the profuse lubrication of all the bearings by means of suitable oilways. The transmission, which being integral with the motor, takes all excesses of oil that may get by. The oil is held in the bottom of the crankcase, and by means of a pump excesses of oil are disposed of; at the same time the right amount is positively maintained, due to the placing of suitable dams (ribbing) in the case. A cone clutch is used.

In Mitchell cars, made by the Mitchell Motor Car Company, Racine, Wis., the oiling problem is met by using a Lavigne lubri-

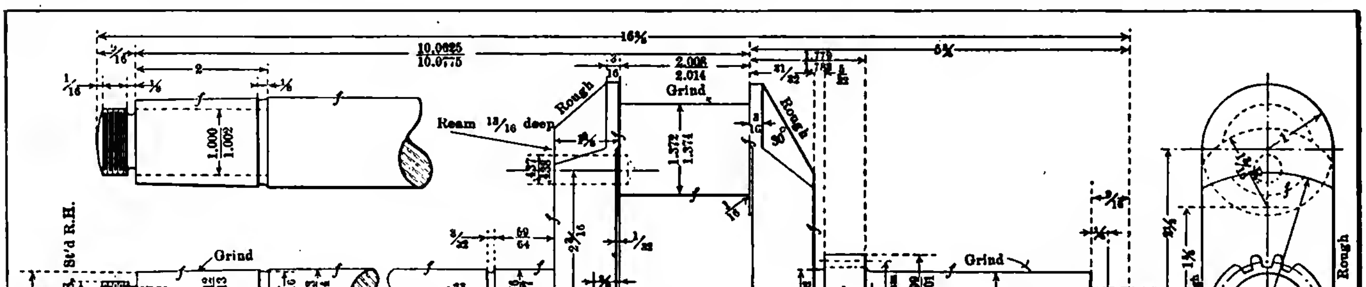


Fig. 19—Crankshaft as used in the Brush Runabout, for a single cylinder vertical motor, and balanced for high speed

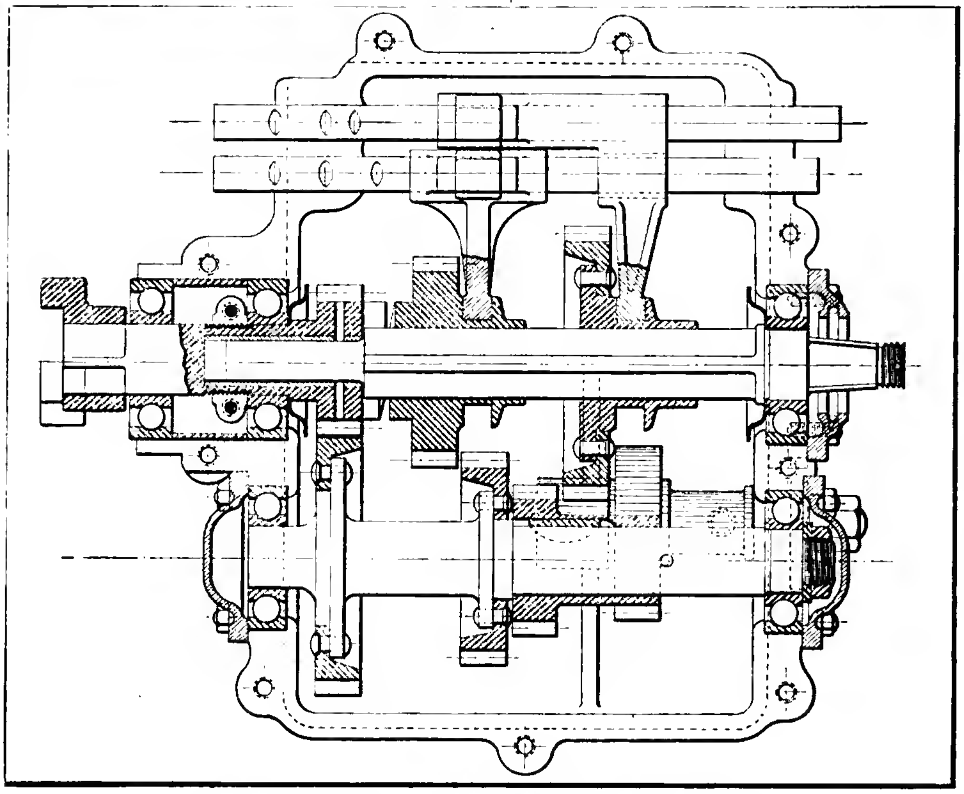


Fig. 20—Premier transmission gear, for three speeds and reverse, selective, and direct on high

cator, which, being positive, has the virtue of delivering the exact right amount of oil to the respective bearings with certainty. The oiler is located on the crankcase, at the front to the right, is belt-driven, and two of the six leads go to the cylinders, while the remaining leads connect with the end bearings of the crankshaft, clutch and crankcase. In the Mitchell there are divers mechanical features that should be given space, but in view of their novelty it is necessary to consider a time when the whole car will be taken up for the purpose of exploiting its excellent qualities.

In the Reo car, referring to the 1909 four-cylinder model, the question of lubrication is cared for in a somewhat different way; the system is self-contained, and piping is entirely done away with. This is brought about by having the plunger pump which is used down in the crankcase, it being driven from the camshaft by means of an eccentric. Lubricating oil is pumped up from the reservoir in the base to the three main bearings of the crankshaft and to the faces of the spiral cams. The plunger pump has the virtue of lifting a definite amount of oil at each stroke, and the number of strokes increase with the speed of the motor, so that lubrication increases as the requirement.

In the Chadwick, made by the Chadwick Engineering Works, Pottstown, Pa., oiling is by splash, but the force-feed oiler is direct drive, hence chances of failure are eliminated. The oil is independently delivered to the respective bearings by separate pipes, and the oil level in the crankcase is definitely maintained. The pump delivers oil to 14 points, i. e., six cylinders, four main bearings, three compartments in the crankcase, and one to the transmission gear case. In this way the condition of lubrication is definitely maintained at every point, and as a result the Chadwick is insured against undue wear, thus eliminating noise as a future prospect. In this make of cars the chains are booted, they being of the side-chain drive design, and by thus keeping out the mud accumulations which would otherwise attach to the chains they are maintained in good working order for several years.

In Stoddard-Dayton automobiles, as made by the Dayton Motor Car Company, Dayton, O., lubrication this year is attended to by utilizing a rotary pump rather than the plunger type of previous years. This is claimed to be a better plan, the idea being to copiously lubricate every bearing. Grease cups are also placed at all points, as on spring shackle bearings, and the springs for this year are 3-4 elliptic, rear, of a very well executed design, the front springs being 1-2 elliptic, which is desirable under conditions of constant loading. With Stoddard-Dayton cars a "lubricating chart" is delivered with each automobile, it being the idea to coach each owner in the art of attending to this important matter, the Stoddard-Dayton maker fully realizing the necessity of maintaining a profuse state of lubrication if noise and trouble are to be kept out; the very essential detail, however, is that oiling facilities are provided in the cars, thus putting it up to purchasers to do the rest.

Large Diameter Road Wheels Help Out—The American Traveler, made by the American Motor Car Company, Indianapolis, Ind., differs from many products, in that 40-inch road wheels are used and lubrication as a requirement is somewhat reduced on this account, insofar as road wheels are concerned. For the rest, a gear pump is employed, being connected in the engine case, with a sight feed on the dash. A container located in the crankcase holds 1 1-2 gallons of lubricating oil, and two extra gallons of lubricating oil are carried in a separate reservoir, thus assuring an adequate supply for touring, which is what the car of this subject is much used for. The liberal use of annular type ball bearings in this model, as well as in all cars of

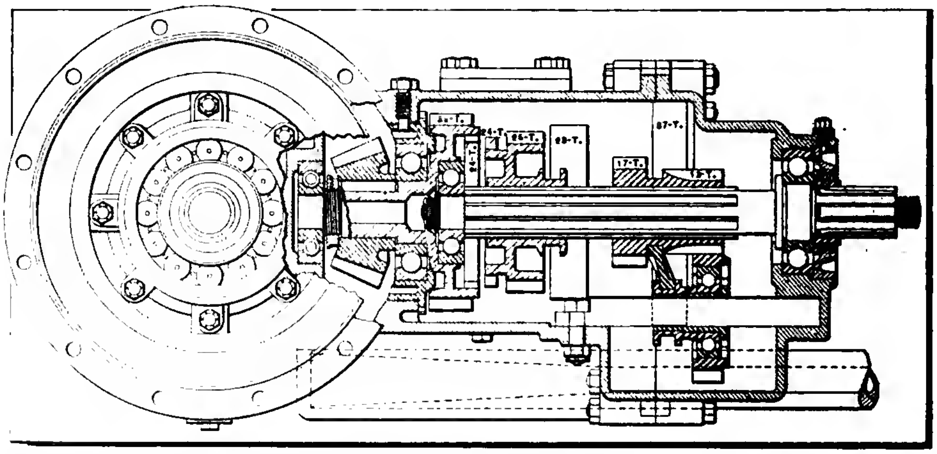


Fig. 21—American Simplex unit type of transmission, longitudinal section in the vertical plane

this company, reduces the lubricating problem to a low level, although, of course, a power plant of the proportions of that used in the Traveler requires more than the ordinary amount of lubricating equipment, which is the reason, perhaps, that the company has made such liberal provision. In this car the motor has a bore and stroke of 5 3-8 x 5 1-2 inches, respectively, and is rated at 60 horsepower, which, as ratings go, is very conservative to say the least. The transmission, which is a selective four-speed and reverse, as well as the differential, which is of the bevel type, run in oil. Power is on an increased basis, largely due to nice design features, and the ignition, which is a Bosch high-tension (dual) system, is so utilized as to afford the best results.

Success Accentuated by Bearings Used—Practice, from the point of view of bearings, excludes plain bearings from all but crankshafts, for the most part. While there is slight indication of the ability of annular types of ball bearings in crankshaft work, even so, considering service rendered by plain bearings in this zone, designers have been a little slow to depart from them.

Of the anti-friction bearings used, the main point to be made is that there is no hard-and-fast preference, it being the case that quality resides in the several types, and in selecting them it is more to the point to employ liberal sizes and having them made of good material, accurately, than to select some one generic type of bearing without bothering much about quality of material and workmanship.

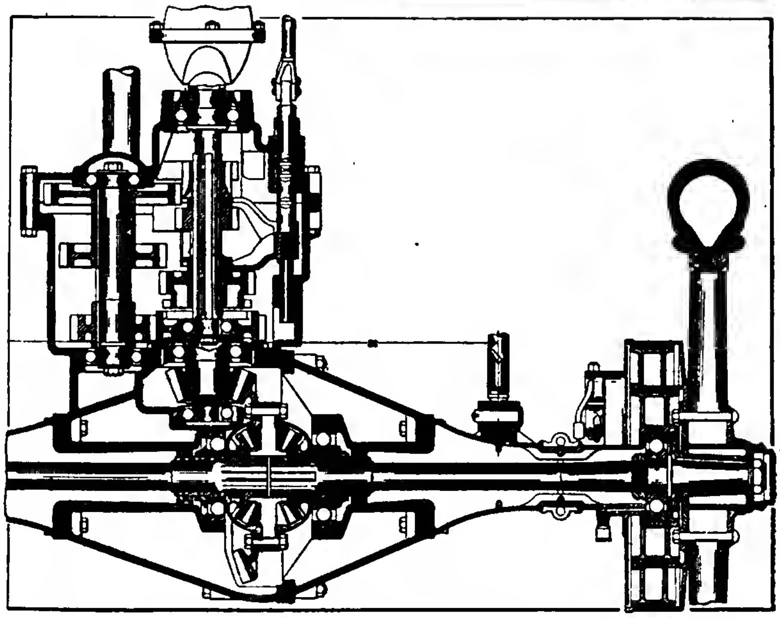


Fig. 22—American Simplex, showing unit transmission system, in section, cut through horizontal plane

The cars of the year, among the makers of the subject, are provided with:

(A) Hess-Bright (D.F.W.) annular type ball bearings;
(B) Bretz (F. & S.) annular type ball bearings;
(C) New Departure dual annular type ball bearings;
(D) R. B. F. annular type ball bearings;
(E) Standard roller bearings;
(F) Timken roller bearings;
(G) Hyatt roller bearings;
(H) Cup and cone bearings of various makes;
(I) A wide variety of thrust bearings by the several producers.

Materials Used in Ball and Roller Bearings—In plain bearings, considering the better class of work, the anti-friction members are "die cast" more often than not, and copper-tin mixtures obtain to a vast extent. In the copper-tin mixture the proportion of tin is 90 per cent.

In the annular types of ball bearings, while there is a wide variation from the point of view of materials used, even so, it is the general practice to employ far better products than those of former times, which is a good reason why failures are scarcely ever to be noted. In some of the bearings the carbon is 100 points; in other examples, 90 points. Some of them are alloyed with chromium; more are not, but in all cases it is the aim to have the metalloids very low, and crucible steel obtains to a vast extent.

In roller bearings, especially those which are cemented, special grades of cementing steel are used, in which the carbon is probably under 16 points in the initial material, and the purity of the stock is looked after with the greatest care. In this class of work, as a result of the methods of heat treatment, the shell is quite as hard as that of the hardest balls (the carbon being the same or even higher), while the core is relatively soft and kinetic properties are coaxed into the material by this method.

CHASSIS WORK IN FULL KEEPING

While the chassis frame is utilized as a platform for the machinery equipment, and serves as well for a place on which to rest the body, it is not looked upon as sufficiently stable to offer adequate rigidity, all things considered, and flexibility is imparted to the machinery units—so much, in fact, that the chassis frame is not expected to do more than serve as a bridge, as it were, in which class of work flexibility is courted.

The scheme of design, then, for automobiles, taking them as a whole, is on a basis of flexibility, which characteristic is embodied in the frame to some extent, and in the assembling of the machinery unity to the maximum possible degree. In chassis frame work there are three prime methods in vogue:

(A) Narrowed frames, without a kickup;

(B) Frames with a narrowing at the front and a kickup behind;

(C) Straight frames.

Channel sections obtain almost to the exclusion of all other shapes, and, considering the lateral tieup at several points from front to rear, the strength of the section is made a maximum in the vertical plane and minimum in the transverse plane.

In many of the cars of the day the rear suspension is 3-4 elliptic, and the frame is stopped off just back of the center line of the rear axle, unless in the examples in which the body is ex-

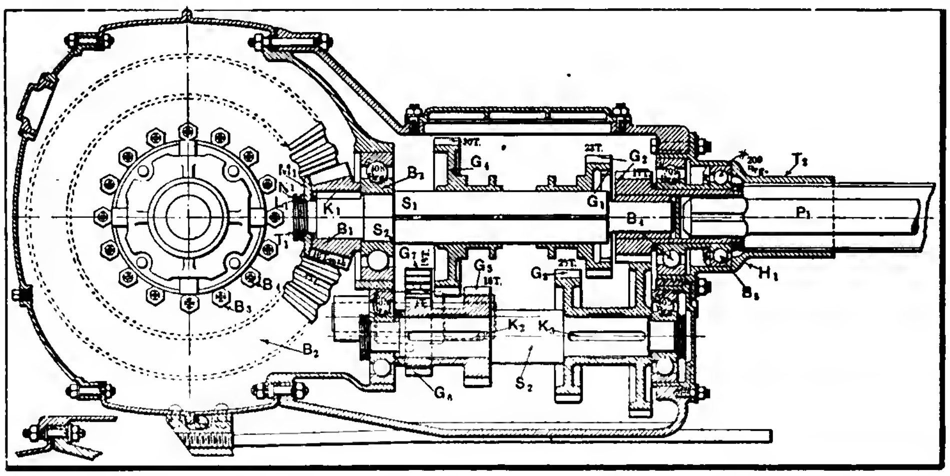


Fig. 23—Marmon unit system of transmission, with lay shaft below, and appearances of excellence of design, using fine materials

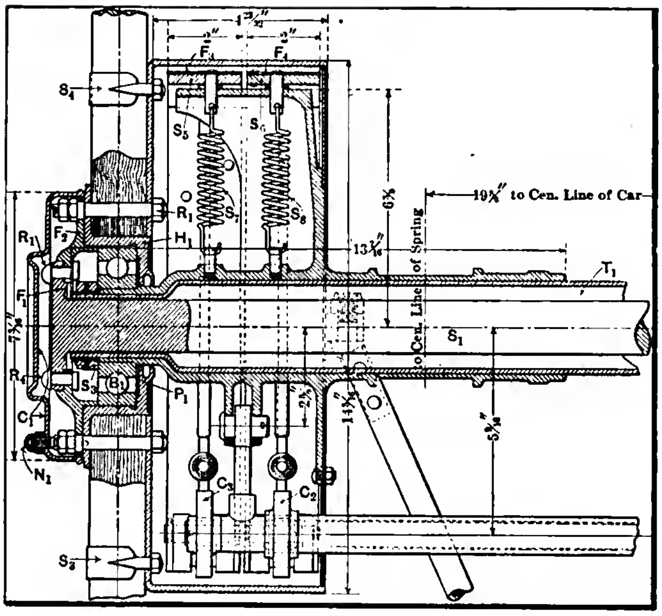


Fig. 24—Marmon live rear axle, showing brakedrum of good diameter, and wide enough to accommodate two sets of shoes

tended back a greater distance, when, of course, the frame is extended back also. The design, as found in National cars, is an excellent illustration of a kickup at the rear and 3-4 elliptic scroll springs, they being wide, with a liberal allowance of metal in the plates, without having them too thick, the result being that the cars ride well, part of which performance is, of course, due to a good length of wheelbase, and, perhaps, to the low center of gravity which is natural to frames of this character.

In the American cars with underslung frame the center of gravity is very low indeed, and having the frame below is another way of realizing all the good that comes from a kickup. The American frames are narrowed at the front to afford a liberal turning angle of the front wheels, considering the use of 40-inch tires on the road wheels.

In the Stoddard-Dayton cars the 3-4 elliptic rear springs fasten on to the rear termination of the chassis frame in such a way that the springs fall outside of the outer line of the frame and the work comes on a liberally sectioned rear lateral. Taking it on the whole, it is a neat piece of work, and one of the points well worth examining in the cars of this make.

The Premier, from the chassis frame point of view, is a fine example of stability, considering the manner of caring for lateral work, in that the web of the channel section is extended down just at the point of narrowing, and strength is added in the process to a marked extent. The shape of the Premier, taking it as a whole, is for strength, it evidently being the idea of the designer to have the frame stand up under collision conditions, and the extension at the front, for illustration, is much as a strut. In the Moon and some other frames, in order to add strength just at the point of narrowing, the flange is widened and cross members come at the place of greatest advantage.

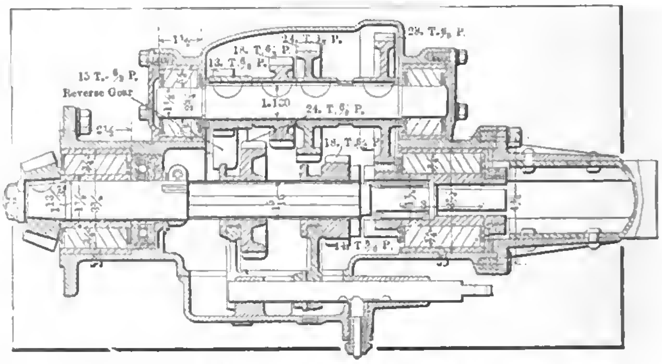


Fig. 25—Regal transmission gear, showing compactness, and Hyatt nickel steel roller bearings

The material used is also on a basis of rigidity, and in the fashioning an attempt is made to preserve the metal to the greatest extent, this being done by making the turns with the greatest possible radius.

In the Cole "thirty," which is a newcomer made at Indianapolis, the chassis frame is neat, strong, and has the virtue of being along tried-out lines. In this car, also, the shaft for the steering gear comes out above the frame, and a secure fastening out of harm's way is the product. The running boards are fastened to the frame by means of pressed steel hangers, and, taking the frame as a whole, it is an excellent piece of work, matching up with the whole car.

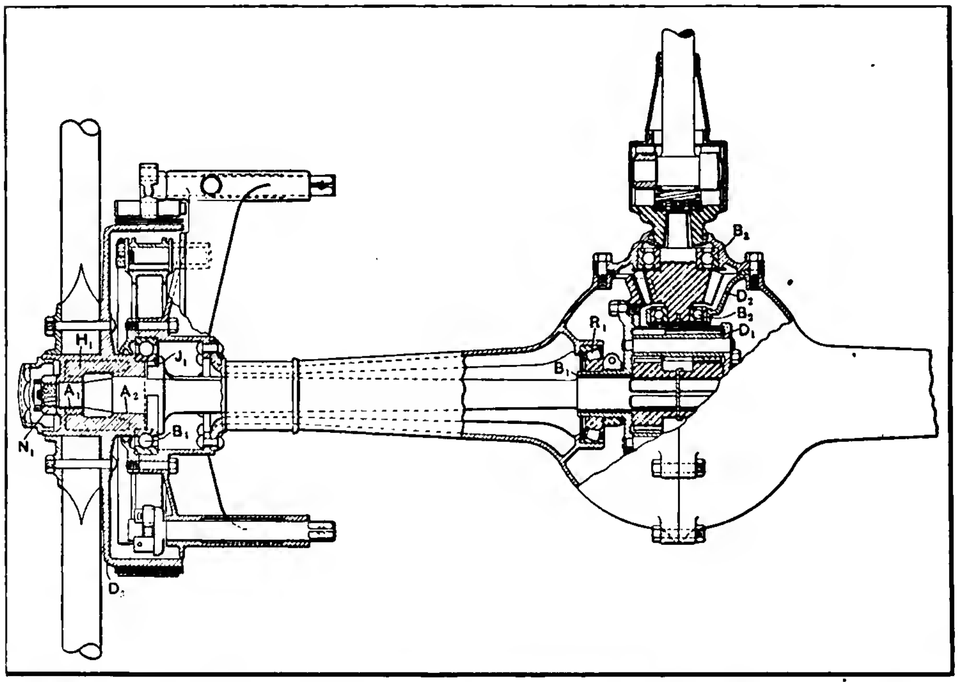


Fig. 26—Premier live rear axle, presenting tube of great strength and lightness, with brake drums of liberal area, and bearings of unusual ability throughout

Materials Used in Chassis—Nickel steel is the mainstay—it being of a special grade, suitable for work of this character, taking into account the bending process and the effect of abuse of this character on the material. On account of the toughness and strength of this steel the work is done hot, and when the frames (sidebars) are formed they are then annealed. In some instances, in order to induce quality to the maximum, the sidebars are oil-quenched and then annealed.

As a second grade of side-frame stock, boiler plate is used, the same being acid open-hearth material low in carbon and fabricated to induce the requisite qualities. Next to boiler plate, which makes a superior frame, basic steel is employed, and when it is a specification product the results are very satisfactory. This and cheaper grades of steel plate, when they go into sidebars, are handled cold and annealing is sometimes neglected, account being taken of the quality of the car in which they are to go.

In assembling chassis frames some of the builders use the hot process, in which rivets are heated, placed into the holes and then riveted over. This process is advocated by them on the ground that when the rivets cool off they will shrink, and in so doing press the members into a closer relation. The rivets are made of a special rivet stock, low in carbon, hence not readily damaged by heating. In other plants all this work is done cold, and in some of them the holes in the plates are drilled.

It is true, of course, that punching does damage the material, and drilling the holes has the virtue of leaving the same in better fettle than it will be after punching. On the other hand, a poor quality of material can scarcely be improved by any one of the detailed processes, and a reamed punched hole in good material is regarded by many builders as very satisfactory.

I-Section Axles Without Welds—In the cars of the class using live rear axles the front axles are as a rule of the I-section, and in order to eliminate failure they are drop (die) forged in one piece. The material used is approximately 20 points carbon steel, low in sulphur and phosphorus, it being a basic open-hearth steel as a rule. In occasional cases the forgings are welded at a mid-point between the perches, and in such cases the material used is of weldable quality.

In live rear axle work, as it is to be seen in the cars of the year, the perches for the springs are sleeved on and torsion is taken by the torsion member rather than through the springs, as it formerly was, to some extent at any rate. The springs, taking them as a whole, are with wider, more and thinner plates, it being true that the increased number of plates will dispose of more energy and suffer less in the process. The fastenings at the perches are much more substantial than formerly, it now being well understood that spring failures will be nearly sure to follow if the springs are not tightly clamped at the perches.

Steering Gear and Linkages Considered—While the worm and sector type of gear has many adherents, even so, it is not exclusively used, worm and nut types being in some presence

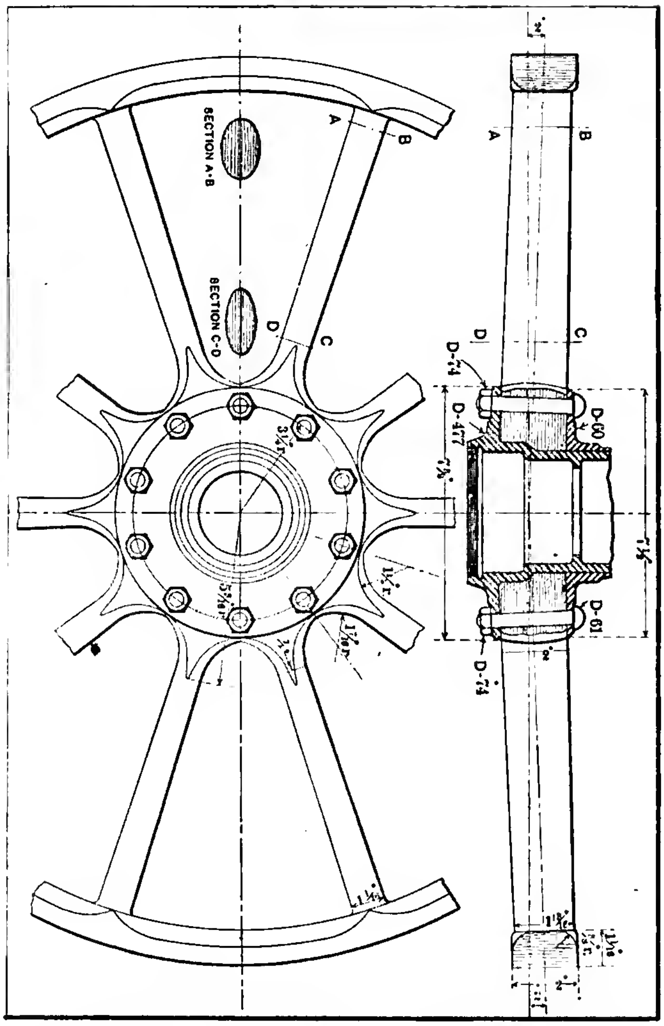


Fig. 27—Example of modern wheel, of second growth hickory, shaped for strength and ease of uniform manufacture

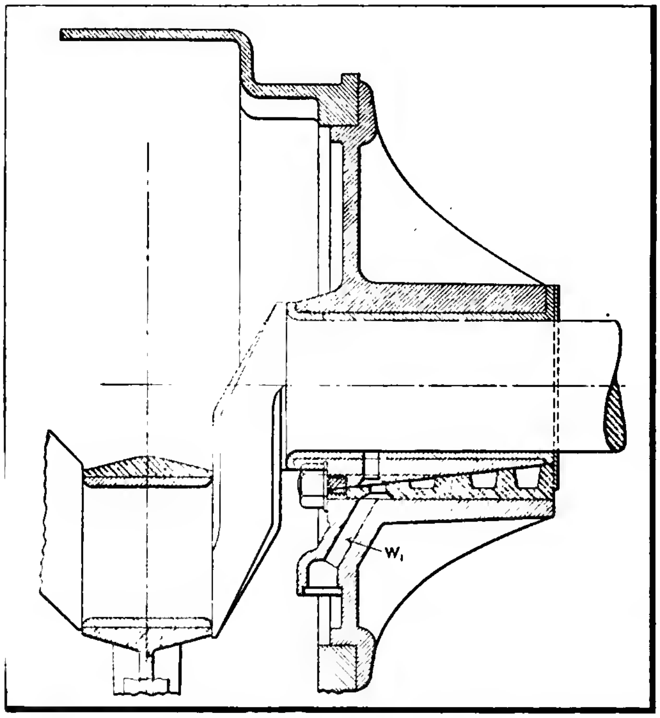


Fig. 28—Rambler, offering evidences of refinement in method of lubrication, involving the crankshaft

also, while the Gemmer type of gear holds sway in numerous examples of the cars. In nearly every car, as compared with last year, the steering wheel is of larger diameter, and where 15-inch diameter wheels was the apparent standard, 17-inch wheels now seem to obtain.

The steering wheel spider, while it is in many cases made of aluminum, is now more frequently of Parsons manganese bronze, and, as will be readily appreciated, the bronze wheels are of vast strength relatively. The materials of which worms are made are usually a good cementing stock, low enough in carbon to stand the heat treatment without being reduced to a crystalline condition, and so built up as to work well in the hobbing machine; free-cutting cementing stock, in fine, is what is wanted. After cementation, if the process is properly conducted, the hardness is that due of over 100 points of carbon in the shell, which crust, if such it may be designated, is about 1-32 inch deep.

Lost motion is avoided in the worm and sector types of gears by having the angle so that the gear is not quite reversible, and, contrary to the belief of some, complete irreversibility is a condition which should be avoided. Besides taking advantage of a favorable angle, it is the practice to provide a pair of eccentric bushings for the worm, and by means of them adjust the worm in closer relation with the sector when the occasion requires. In certain examples, in view of the way the worm and sector wears, the sector is shaped to compensate for the wear, thus making the adjustment more profitable.

Tierods and draglinks, as they obtain in most examples of cars, are most carefully made, and if they have to be crooked the method of doing the work is carefully considered. The diameters of the tubes are regulated in view of the shape, and if brazing is done the parts are pinned as well. Purchasers of acumen this year are inclined to give this matter a little attention, and it is reasonable that they should.

Body Work Has Advanced a Pace—Torpedo types of body work look a little novel; they represent something by way of utility, keeping out the cold, reducing wind resistance, and are probably with us to stay, for a time at least. With the lengthened wheelbase, which is a characteristic of the year, there is more room for body innovations, and the torpedo type is the real innovation. The tendency is for more foot room in front, it being the practice now to allow about 26 inches from the panel of the front seat to the back line of the dash; last year this distance was about 24 inches, but in many cases it was less—23 inches perhaps.

While aluminum is being used to some extent in the higher priced body work, the fact remains that sheet steel and products using sheet steel as a foundation are being used to a great extent. The woodwork is on a substantial basis, and the framing is so ironed, as a rule, that body work may be regarded as on a most stable basis.

Upholstery, despite the use of some leather of a rather inferior grade, is as a rule on a fitting basis. Hand-buffed leather is much used, even in cars of quite low prices, and the stuffing in many of the examples is No. 1 hair. Machine methods of doing upholstery are now so well advanced that quality within allowable cost is a reasonable expectation. It is this advance in method, perhaps, that is at the bottom of the rather good quality, taking it as a whole, which is to be noticed.

Water Cooling by Different Methods—Of the cars with water-cooled motors, while most of them circulate the water by positive means, some employ the thermo-syphon system, notably Regal and Ford, and in the Regal, for illustration, the method of cooling is quite different from that in vogue in general when reference is had to thermo-syphon systems. In this system the water enters the radiator pocket about 2-3 up from the bottom. The water is then deflected up, or down, depending upon the offering resistance to the flow in either direction. All the water that passes up is cooled in the process, and it then descends, through separate tubes, and when it arrives at the bottom, where it mixes with the water that descends directly, it is substantially of the same temperature as the water which directly descends. In this system, as it is understood, steam, if any forms over the domes of the cylinders, is used to force the water up, and the steam is condensed before it arrives at the top of the radiator, thus preventing steam from spouting out of the top of the radiator, or through the overflow. The radiator maintains a very efficient temperature at all times, and the size of the same, despite the application of principle of the thermo-syphon, so called, is very well within the limits for other types of radiators. This type of radiator as referred to is made for the Regal by the McCord Manufacturing Company, of Detroit.

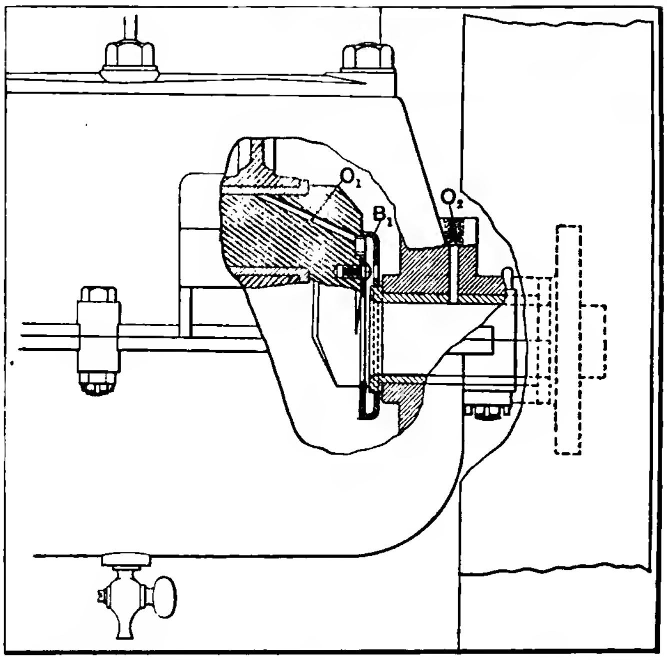


Fig. 29—Moon, presenting a detail in the method of lubricating the crankshaft, indicating ingenuity

In the commercial section, the Grabowsky power wagon, as it will be shown, will also have a radiator in which the water enters at a point below the top, but in this radiator the space above the water level is filled with steam, and the temperature being higher at this level, the quantity of heat which will be disposed of, will be greater, so that the radiator has a higher inherent ability; this type of radiator does very fine work, and it may be regarded as a type which the future should see more of.

In water circulating, centrifugal pumps are very much to the fore, it being the case that they deliver the required volume of water, and last for a long time, there being no surfaces that are prone to wear; moreover, these pumps deliver water whether they are well fitting or not. Centrifugal pumps, in view of their noiselessness, are, as a rule preferred, and, in the examples of gear pumps to be seen, they are so made that noise is practically eliminated; they must, however, be well made and of good design, to come within the class designated as noiseless.

Air-Cooled Motors in Good Presence—It would seem as if the air-cooled examples are just about holding their own, there being no desertions of moment, and the newcomers are mostly among the high-wheeled rings. Principles, as they are apparently carried out, are about on a par with former practices, referring to examples at the Palace.

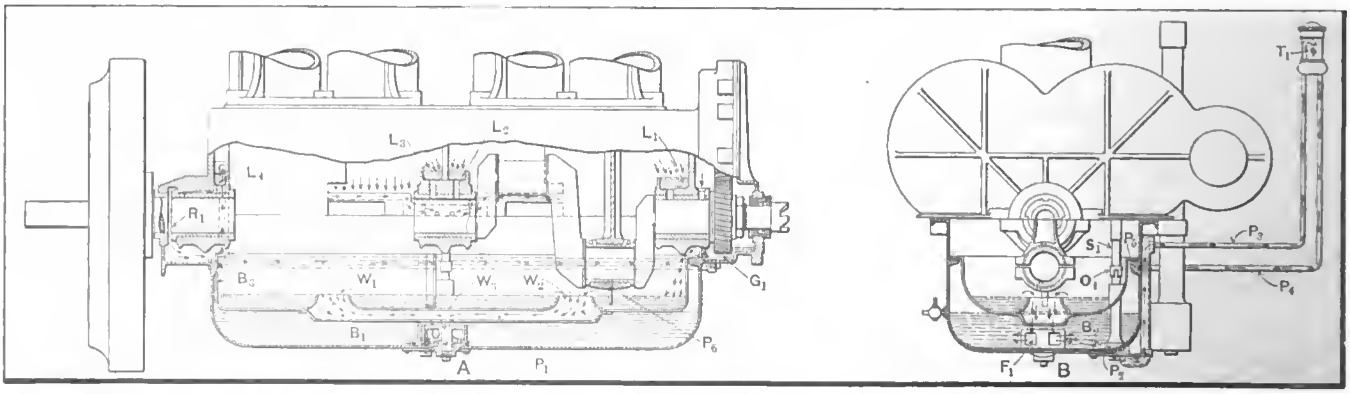


Fig. 30—National, showing a section of the motor and method of lubrication, with a gear pump in bottom of case

Contests of Value to the Automobile Industry

By R. O. Smith, Chairman, A. M. C. M. A.

ENDURANCE contests furnish valuable information to the motor car builder and guide posts to the purchasers in choosing between cars.

If we reflect and note how little was known of the automobile, even by the makers, less than ten years since, and consider the small number of cars then in use, one would naturally conclude that it would not be reasonable to suppose that the average buyer, and particularly one contemplating his first purchase, is well equipped with the knowledge to judge the value, actual and relative, of the various cars found on the market. The public have a right to know and demand the proof of the worth of a car, but the great question is, the basis for establishing the proof. The conscientious manufacturer undoubtedly tries out and proves the worth of an idea before incorporating it into the product, and if this is true with the several individual items entering into the construction of a motor car, why would it not be reasonable to subject the entire car to conditions which would try and prove out and determine the worth of the car as a whole.

Automobiles can no longer be classed as a luxury or a fad. The purchasers are seeking value, and are interested in the ability of a car to perform properly, and its dependability. Undoubtedly some cars are better than others. Some cars of a given class or price are better than other cars of the same class or price, but the value is not altogether indicated or determined by the appearance of the car. What is in it; what constitutes the vital parts; how every part works with the other—are the bases for determining the results to be obtained from the car as whole, and the public should feel interested and have a right to know the results which can be expected of a finished car.

One or more unsatisfactory features, coupled with few or many excellent features, would make a satisfactory car impossible. Undoubtedly a perplexing question to the buyer of a car, where so much is at stake, is how to know whether or not he is getting his money's worth, and a car such as he has a right to expect.

Looking at the situation broadly, the purchasing of a motor car is in line with the buying of any other article. The average buyer of a steam engine to be installed in a power plant is probably not as a rule well posted on the relative merits of the engines such as are offered to the market, and certainly not if a decision is supposed to depend upon his personal ability to judge the engine by its appearance and several mechanical features, as they appeal to him. In such cases a decision is not arrived at without an investigation of the way the various makes perform in service, and no doubt comparisons are drawn to determine the relative worth of the various makes under consideration.

This same information concerning a motor car can be obtained. All motor cars of standing have histories which reveal the strong and weak points and what the car can be depended upon to do. This information as it comes from individual owners is valuable, but conditions prevail in the motoring world which make possible even more accurate comparisons.

Follow the contests which have been run under rigid rules and strict supervision and the history of the various cars entered, and the results carry information which can be relied upon. Not only have these contests become more rigid as cars have developed and we have made advances in the art, but added to the ordinary rules governing the road performance has been that of an inspection at the finish, showing in detail what it has cost the car to cover the course, or the effect the hardships have had upon it. Such information should be invaluable to the buyer. There is no given standard by which a motor car can be measured, but the comparative showing tells the comparative worth. From year to year we have profited by our experience in contests in this country, and each year have made them a little more rigid than the year previous.

A still better guide would be furnished the buyer, and the information would be more accurate, were it possible to have all contests of a kind carried on under like rules, with a committee selected to govern the various contests, insuring like interpretation of the rules, and awards be made only after full consideration of all the entrants guided by the rules under which the contests was started and run. This would not only give the public the opportunity of judging the cars in each contest, but the various cars in the various contests. These results should be a telling criterion and of value, not only to the purchaser, but quite as much to the manufacturer who is earnestly endeavoring to produce the best car possible. They have the effect of demonstrating to each entrant if any competing car in the contest is better, and of showing to the world the best car.

Strenuous contests tell a story which sould carry weight, as constantly keeping at it is what shows up the weaknesses.

Contests can be classified under three heads: Speed, hill-climb and reliability.

Speed contests are fascinating and instructive along certain lines. They may show the ability of the designer to produce a fast car, but this is sometimes done at the expense of durability. The history of the past shows that racing cars have frequently differed even in the fundamentals from the stock product of the same make. In designing, speed can be taken into account as the main object and the results may be at the expense of long life and reliability. It is not always the snappy and fast motor which goes farthest. In speed contests, cars are as a rule entered with a view of covering the course in the shortest time, irrespective of cost, either as relates to the whole, or damage in the way of wear and tear, the question of the car at the finish in such events being of secondary consideration, if considered at all.

By following any of the large events it will be noted the amount of work in instances which is done on a racing car to keep it going, and yet, if it crosses the tape first, it is heralded a winner, though other cars may have suffered less on account of the strain and hardship, and be capable of going much further than the winning car. A most appropriate example is furnished by one important race this season where a certain car finished first and was pronounced the winner when it was known that, due to certain parts going out of commission, the car finished on three cylinders.

Reliability is what counts in every-day service of motor cars, and most cars are capable of attaining a speed greater than the average driver can pilot a car with reasonable safety.

Hill climbs can be viewed in much the same way, since, as with a race, the conditions are usually abnormal and the temptation to build special for the particular test is usually more than the maker can resist.

Notwithstanding the fact that these two classes of events have their value, the third class, known as reliability contest, will no doubt generally be accepted as the most reliable character of events, where results as a criterion are desired, there being no object in building special were it permitted, provided the maker is trying to produce the best possible car regularly. These contests are characterized by touring conditions and tell a truth worth knowing.

There is probably no better way for one contemplating the purchase of a motor car to be assured a basis of judging cars than by looking up their records. The showing made in one of our large annual contests during the past year has astonished the world, including those who participated in the event. The Glidden tour covered a distance of almost 2,700 miles and the schedule required an average of at least a mile every three minutes on the road from Detroit to Kansas City, by way of Minneapolis and Denver, irrespective of road or weather conditions. An observer was appointed by each entrant, these observers riding on other cars, and changing every day. This avoided a possibility of violating the rules without penalty, the contestants not being allowed to use any new material, to make any repairs, to adjust so much as a bolt or screw, with the exception of brakes, oilers and ignition without penalty, and witht ignition, no exchange, replacement or repair of parts were permissible. Notwithstanding these strenuous conditions several cars finished with perfect road scores at Kansas City.

It is a true saying that motor cars, like men, have a record and a history, which tell what they are and what they have done and furnishes a most reasonable basis for deciding what they can be depended upon to do.

ADVANTAGES OF INCREASING THE WHEEL SIZES

BY CHARLES E. DURYEA, Technical Expert, A. M. C. M. A.

THAT large wheels roll more easily than small ones everybody seems to know, but it has only been a few years since that same everybody seemed to think that no real automobile could be equipped with other than small wheels. To try the self-propelled vehicle with wheels of the size in common use on horse vehicles, was to mark oneself as utterly out of fashion and was equivalent to proclaiming one's origin in the country districts.

Suppositions are often wrong and none more wrong than this. Our country cousins are just as anxious to be up-to-date as our city ones can be and they certainly equal, if they do not exceed, the city dwellers in their desire to have the latest. On this account the small-wheeled auto has found its way to every portion of the country, and wherever it has gone it has proclaimed the same truth that small wheels do not roll over obstacles so easily as large ones. The rocky country road or the cobblestone city street alike teach this lesson, and if there is any difference in the requirements with the respect for wheel sizes, it is the average city with its irregular cobblestone street which needs the large wheels, rather than the less used and therefore less worn-out country road.

As a result of learning these facts, standard automobiles have each year been increasing their wheel sizes until to-day we see vehicles like the American Roadster and the American Traveller with 40-inch wheels all around, and these large wheels equipped with four-inch tires, a size that but a few short years ago was looked upon as foolish. On the Austin 60 we find 37-inch wheels front and rear, and five inch tires. Of the autos to be shown at the Grand Central Palace show, by far the greater number of the higher priced vehicles will be equipped with 36-inch wheels, and four, four and one-half and five-inch tires. In the Chadwick we see 36 by 4 fronts, and 37 by 5 rears.

To make more clear the comparison, right alongside of these conventional autos do we find the Holsman motor buggy recognized for years as the leading maker of this type, with 42-inch front and 44-inch rear wheels, and the McIntyre with 34-inch wheels all around, with 1 3-4 solid tires. The Duryea buggyaut is equipped with 38-inch front and 44-inch rears, so that from these examples it will be seen that the motor buggy and the conventional auto are now very close together in the matter of wheel sizes, and that wheel diameter is no longer a mark by which one can say that the vehicle was built for city or country.

On the contrary, busy business men in the cities are recognizing the advantage of large wheels and are demanding same whether fitted with pneumatics or with solid tires, that they may roll smoothly and with less damage to the mechanism over the car tracks, sidewalk crossings, stony streets and rough places found in all our American cities. In the lighter vehicles, particularly those of moderate price, the small wheel diameter is still retained, but even here the effect of the advance in public opinion can be seen, for tire sections have often been increased.

Points on Clutches and Brakes

The clutch is the device by which the gasoline engine is enabled to pick up its load gradually and smoothly, and having gotten it started, continued to transmit the power positively. The brake is a device for absorbing the energy stored in the vehicle, gradually and smoothly, until the vehicle comes to a standstill, when it positively holds against further motion until the brake is released. Both devices are in almost constant use while an auto is being driven. Often the brake is applied without disengaging the clutch and often the clutch is let in with the brake still partly applied. Although working in reverse directions their service is identical and there is no reason why a good brake may not be substituted for the clutch, or a good clutch substituted for the brake.

It is a peculiar manifestation of habit, imitation, or like thinking among designers that the brakes in common use very closely resemble each other and are with few exceptions what is known as band brakes, consisting either of a constrictive band to grip the outer surface of the drum attached to a rear wheel, or expanding bands adapted to enlarge into the inner surface of this drum. And, in fact, most cars are fitted with both these, generally on the same drums, but sometimes on different drums.

In a few instances shoes take the place of the bands, but these are usually several in number and closely resemble the band construction, one of the exceptions being the Duryea brake, which is a small steel shoe resembling the horse vehicle brake.

In clutches a considerable variety is found, some of them being expanding bands, some contracting bands, but by far the greater number are of the cone type, or of the multiple disc types. The cone clutch gets a gradually increasing friction by being forced into a cone surface in the flywheel, until it takes up the load and drives positively. Its shape, however, renders it easily withdrawn whenever desired to unclutch. Generally this type of clutch is faced with leather to render it more smooth in operation, and it is found on a wide variety of automobiles, such as the Mitchell, Regal, Moline, Overland, Stoddard-Dayton, Pullman, Mora, Pennsylvania, National Speedwell Marmon, Standard, Acme and Welch. Among the users of the multiple disc are the Austin, Premier, Glide, Dorris, Ohio, Jackson, Marion, Pierce, Maxwell, Overland, Ford, Reo, Brush and many others. The Atlas employs an internal expanding ring clutch. The Midland clutch is of the floating disc type. The Moon has expanding bands, and a number of others forms are used.

Why this wide variety of clutches and closely followed single design of brake is a question the designers themselves cannot answer.

Owing to the Difficulty in finding a suitable course for the two speed trials during the Prince Henry tour, there has been a delay in publishing the propositions. The one flat race is to be held in the vicinity of Berlin; the second was almost definitely fixed for the Limburg-Weilburg stretch of the Taunus course, but on second consideration there are too many turns here to permit the vehicles being fully extended over so comparatively short a distance, and a route is being searched for on Alsatian territory. The second event may be run in the Hagenau Forest.

COLUMBUS SHOW OPENED BY OHIO'S GOVERNOR

COLUMBUS, O., Dec. 27—Under conditions most auspicious, the first automobile show in the history of Columbus, and one of the first shows in the Middle West for the present season, was officially opened Christmas night at 8 o'clock by Governor Judson Harmon of Ohio. The chief executive of the Buckeye State by a slight pressure of an electric switch turned on the current which lit up thousands of lights in every part of the huge Columbus Auditorium, where the display is taking place. The act of the governor was prefaced by a few remarks in which he commented on the rapid strides being made by the automobile industry and the good work being done by the Columbus Automobile Club, under which organization the show is being held.

There were about 83 cars on exhibition when the show opened, and because of the congested condition of traffic on the railroads a few cars were delayed. They were placed on exhibition later in the week. Every available square foot of space is taken up with the automobile and accessories displays, and the first night the crowd was all that could be desired. It was society night, and the "400" of Columbus was out to view the 1910 cars. The cars are exhibited entirely by dealers with the exception of local factories, which fact added more local interest to the show. The number of different makes numbered 43.

When the doors of the huge auditorium were thrown open and the crowds rushed in, surprise and appreciation were expressed on all sides for the beautiful decorations. The interior of the hall is covered with white bunting trimmed with red. Everything is in keeping with the Yuletide period. Opposite the entrance is a huge automobile wheel constructed out of hundreds of various colored electric lights. Scattered in excellent order throughout the hall are many artificial palms and other flowering shrubberies which were decorated with many colored electric lights. The floor is covered with green burlap, which affords an excellent background to display the cars to the best advantage.

One of the features of the decorations is a large number of canary birds which are concealed in the foliage of the artificial shrubberies. When the lights were turned on by the governor the birds started to sing, and this, together with the orchestra, which rendered music at frequent intervals, completed the stage setting for what has been pronounced one of the most beautiful of shows.

Special rates have been granted by the Central Passenger Association, and it is believed that fully 50,000 visitors will pass through the doors during the week.

The proceeds from the exhibition are to be used in erecting a clubhouse for the Columbus club, a large and flourishing organization. The committee on arrangements consists of Perin B. Monypeny, chairman; Herman Hoster, Harry D. Sims, Norman O. Aeby and Dennis Kelly. Max Morehouse is president of the club, and Arthur Crumrine is publicity agent.

The complete list of exhibitors and cars shown are as follows:

O. G. Roberts & Co., Stearns, Stoddard-Dayton, Overland, Lexington, Jackson.

Love Automobile Co., White gasoline, Cole "30."

Maxwell-Briscoe Columbus Co., Maxwell.

Broad-Oak Auto Co., Pierce-Arrow, Chalmers-Detroit, Hudson.

Kimmel Bros., Speedwell.

R. C. Wescott, Regal.

Ohio Motor Car Co., Ohio.

Franklin Motor Car Co., Franklin, Reo.

Central Ohio Motor Car Co., Oldsmobile, Oakland.

Studebaker Automobile Co., Studebaker, E. M. F. "30," Flanders "20."

Early Motor Car Sales Co., Rambler, Babcock Electric.

Columbus Buggy Co., Columbus Electric, Firestone-Columbus.

McDonald Auto Co., Buick.

Robert F. Boda Auto Co., Mitchell, National.

Charles Schlear Motor Car Co., Hupmobile, Velie.

American Auto Co., American "40" Traveler.

United States Carriage Co., Rauch-Lang, Apperson, Great Eagle.

F. E. Avery, Packard, Waverly Electric.

Curtin-Williams Co., Cadillac, Peerless, Winton.

Oscar Lear Automobile Co., Frayer-Miller trucks.

W. A. Paterson, Paterson.

Franklin Cycle and Supply Co., Demotcar.

Accessories: Welton Auto Fender Co., fenders; Williams & Schlereth, tire inflaters; Barndt-Johnson Auto Supply Co., automobile bodies and supplies; Cleveland Puncture Proof Tire Co., tires; Central Ohio Oil Co., oils; A. C. Edwards, motorcycles; Columbus Auto Brass Co., lamps and parts; Rubber Tire Repair Co., repaired tires; Motor Supply Co., automobile accessories; Eckel Tire & Rubber Co., tires.

BLUEGRASS SHOW TO BE IN LOUISVILLE

LOUISVILLE, KY., Dec. 24—The Louisville Automobile Dealers' Association has decided to hold a show next March. At a meeting of the dealers a committee was appointed to select a place for holding the exhibition. No definite decision has been reached, but it is generally expected that an effort will be made to secure the Armory, said to be the largest building in the South. Several new members have been admitted to the association recently, and the exhibition this year will be on a much larger scale than ever before.

PORTLAND PREPARES FOR FOURTH ANNUAL

PORTLAND, ME., Dec. 27—According to Manager F. M. Prescott, Portland's fourth annual auto show will be held during the last week in February. It gives every assurance of being the biggest and best yet held. All the floor space has already been rented, and there are only a few sections in the basement of the big Portland Auditorium which yet remain to be taken.

That the space for the show has been in such early demand is due to the fact that Maine dealers are looking for the biggest business in 1910 the State has ever enjoyed.

BALTIMORE CLUB'S SHOW IN FEBRUARY

BALTIMORE, Dec. 27—The fourth annual automobile show to be held in Baltimore, and the second one to be under the direction of the Automobile Club of Maryland, will take place February 22 to 26, inclusive, at the Fifth Regiment Armory. This announcement was made by President C. Howard Millikin, of the club. It will follow the exhibition in Buffalo. It was originally intended to have the display the latter part of January, right after the Philadelphia show, but it was not certain that the Armory could be had. When the Regiment officials gave their consent Washington had taken the January dates.

RAMBLER HOLDS OWN NEW YORK SHOW

Following its custom, the Thomas B. Jeffery Company will not exhibit at either of the New York shows. However, to afford the many show visitors a better opportunity than usual to view the 1910 Rambler models, the Rambler Automobile Company of New York announces that it will hold an exhibition in its showrooms, at 38 and 40 West Sixty-second street, just off Broadway, during the fortnight from January 1 to 15. Invitations have been issued to the trade, and all interested are asked to attend.

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THE SHOW IS NOW THE THING

Shows are a source of considerable expense to the automobile industry, and the day may come when possibly one national event of this character will answer for the entire country. One is inclined at this time to believe that a series of national exhibitions will be found the most advantageous in a country of such wide expanse wherein the motor-driven vehicle is certain to succeed all horse-drawn carriages and wagons. Once a year there comes the annual outcry about the disorganizing effect of the show circuit, with its utilization of the time and energies of the entire factory, from the highest officer of the company down to the minor employees. Frequently an inventory of the results fails to supply any substantial gains except of an indirect sort, and the impetus given to the industry itself is frequently lost sight of, though in this all makers of cars and accessories unquestionably benefit and to a far greater extent than many of them imagine.

Under the present plan, local shows more than support themselves, and are no longer a drain upon the manufacturer. Thus the show proposition reduces itself to national exhibitions alone. New York is a necessity: Chicago is equally and perhaps even more essential; and the day is near at hand when a third show of national calibre may be required to satisfy the great country beyond the Rockies, which, with its magnificent distances and widely scattered cities, finds greatest use for the automobile in the conduct of commerce.

First of the New York affairs again comes in the Grand Central Palace show, under the auspices of the American Motor Car Manufacturers' Association. Housed in a building which is illy prepared to meet the needs of a vehicle display, the promoters have accomplished wonderful things in fitting the ungainly structure for the really extraordinary unfolding of 1910 automobile products which will be available to the public, beginning to-morrow afternoon and evening and extending for a week thereafter. Here one will see how great the industry has expanded, for this show contains all the newcomers who have qualified to obtain a place in the procession.

With the gradual disappearance of patent litigation difficulties there comes the prediction that another year may see a fortnight in Madison Square Garden for the public telling of the story of automobile-making, for, unfortunately, it is a fact that even this big amphitheater and its overflow halls and basements cannot total sufficient room to meet the entire situation. Hence, there might come a week for those who were first on the scene, followed by the appearance of others entitled to showroom in the big tent.

But the 1910 metropolitan show fixtures call first for a visit to the Grand Central Palace, and then the sequence follows in Madison Square Garden. It will be a most reassuring and wonderful assembling of all that appertains to automobiling; and nowadays, the man who buys never runs the risk that was involved in the earlier purchase of motor-propelled vehicles.

When the first show was held in Madison Square Garden ten years ago, space was so abundant that about half of the main floor was taken up by a track. Around this the cars on exhibition were run, at the request of prospective buyers, to show that they really would go. Outdoor demonstrations did not come into vogue till several years later. To those who can recall these earlier exhibitions that of 1910 will be a notable contrast.

To-day to New York City the two annual automobile shows are perhaps the greatest events, in that line, of the whole year. The horse show, their natural rival, has admitted defeat, on the unanimous decision of the hotel-keepers that it was far outstripped in attendance. Other exhibitions which might have competed, such as those of electrical and business appliances, have been "out of the running" for several years.

A survey of the past decade brings with it a realization of the great progress made in automobile manufacture. In some of its aspects the improvement is stupendous in its proportions, and herein the man who intends to add aerial travel to his automobile accomplishments bases his hopes for early progress in this direction. Mayhaps that which came about in France may be repeated in this country—the replacing of the automobile show with an exhibition of aeronautical craft. In this country the indications are that we shall have both, and the second in a sporting rather than in a practical sense.

TENTH GARDEN SHOW WILL BE MOST ARTISTIC

WHILE chickens are cackling overhead during the session of the Poultry Show, carpenters, designers, plasterers, painters, and signmakers are zealously engaged in the basement of Madison Square Garden preparing the details of the magnificent decorative setting for the cars to be exhibited at the Tenth National Automobile Show. Next week they will take possession of the entire building, and the work will be pushed night and day until 8 o'clock on Saturday evening, January 8, when the doors of the Garden will be open from noon Friday, January 7, to 6 o'clock Saturday evening for the installation of exhibits.

The Garden show each successive year is proclaimed by the public and the tradesmen to be a bigger and better one in every way than its predecessor. This verdict is due chiefly to the untiring efforts of the show committee, who are the pioneers in many methods of show management that are now generally accepted in this country and abroad as a matter of course. The show committee is composed of Col. George Pope, chairman; Charles Clifton, and M. L. Downs, secretary.

Col. George Pope is a pioneer in the automobile industry, having been connected with it since 1897. He is treasurer of the Pope Manufacturing Company, and has been chairman of the A. L. A. M. show committee for four successive years.

Charles Clifton has been prominently identified in the industry since 1898. He is the president of the Association of Licensed Automobile Manufacturers and treasurer of the George N. Pierce Company.

Merle L. Downs, secretary of the committee, managed several big automobile events in the early days of racing and touring. He has been in many branches of the automobile business, and for the past six years has attended to the detail work in connection with all the A. L. A. M. shows.

Coker F. Clarkson, the assistant general manager of the Association of Licensed Automobile Manufacturers, though not a member of the show committee, has been prominently identified with it. Mr. Clarkson is a lawyer who found a greater interest in engineering matters, and from electrical experimenting he stepped into the A. L. A. M. as secretary of its mechanical branch. He has edited various engineering publications which have been most favorably commented upon by the engineering profession. He is the compiler of the A. L. A. M. handbooks.

CHICAGO SHOW TO HAVE NOVEL DECORATIONS

CHICAGO, Dec. 27—The ninth annual automobile show, held in this city February 5 to 12 under the auspices of the National Association of Automobile Manufacturers, will prove a revelation to the automobile world in its decorative scheme, if in nothing else. Manager Samuel A. Miles believes that he has succeeded in his aim to present a setting that will in no way permit of comparison with past efforts. In short, this show will be held in a forest.

This will necessitate the use of about 100 real trees, of which twenty will be two feet in diameter and seventy feet high; about a mile and a half of brick wall, real bricks; and the same amount of vine-covered iron railings; about 80,000 square feet of trellis work and pergola; 150 ornamental vases; 200,000 leaf sprays and flowers; four fountains of real water, and 150,000 square feet of paintings. No sign of the roof will be visible. The walls and the roof will be entirely covered with foliage and blue sky.

Mr. Miles reports that he has assigned spaces to 250 manufacturers of automobiles, motor cycles, part and accessories for the coming show. The list of automobile exhibitors includes the names of many new firms which have come into the limelight since the last exhibition. In order to accommodate more exhibitors this year it was found necessary to limit the spaces. In all, ninety-five automobile manufacturers have been given spaces on the main floor of the Coliseum and the Annex, the basement of the Annex and the main floor of the First Regiment armory.

The motor cycle department will again be an interesting feature. Spaces have been assigned to twelve makers of the two-wheelers on the second floor of the Annex. The parts and accessories firms have been taken care of in the galleries of the Coliseum and the First Regiment armory. As usual, the Chicago show will be national in its scope, and both licensed and unlicensed makers will exhibit their products under the same roof.

A. A. A. MEETINGS DURING SHOW WEEKS

THE American Automobile Association will have space at both the New York shows. Representatives of the association will be in attendance, and members are invited to make use of the booth, where a telephone will be provided and everything possible arranged for their comfort. At the Grand Central Palace show headquarters will be at space 300. At the Madison Square Garden show headquarters will be at space 327 in the Concert Hall.

The Automobile Association of London, with which the A. A.A. has reciprocal arrangements, will have a representative in attendance at both booths and information will be gladly given regarding the facilities afforded by this great motoring organization to those contemplating touring abroad. A.A.A. members can join the A.A. of London upon payment of one-half the regular annual subscription.

During the week of the show at Grand Central Palace the first meeting of the Good Roads Board for 1910 will be held at National headquarters, 437 Fifth avenue, Thursday, January 6, at 10 o'clock, Chairman George C. Diehl presiding.

During the week of the Madison Square Garden show the following meetings will be held at National headquarters, 437 Fifth Avenue, unless otherwise indicated.

Tuesday, Jan. 11, 10 A. M.—A.A.A. Executive Committee monthly meeting, President Lewis R. Spear presiding.

Wednesday, Jan. 12, 11 A. M.—Legislative Board, Chairman Charles Thaddeus Terry, presiding.

Thursday, Jan. 13, 10 A. M.—Directors' meeting, New York State Automobile Association, President H. A. Meldrum presiding. To be held at Hotel Belmont.

Thursday, Jan. 13, 2 P. M.—Touring Information Board, Powell Evans, Chairman, presiding.

Friday, Jan. 14, 10 A. M.—Second Annual Reunion A.A.A. State and Club Secretaries, Frederick H. Elliott, Secretary, presiding. Luncheon at 1 o'clock.

A.A.A. members holding certificates for reduced railroad rates should present the same for validation promptly.

COURT RULES E-M-F CAN SELL INDEPENDENTLY

DETROIT, Dec. 27—According to the finding of Judge Severens, of the United States Circuit Court, the E-M-F Company of this city was fully justified in rescinding the selling agreement it entered into with the Studebaker Automobile Company, last April, and is at liberty to handle its own product.

Some two weeks ago President Walter E. Flanders, of the E-M-F Company, it will be recalled, abruptly terminated the relations up to that time existing between the two concerns, serving notice on the Studebaker Automobile Company that thereafter the Detroit concern would market its own products. The Studebaker officials, who constituted the minority stockholders in the E-M-F Company, immediately sought to have Judge Swan, of the local United States Court, issue a peremptory restraining order against the E-M-F Company, to prevent the summary severance of relations and the selling of cars through any other medium than the Studebaker Company. Judge Swan declined to take this step, stating that he would decide the case on its merits as they might be presented to him on a date set. Then counsel for Messrs. Fish, Studebaker, and Eames, of the Studebaker Company, stole a march by securing a temporary restraining order from United States Circuit Court Judge Severens, of Cincinnati.

When the matter came up at Kalamazoo, Mich., last Friday, for final settlement, Judge Severens denied the application of the Studebaker officials for an injunction to prevent the E-M-F Company selling its cars to independent dealers, holding that the latter company was justified in rescinding the selling agreement, whose alleged non-fulfillment on the part of the Studebaker Company proved the bone of contention, and leaving the Detroit company free to market its cars as it sees fit.

The only point questioned by Judge Severens at the preliminary hearing was whether the action of the majority directors was really the corporate act of the company. In rendering his decision, Judge Severens did not touch upon this phase of the matter, evidently having satisfied himself fully.

Immediately after the reading of the decision counsel for the Studebakers called attention to the fact that there was pending before Judge Swan in the United States circuit court here another case, brought by the Studebaker Automobile Company, and asked Judge Severens to hear it, on the grounds that he was already familiar with the facts, and that Judge Swan would not be able to do so. Counsel for the E-M-F interests promptly question Judge Swan's inability to handle the case, and after considerable argument on both sides, Judge Severens stated he would hear the case if Judge Swan requested him to do so, but that under no other condition would he interfere. Studebaker counsel pressed the point, and acting on the supposition that Judge Swan would not hear the case, it was set by Judge Severens for a hearing at Cincinnati, January 3.

It developed that what the Studebaker Company really was after was another restraining order which would tie the E-M-F officials up until the other case could also be heard, thus causing another ten days' delay. When the matter was put up to Judge Swan he promptly declared that inasmuch as the original action had been taken before him he considered it his duty to hear it, and set the case for Monday morning, December 27.

Latest Move in Court

DETROIT, Dec. 28—When the Studebaker case against the E-M-F came up before Judge Swan Monday morning the Studebaker lawyers asked permission to withdraw the motion for a temporary order to restrain the E-M-F company from going on with the sale of cars, and to also withdraw the bill of complaint, without prejudice and at the cost of the Studebaker company. E-M-F attorneys had no objection to the withdrawal of the motion for a temporary restraining order, but, believing that the withdrawal of the bill of complaint was merely a step toward clearing the way for action in some other court, asked that if the court granted such permission it be accompanied by an order estopping further proceedings against the E-M-F company.

Judge Swan promises a decision at an early date.

REAL AUTOMOBILE NEWS FROM THE PINE TREE STATE

PORTLAND, Me., Dec. 27—That the coming of cold weather has little effect upon the automobile business of Maine is clearly evidenced by the figures which have just been compiled at the office of the Secretary of State in Augusta. The record of registration of automobiles, according to the figures, shows that for the past 11 months of the present year 1,614 machines were registered; the number of licenses issued to operators was 1,788; the number of motorcycles registered was 133, and the number of licenses issued to dealers was 42. From these sources the total receipts in fees amounted to $5,486, divided as follows: From registration of automobiles, $3,224; from licenses issued to operators, $3,576; from registration of motorcycles, 266, and from licenses issued to dealers, $420.

During the month of November, when the trade in a State so far north as Maine is thought to be at a standstill, the number of automobiles registered was 34 and the amount received in fees was $68; the number of licenses issued to operators was 30, and the amount received in fees was $60; the number of licenses issued to dealers was four, from which $40 was received.

The number of automobiles which have been registered since the law went into effect in June, 1905, is 4,846, and the number of licenses issued to operators during that time is 5,578. The number of motorcycles registered is 472, and the number of licenses issued to dealers is 123. The total amount received in fees since the law went into effect is $23,012, which is divided as follows: From the registration of automobiles, $9,693; from licenses issued to operators, $11,156; from registration of motorcycles, $944, and from licenses issued to dealers, $1,230.

Reviewing the automobile season in Maine which has just come to a close, it may easily be said to have been the most successful the State has ever enjoyed. Conservative business men, those who at first it was thought could not be brought to the use of the automobiles, have taken up the new means of locomotion, and many of them, although well advanced in years, may be seen about the streets of Portland, Bangor and the other cities of the State driving their own cars. Doctors in particular have recognized the usefulness of the horseless carriage.

Auto Tourists in Plenty—It is estimated from the figures of the Maine railroads that fully 250,000 people visited this State during the vacation season of 1909. That is the number that came by train, but it does not by any means even hint at the thousands that came by automobile. In fact, there has been a general complaint that the automobile has cut into the business of the steam lines, for hundreds of people who formerly came that way have entered the State in their touring cars.

The commercial vehicle has yet to make a pronounced impression in the State, but it is being slowly adopted. Several smaller ones are used in Portland and at Poland Springs and Rockland the Ricker Brothers are using the big Stanley passenger car for the transportation of guests to the mammoth hotels.

BISONS ELECT ENOS TO CLUB PRESIDENCY

BUFFALO, Dec. 27—About seven hundred members of the Automobile Club of Buffalo attended the annual meeting and election of officers. The new official roster includes the following: Laurens Enos, president; Harry Thorpe Vars, vice-president; Dai H. Lewis, secretary; Donald Mackay, treasurer; Edward H. Butler, Charles Clifton, Edwin R. Thomas, George C. Diehl, George P. Urban, John G. H. Marvin and Maurice M. Wall, directors.

A silver loving cup was presented to retiring President John M. Satterfield.

It is the custom of the club that a president shall have only a single year in office. President Satterfield's report reviewed the work of the club during the year, including the launching of the official monthly, the *Buffalo Motorist*, which has yielded a net revenue of $1,698.75 to the club; the institution of the club dashboard emblem, the distribution of road maps, including the new map of Erie County; the automobile show of 1909, which gave a net profit of $2,700 to the club after paying a dividend or rebate of over 51 cent to the exhibitors; the one-gallon gasoline contest which established a new world's record; the warfare against the Williamsville speed trap, in which the club defended all who were arrested and secured a reversal of the convictions in the justices' court and the repayment of all moneys exacted under the guise of fines; the winning of the Glidden and Hower trophies by members of the club; the institution of new steel-enameled road signs; the warfare by the club on automobile thieves, resulting in the recovery of all of the 63 cars stolen and the sentencing of eight of the thieves to prison for terms ranging from 20 days to 3 1-2 years.

The treasurer's report showed a balance of $4,551.19 in the treasury. The club spent $300 in rewards for the arrest of automobile thieves and $212 in smashing the Williamsville speed trap.

Secretary Lewis reported that the club's total membership is 1806, of which 612 were added this year and 105 within the last 30 days.

The club will send a delegation to attend the A. A. A. National Automobile Legislative Convention, which will meet in Washington in February in the interest of a Federal motor registration law and a uniform State law throughout the country.

DENVER MOTOR CLUB READY FOR NEW YEAR

DENVER, Dec. 24—The Denver Motor Club will start the new year with all its objects outlined beforehand and a new set of officers. At the election held recently William D. Nash was elected president, Dr. J. N. Vroom vice president, E. C. Healy secretary and C. P. Allen treasurer. This makes a complete change of officers, with the exception of Mr. Allen, who has held the position of secretary since the organization of the club. The board of governors for the following year consists of the above-named officers with the addition of Morris Mayer, Dr. S. D. Hopkins, W. H. Sharpley, Dr. E. F. Dean and George E. Cartwright.

The work which has been outlined for the coming year embraces a strenuous campaign for good roads, the erection of many new signboards, the biggest and best automobile show ever held west of Chicago (to open March 23), a 290-mile road race on Decoration Day, a reliability contest in June, another road race on Labor Day, an economy contest in October and a hill-climb in November.

Within the last two months the commissioners in Weld, Adams, Jefferson, Douglass and El Paso counties have had a number of men at work on the roads. The club has made a general canvas and has found in almost every section that the land owners, ranchmen and farmers are ready to assist the work in any way. Many of them have offered funds as well as labor, teams and implements.

MILWAUKEE CLUB'S SHOW STRIKES A SNAG

MILWAUKEE, Wis., Dec. 27—Representatives of twenty-five well known makes of automobiles in Milwaukee have issued a public statement announcing that they have mutually agreed not to display their cars in the second annual automobile and motor show of the Milwaukee Automobile Club, in the Auditorium, from February 22 to 27.

"Believing the expense of exhibiting will be greater than the profits to be derived from the show," the announcement says, "we will not exhibit at this coming show." The agencies are:

Mitchell Automobile Co., Mitchell; Rambler Garage Co. of Milwaukee, Rambler; Sanger Automobile Co., Oldsmobile, Maxwell, Stearns; Curtis Automobile Co., Reo; Jonas Automobile Co., Peerless and Cadillac; Welch Bros. Motor Car Co., Packard and Rauch & Lang electric; Akin Motor Car Co., Stevens-Duryea and Columbus electric; Emil Estberg, Pope-Hartford, Waverly and Woods electrics; Hickman, Lauson & Diener Co., Ford; Waite Bros., Moline; Riverview Automobile Co., Moon; Bates-Odenbrett Auto Co., Overland, Marion, Winton; Albert Smith, Palmer & Singer; American Automobile Co., Pierce-Arrow, Apperson, Babcock electric.

Each of the fourteen agencies will conduct private shows in their respective garages. They claim unfair treatment from the Milwaukee club, but the nature of this is not given out. President Clarke S. Drake, of the M. A. C., says that he is not aware of any unfair treatment, and while regretting the attitude of these dealers, believes the club will be able to get along without them. All space has already been contracted for, which gives promise of a show at least 75 per cent. larger than the first show held in the Milwaukee Hippodrome last March.

SALT CITYITES PLAN MUCH FOR 1910

SYRACUSE, N. Y., Dec. 27—The Automobile Club of Syracuse did things during 1909, and its members have a right to congratulate themselves upon results attained. During the Summer a fine room, principally for the convenience of tourists, was located on the second floor of the S. & A. K. building, on East Genesee street. A club publication, the *Spark Plug*, is about to be launched. The club ends the year with a total membership of 390, a gain since the first of July alone of 150. The officers of the club say that in the week remaining of 1909 they'll get another ten, making an even 400 to begin 1910.

The results attained are due principally to the efforts of President Hurlbut W. Smith, Secretary Forman Wilkinson, and the assistant treasurer, Miss Grace L. Tickner, who has proved a veritable dynamo in the interest of the club.

The club was started in 1902, and Fred H. Elliott, present secretary of the American Automobile Association, was its first secretary. The present recruiting movement is the most ambitious one the club has had, and it is by no means finished yet. Five hundred members is the goal, and it is confidently asserted the club will have them by the early part of the Spring. Not only has the club done a great amount of road and danger sign work, but it has had a potent effect upon legislation at Albany.

BAY STATERS INSPECT INTERESTING TESTING DEVICES

WORCESTER, MASS., Dec. 27—The Worcester Automobile Club, Wednesday evening, was given a demonstration at the new automobile testing plant of the Worcester Polytechnic Institute. The apparatus is the invention of Prof. D. L. Gallup, professor of gas engineering in the department of mechanical engineering at the Tech, and the demonstration Wednesday night was the first public one given. The apparatus is on the street level of the building and permits a car to be run in directly to the testing wheels. On the wall facing the driver while his car is being tested is a chart ruled with lines and curves. The horizontal distances represent the rate of speed in miles per hour and the vertical distances the draw-bar pull. From these two factors are plotted curves which represent the horsepower and per cent. of grade. In front of the chart are strung two automatically controlled ribbons, one of which is horizontal but which moves up and down, the other is strung vertically and moves back and forth and represents the speed. The horsepower and the per cent. of grades are indicated on their respective curves by the varying point of intersection of the two ribbons. The apparatus is designed to operate at speeds representing a maximum of 60 miles per hour and a draw-bar pull of 1,500 pounds and to grades of 25 per cent.

In addition to the testing plant Prof. Gallup has on exhibition an optical monograph which, by means of a tilting mirror mounted on a flexible diaphragm can, when connected to the combustion end of a gas engine cylinder, be made to project an electric arc upon a ground glass screen in such a manner as to indicate the changes of pressures which take place in the cylinders. An elaborate piece of apparatus designed to show the effect of different types of ignition and spark plug combinations is also shown. By rotating this device at different speeds the conditions and reliability of the sparking devices can be shown as they would occur if the automobile was running at different rates of speed.

NEW OFFICERS AND NEW CLUB HOUSE

New Rochelle, N. Y., Dec. 24—Very commendable was the meeting of the New Rochelle Automobile Club held recently. This was the annual meeting, and officers were elected as follows: President, W. B. Ogden, Jr.; first vice-president, Edmund Eckart; second vice-president, G. W. Bennett; treasurer, F. D. Le Count; secretary, F. M. Carpenter. The sum of $4,000 was subscribed as the first payment on the new $25,000 club house. The activity of the club has resulted in the reduction to the ranks of an obnoxious motorcycle officer and the putting of the other plain-clothes motorcycle officers in uniform. By its prompt action in this case the club gained many friends.

A. C. OF PHILADELPHIA PASSES 1,000 MARK

Philadelphia, Dec. 20—At last week's meeting of the board of governors of the Automobile Club of Philadelphia, Secretary S. Boyer Davis' report showed a total membership of 1,014. The passing of the thousand mark has given impetus to the club-house idea, and Chairman D. Braden Kyle, of the club garage committee, who has been quietly investigating the matter during the past twelvemonth, is said to be loaded to the guards with data, which, when presented to the club at a meeting in the near future, will result in the authorization to go ahead with the work of providing splendid headquarters for the club in the central part of the city. Besides the garage and the usual equipment of the up-to-date club house, the plans contemplate a library and squash and handball courts.

The Automobile Club of Germantown is continually outgrowing its splendid quarters at Carpenter and Emlen streets. Two additions have already been made to the original building, and now numerous local architects are estimating on a 62 x 90 feet addition that will cost $15,000, the work to be begun next Spring.

QUAKERITES ARE BUSY THESE DAYS

Philadelphia, Dec. 27—The Quaker City Motor Club will present each member with a copy of the 1910 "Official Automobile Blue Book" as a New Year token. President Berger will name two delegates to attend the National Legislative Convention of the A. A. A. at Washington, D. C., next February. A donation of $100 was made to the pension fund of the Fairmount Park guards. The annual dinner, Thursday, January 6, at Hotel Walton, promises to be a record-breaker. A feature of the affair will be an exposition of the new rules of the A. A. A. Contest Board by Chairman S. M. Butler.

A mix-up with the Contest Board has necessitated the postponement of the New Year's run of the Century Motor Club. An eleventh-hour change in the entry blank, which was insisted upon by the chairman, allowed insufficient time for the securing of new entries, and the run may be held during the coming show of the Philadelphia Automobile Trade Association January 15-29.

THE AUTOMOBILE CALENDAR

Shows and Meetings.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 4............New York City Automobile Club of America. Annual Meeting, Society of Automobile Engineers.

Jan. 5............New York City, Waldorf-Astoria Hotel, Annual Meeting Motor and Accessories Manufacturers, Inc.

Jan. 7............New York City, Manhattan Hotel, General Meeting Manufacturers' Contest Association.

Jan. 8-15.........New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Jan. 13...........New York City, Engineers' Society Building, Adjourned Meeting, Society of Automobile Engineers.

Jan. 17-22........Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows' Building.

Jan. 17-22........Kansas City, Mo., Annual Automobile Show of the Motor Car Trade Association of Kansas City. P. S. Sutermeister, Secretary, Midland Building.

Jan. 24-29........Detroit, Wayne Hotel Gardens. Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Jan. 24-31........Washington, D. C., Convention Hall, Automobile and Aeronautical Show, Automobile Dealers of Washington. B. R. Johnson, Manager, 1313 New York Avenue, N. W.

Feb. 5-12.........Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19........Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dai H. Lewis, Manager, 760 Main Street.

Feb. 14-19........St. Louis, First Regiment Armory, Fourth Annual Automobile Show, St. Louis Automobile Manufacturers' and Dealers' Association, Robert E. Lee, Manager, 1629 Washington Avenue.

Feb. 19-26........Minneapolis, Minn., Third Annual Automobile Show, Minneapolis Automobile Association. Walter R. Wilmot, Chairman, Hotel Nicollet.

Feb. 19-26........Newark, N. J., Essex Troop Armory, Automobile Show. New Jersey Exhibition Company.

Feb. 19-26........Salt Lake City Auditorium, Automobile Show. Utah Automobile Dealers' Association. W. D. Rishel, Manager, 1-5 East First South Street.

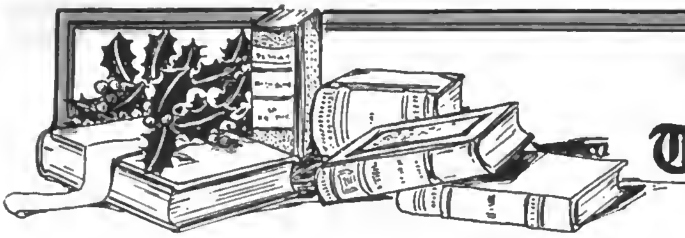
Feb. 21-26........Cincinnati, Music Hall, Automobile Show, Automobile Club of Cincinnati. Jesse Lippencott, Chairman Exhibits Committee, Gibson House.

Feb. 22-27........Milwaukee, Wis., Auditorium, Second Annual Automobile Show, Milwaukee Automobile Club.

Feb. 24-26........Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 24-Mar. 3....Toronto, St. Lawrence Arena, Canadian Automobile Show, Ontario Motor League. E. M. Wilcox, Secretary.

March 5-12.......Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.



The Law and The Automobile

WHAT MICHIGAN'S NEW LAW CONTAINS

DETROIT, Dec. 27—Several important changes are embodied in the motor vehicle laws, which go into effect January 1. Under the new order of things all registrations will expire December 31 of each year, and may be renewed at a cost of $1. Each new registration will hereafter cost $3, instead of $1, as formerly. It will also be compulsory for every purchaser of a second-hand machine to deposit $1 with the secretary of state, and any dealer or individual selling a second-hand car must report the sale to the secretary of state's office within ten days.

Hereafter the driver of an automobile obstructing a highway must turn out for a motor car. At the same time the driver of the car must use every precaution to prevent the frightening of horses, and it becomes the legal duty of occupants of a car to render all possible assistance in the event of trouble.

The state law takes cognizance of the power of municipalities and townships to regulate the speed of automobiles, but in no event must the rate prescribed by them exceed the provisions of the state law, which is 25 miles in the country, and 10 and 15 miles respectively in the business and residence portions of cities. Upon approaching a pedestrian or team in the highway the motor car must be slowed down to 10 miles an hour, and notice of its coming must be given. Numbers must be displayed conspicuously on the front and back of each machine, and different colors will be designated each year.

A MARYLAND LEGISLATOR WITH A GRUDGE

BALTIMORE, Dec. 27—Former Mayor John A. Garrett, of Glen Echo, Montgomery County, noted as a terror to Washington and Maryland speedists, announces that he is going on the warpath again. He has been elected a member of the coming General Assembly of Maryland and he says that it was his purpose, in securing the election, to carry the battle against autoists to the legislature. Now he wants a special law which will permit the Montgomery County commissioners to impose a tax on autos that use any of the County's highways. This money he would employ in establishing a corps of special officers to patrol the County against speedists, particularly of Washington and the lower sections of Maryland. He says that these cars in the hands of speedists injure the roads more than any other kinds of vehicles combined. Glen Echo will be remembered by all who had occasion to pass through there during the last few years as the site of a particularly obnoxious trap, which the Automobile Club of Maryland finally succeeded in breaking up.

KENTUCKIANS CELEBRATE GOOD ROADS LEGISLATION

LOUISVILLE, KY., Dec. 20—Automobilists, senators, mayors, merchants, and those who fought in the trenches for the cause assembled in the leather room of the Seelbach Hotel, Friday evening, in celebration of the victory of the Kentucky Good Roads amendment to the constitution. About eighty were present, and the betterment of the State highways was discussed from every angle. The affair began shortly after 8 o'clock with a banquet, over which Dr. Ben L. Bruner, Secretary of State, presided as toastmaster. What the amendment means to Louisville, Kentucky, and the farming and automobile industries of the State was the keynote of the addresses made by Senators Joseph F. Bosworth and G. T. Wyatt, Mayor William O. Head, Julius V. Beckmann, secretary of the Kentucky Good Roads Asssociation, and M. C. Renkin, State Commissioner of Agriculture.

PENNSYLVANIA'S LAW IS NOW EFFECTIVE

PHILADELPHIA, Dec. 27—On Saturday morning next one of the most important provisions of the Keystone State's new automobile law will go into effect for the first time: that requiring the registration of cars and the licensing of drivers. It will be recalled that when the present law went into effect last Spring an exception was made of the clauses governing registrations and licensing, it being stipulated that in this particular the old law should remain in force until January 1, 1910. The new schedule provides for a sliding scale in registry charges—less than 20 horsepower, $5; 20 horsepower and less than 50 horsepower, $10; 50 horsepower and over, $15 per annum. Owners or their relatives who might drive are not compelled to take out licenses, but paid chauffeurs will be required to pay $2 each and to wear the official badge while on duty.

MICHIGAN'S NEW LAW SOON EFFECTIVE

LANSING, Mich., Dec. 27—There will be 15,000 automobiles in use in Michigan in 1910, according to the Secretary of State's office. Twelve hundred licenses were issued in 1909, and an increased number is expected this year. The fee for registration under the new law going into effect January 1 has been increased from $1 to $3.

Some of the provisions of the new law are a gain for users of automobiles. One provision makes it the imperative duty of teams ahead of an automobile to turn out and let the automobiles go by. A speed of 25 miles an hour is the limit allowed in the country, and in the cities 15 in the residence portion and 8 in the business portion. Numbers are to be displayed on both ends of the machine.

DELAWARE WANTS NO JOY RIDING

WILMINGTON, DEL., Dec. 6—Two city departments, the water department and street and sewer department, having provided themselves with automobiles for the use of their officers, *Every Evening*, a local newspaper, makes the suggestion, editorially, that all municipal machines be plainly lettered with the name of the department to which it belongs, one object being to guard against misuse of the machines by subordinates. There is reason to believe that in this respect some of the employees have been imitating the practice in certain larger cities.

There Is Hope! In his address to the grand jury of Potter County, Pa., Judge Ormerod, who, perhaps, never noticed them in his horse-driving days, called attention to the numerous "thank-ye-ma'ams" on the roads of that hilly country, characterizing them as "nuisances that must be abated." The judge has become an ardent automobilist, and the judicial ventebræ have doubtless been oftentimes severely wrenched by these relics of a bygone age of road building, to call forth such a bitter arraignment.

The Interesting Law Suit between the Cannstatt Daimler Company and the Swiss motor car firm of Niegevet & Cie. has now been concluded after having been carried from one court to another. The Swiss high court, which had to definitely settle the plea for damages for infringing the Daimler radiator patents, fixed the sum Niegevets have to pay at 300,000 francs; Daimler demanded no less than 7,673,000 francs indemnity.

MOTORCYCLE TROUBLES

Editor THE AUTOMOBILE:

[2,131]—Will you please favor me with an answer to the following: I have a 4 horsepower air-cooled motorcycle which does not have as much power as it ought to on very steep hills. The compression is good, the timing as it should be, valve springs are right, but motor will run very fast on the level, very well on slow speed, having great pulling power when throttled down on moderate grades, yet when the throttle is wide open, the machine does not do what it should. What should I look for as the trouble? What should be the clearance space with a 3½-in. piston, on an air-cooled engine? The motor uses an excessive amount of oil, which leaks out around the valves. If I do not use enough, smoke comes out around the crankcase. Would this indicate that the piston was too small? C. O. W.
Binghamton, N. Y.

Either the throttle valve is loose on its shaft or else all of the good things which you enumerate are not actually in existence on the machine at one and the same time. The loosened throttle valve would account for the very good pulling powers of the motor at slow speeds, that is, the throttle was probably open wider than you thought. On this basis, you expected to get much more power in proportion at wider openings, which could not come true for the reason that the throttle could not open any wider.

As to the clearance, that depends entirely upon the compression desired. Knowing the latter you can easily figure the former, or if you know what figure the manufacturer claimed as the latter, you can figure out what that means and check up on your cylinder to see if you have it. Thus, for a compression pressure of 50 pounds (gauge), the compression space should be roughly 47 per cent of the piston displacement; for 60 pounds, 41¼ per cent; for 70 pounds, 36¼ per cent, and for 80 pounds, 32 per cent.

This piston displacement is the area of the piston in square inches multiplied by the stroke in inches. While the usual compression pressures in motorcycles is not definitely known, in air-cooled automobiles, 50 to 60 pounds is more used than the higher pressures. From this, you would apparently want to find your engine giving between those two figures. Midway between the two would mean about 44 per cent of the piston displacement.

Just to show you how to figure it, suppose the stroke which you have not given is 3½ in., then the area of the piston is 9.62 sq. in. Then, the piston displacement is 9.62 by 3½, which is 33.67 cu. in., 44 per cent of this is 14.82 cu. in. for the clearance, or 48.49 cu. in. total.

GEAR RATIO'S INTEREST

Editor THE AUTOMOBILE:

[2,132]—What in your opinion is the best gear ratio for both three and four-speed transmissions, that is, the most practical and satisfactory, all things considered? Please give your answers in numbers of the crankshaft turns per one of the rear wheels. How are the Peerless "30", the Packard "30" and Stearns "30-60" geared? RATIO.
Albany, N. Y.

This is a subject on which very little information is available, strange to say. It also varies greatly from one make to another, with the size of wheels, inclination of owner, country to be used in, service, etc. Thus, hill climbing calls for a much lower gearing ratio than ordinary use, while speed work calls for a much higher ratio.

Some of the cars which you mention are available, thus: Peerless 19 had 2.85 ratio on high with 36-in. wheels; Peerless 25 had 2.59 ratio on high with 36-in. wheels; Stearns 15-30 has 3.5, 4.8, and 10.6 to 1 respectively on high, intermediate and low gears, with 34-in. wheels; Stearns 30-60 has 2.78, 3.77, 5.5, and 11.2 to 1 respectively on high second, third, and low with 36-in. wheels.

Other gear ratios which may interest you are: Stevens-Duryea Model X, 3 to 1 with 34-in. wheels; Winton Sixes (both) 3.69, 3.2, 2.937, or 2.64, choice of these for high gear; 45 has 34-in. wheels and 60 has 36 in.; Thomas 16 town car, 4 to 1 with 34-in. tires; Thomas 6-40, 3.5 to 1.36-in. wheels; Thomas 4-50, choice of 2.78, 2.6, 2.36, 2.23 or 2.18 on high, with 36-in. wheels; Thomas 6-70, same as 4-60. There is remarkably little information available on this subject.

WOOD ALCOHOL IN FUEL

Editor THE AUTOMOBILE:

[2,133]—The writer has been told by a mechanical engineer that, if once a month one gallon of wood alcohol be introduced into the gasoline with the 14 gallons of gasoline and allowed to serve the cylinders through the carbureter as a fuel, this will result in keeping the spark plugs and cylinder interior free from carbon. What is your opinion on this subject? H. L. HOPKINS.
New York City.

It is doubtful if the wood alcohol and gasoline in the proportions you mention, will mix, the former simply floating on the latter. In that case, it is hard to see what good it will do. Similarly, with its use as a fuel, if it does not mix thoroughly with the gasoline, it will not burn at the same time as the latter, but separately, which would result in a very peculiar action on the part of the engine. That is, the alcohol would call for one adjustment of the carbureter and the lighter gasoline, another.

While the use of alcohol may not cause as much carbon to be deposited on the spark plugs and the interior of the cylinders, its use brings out other equally undesirable features, for instance, it is said to corrode valves and valve seats, eating into them in much the same manner that a weak acid or strong alkali would.

TWO-CYCLE ENGINE POWER

Editor THE AUTOMOBILE:

[2,134]—Please answer through the columns of "Letters Interesting, Answered and Discussed" what would be the power of a one-cylinder, two-cycle, three-port engine for an automobile having a 5-inch bore and stroke? B. H. M.
Morgantown, W. Va.

For automobiles, the usual rating used for two-cycle engines regardless of the number of ports or type, is the same as that for four-cycle, the assumption being that since the greater amount of power per cylinder has not been proven, the two are equal. On this basis, the size cylinder you mention (5 in.) would rate at 10 h.p.

A formula which has been advocated by Roberts, the two-cycle authority, gives a rating for this size depending upon the speed at which it is run of: at 1,000 r. p. m., 9.3 h. p.; at 1,200 r. p. m., 11.0 h. p.; at 1,500 r. p. m., 14.0 h. p. It is doubtful if the latter speed can be attained with a two-cycle engine, however.

Another rating formula advocated by the A. P. B. A. for marine racing engines gives this engine a maximum power of 9.6 h. p. For other marine use, the rating is but 2/3 of this or 6.4 h. p. In this, you should bear in mind that the figures are for very slow speed work such as is common with motor-boat engines.

CURE FOR KNOCKING

Editor THE AUTOMOBILE:

[2,135]—I note in your answer to letter number 2,102, relative to knocking in the two cylinders 2 and 3 that you suggested coil trouble. I had a similar experience, and when I tightened up the center bearing of the crankshaft the knocking stopped. Although the distance from the two bearings is short, nevertheless, the pressure in the center from the two cylinders, one on each side, would certainly spring the shaft enough to cause a knock if there was any play. Of course, the cylinders fire alternately with number 1 and 4, so that the knocking would not show much when the engine was running at high speeds. If the trouble was in the coil, he could change the connections 2 and 3 to the outside without much trouble.
Reger, Mo. PLATT OVERTON.

The first idea is a good one, but the last named, that is, the interchanging of terminals could not be done, as the timing would then be defective, and the engine would not run at all. If a wire was connected up to cylinder number 1 and then changed as this writer suggests to lead to cylinder number 2, the result would be that cylinder 1 would receive a spark at the correct time for number 2 and, vice versa, cylinder 2 would get a spark at the right time for cylinder 1. This would of course be incorrect for both, and the engine actually would not make a revolution, after this change had been made.

Answered and Discussed

COLLISION LIABILITY

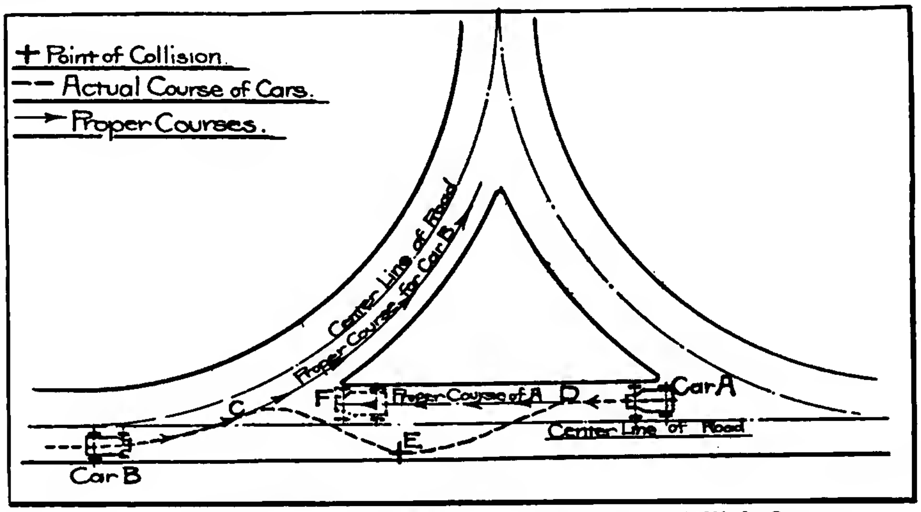
Editor THE AUTOMOBILE:

[2,136]—Will you please advise me as to the liability in the following case: If A driving an auto meets B also driving a car, the latter (B) giving a signal by means of his hand that he is going to turn around to his (B) left following the curve of the road at that point. A slacks up, and thinking to give B more rooms, turn to his own (A) left. B starts to turn to his left, then apparently changes his mind and turns back to his right, running into A at the point marked E. Which is to blame? N. W. L.
Plainfield, N. J.

The sketch below shows the scene of the collision, and the layout of the roads there, with two forks from the main road branching together to form a Y. Car B followed the course B C E as indicated by the heavy dotted line, while the other car proceeded along as per A D E, also indicated by heavy dotted lines.

As the case is told by the writer above, it appears as if the liability lies with A, although in turning out as he did he showed a kind heart and a tendency to think for the other fellow. Nevertheless, when he crossed the center line of the road at point D, he went wrong and for that he would be liable. His proper course would have been to proceed in a straight line as shown by the arrows, up to the intersection of the two roads F, where he should have thrown out his clutch until B passed or until the road was otherwise clear.

Had he done this, and had B driven as he did, changing his mind and his course at C, A would have been on the right side of the road somewhere between D and F, but wherever he was, he would have been in the right. Then, had B run into him, the latter (B) would have been in the wrong and therefore, liable. In another column we print a tentative list of signals which would undoubtedly be valuable in such cases.



Sketch of Road Intersection Where Collision Described by N. W. L. Occurred

POINTS ON FRICTION DRIVE

Editor THE AUTOMOBILE:

[2,137]—Will you please advise me through "Letters Interesting, Answered and Discussed," what is said for and against the friction drive? As I am on the point of buying a new automobile in the medium-priced class, I would like to get an opinion on this. I am more interested in durability than speed. A. SUBSCRIBER.
Crowley, La.

As for the drive, the arguments are lessened weight, lesser number of parts, simplicity, low first cost, ease of operation, and infinite number of speeds.

On the other side it is said that the friction form possesses many disadvantages, such as lack of holding power, too raipd wearing out of the friction surfaces with consequent expense and cost of frequent replacements.

The lack of holding power alone would more than counterbalance all favorable advantages could it be proven definitely. The fact that it has been impossible to prove this to the satisfaction of all concerned accounts for the continued existence and healthy growth of the companies manufacturing this form. Otherwise, they would have been obliged to go out of business long, long ago, for want of business support.

Manufacturers on this type of transmission say, also, that the frictional surfaces which wear out are very cheap in price, so that their cost is negligible, while the work of replacing them is also very small and inconsiderable.

SIGNALING CODE FOR AUTOS

Editor THE AUTOMOBILE:

[2,138]—Will you kindly tell me through "Letters Interesting, Answered and Discussed," what warning or signal I am supposed to give an automobile ahead of my car when I wish to pass such car on a public highway at night, when any body motions on my part cannot be seen by the person at the wheel of the car overtaken? It occurs to me that an established signal code blown on the horn, known to both to mean "I wish to pass you" would be practical and very useful to tourists. More than this, it would enable the overtaken car to give the allotted road to the passing car. Are there any fixed road signals to be used in such cases, and if so, what are they? READER.
Buffalo Lake, Minn.

A long article was published on this subject in THE AUTOMOBILE, but as this was some time ago, part of it will be repeated. At present there is no accepted code of road signals, although the need is freely granted by tourists. A series of signals advocated in these columns is as follows:

Auto Signaling Code.

(1) When running ahead and going to make port, or to stop,	One long and one short blast of horn, to be sounded not less than 30 yards from stopping point.
(2) When coming to a standstill, or have made port,	One short blast.
(3) Going to start ahead, or leave port,	One short blast.
(4) When standing still and going to back up,	Two short blasts.
(5) Starting ahead slow on bad roads, slippery or muddy,	Three short blasts.
(6) Going to turn to left at road crossing, to be sounded before starting to turn,	Four short blasts.
(7) Going to turn to right at road crossing,	Two short and one long blast.
(8) In passing a slower car on port side (left),	One long blast.
(9) In passing when abreast on port side.	One long and one short blast.
(10) When crossing intersecting roads, signal must be blown at least 20 yards distant from crossing,	Two long and two short blasts.
(11) Coming to forks of road, if any, cars, teams, vehicles coming in opposition use marine signal code; will turn to left; always keep on right side of roadway.	(Port) One long blast. (Starboard) Two long blasts.
(12) Calling for assistance if stalled on the road,	Five long blasts.

We give the letter and code in full above, but would make the criticism that there are three pairs of signals, which are alike, and while it would appear that there is no danger of their conflicting with each other, it would be best to have different signals for the present duplicates. So we are suggesting changing three of the above as follows:

(3) From one short to five short.

(8) From one long to three long.

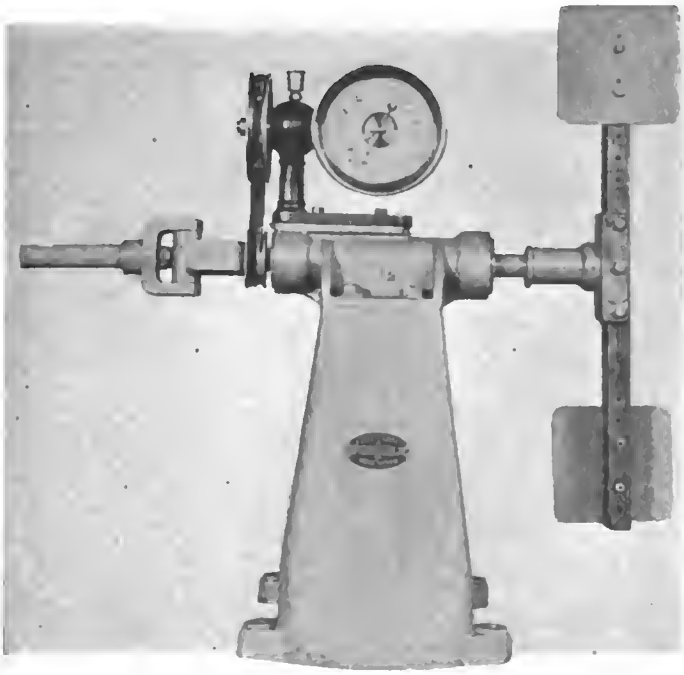
(9) From one long and one short to one short and one long, a transposition.

(11) From one long to three long or leave this as it is and change

FAN-TYPE DYNAMOMETER FOR TESTING

The standard type of fan dynamometer shown in the accompanying photograph has been placed on the market by Joseph Tracy, consulting automobile engineer, 116 West Thirty-ninth street, New York. It consists essentially of a metal standard carrying a horizontal steel shaft in large ball bearings; one end of this shaft is connected to the motor under test by a universally jointed extension shaft, the other end carries an overhung two-bladed fan, as shown. On the dynamometer shaft a small pulley fitted to a boss on the rear of the universal joint is belted to a larger pulley on the special tachometer which is mounted on top of the housing that carries the dynamometer shaft.

The tachometer is provided with a double scale and single pointer, the inner scale showing the revolutions per minute and the outer scale the horsepower developed. The r.p.m. scale is graduated progressively by divisions of 20 revolutions from 200 to 2,000 revolutions. The horsepower scale gives a minimum reading of 1 horsepower at 480 revolutions and a maximum reading of 70 horsepower at 1,980 revolutions. Consequently at all ordinary rates of motor speed a simultaneous reading of r.p.m. and horsepower can be obtained without computation.



New Dynamometer, the Invention of Joseph Tracy

This dynamometer can be employed in testing motors on the block by making suitable connection between the jointed dynamometer shaft and the motor shaft, clutch or flywheel. It can also be used to test an automobile motor in position on the chassis by disconnecting the propeller shaft and substituting for it the jointed shaft of the dynamometer.

It is designed to test motors of medium-sized cars. However, by the use of fan blades of greater or less area and suitable tachometer scales, the range of absorption and measurement of power can be varied between wide limits.

Features of this apparatus which will commend itself to builders of motors, automobile manufacturers and others include simplicity, low first cost, compactness, durability and freedom from possible breakdown or interruption of tests; ease with which readings may be obtained by unskilled help; capacity for continuous tests for long periods without constant attention.

Modifications of the standard apparatus are built to conduct tests of power delivered to the driving wheels of automobiles, either shaft or chain driven. Patents have been applied for.

SOME NEWS FROM TIREVILLE

Akron, O., Dec. 27—The Akron Auto Garage Company, joined by the Akron Auto Supply Company, gave a successful automobile show here Friday and Saturday. The festivities took the form of a celebration for A. Auble, Jr., and Fred C. Wood, who are now the Oldsmobile-Oakland agents for the state of Ohio, with a large establishment in Cleveland, established there less than six months ago. Eight years ago Mr. Auble started in the automobile business in Wadsworth, and before that he was active in the bicycle trade, and appeared in many speed contests. He came to Akron, and a few years ago was joined by Mr. Wood. They began in a modest way, but made a big success out of the agency and garage business, and since they have organized the Oldsmobile-Oakland Company they have establishments in Cleveland and Toledo, as well as in Akron, and more than 60 men are in their employ throughout the state.

Local Elks are planning to carry a greeting from "Tireville" to "Autoville" when the Elks' national convention is held at Detroit next year. A steamer is to be chartered if present plans are worked out, and some sort of a souvenir is to be designed typifying the city's advanced position as a rubber center. The purpose is to bring Akron and Detroit into close juxtaposition on account of the former being the rubber tire center of the United States and Detroit being the auto center.

AUTOS FORGING AHEAD IN THE U. K.

London, Dec. 20—A recent census shows that during the past year a great increase has taken place in the number of motor vehicles registered in the United Kingdom. The classified totals are as follows:

	Motor Cars.	Motor Cycles.	Commercial Vehicles.	Total.
England and Wales..	89,858	65,075	6,273	161,206
Scotland	7,521	5,321	421	13,263
Ireland	3,790	3,425	71	7,286
United Kingdom....	101,169	73,821	6,765	181,755

The following figures show the increase in the number of motor cabs and motor omnibuses in London during the past year:

	December, 1909.	December, 1908.	Increase.
Motor cabs........................	3,799	2,358	1,441
Motor 'buses.......................	1,164	1,115	49

A. M. C. M. A. Handbook—The official handbook of the American Motor Car Manufacturers' Association, entitled "Leading American Cars," contains detailed specifications of all 1910 models made by members of the association. It also gives the names and addresses of all members of the association.

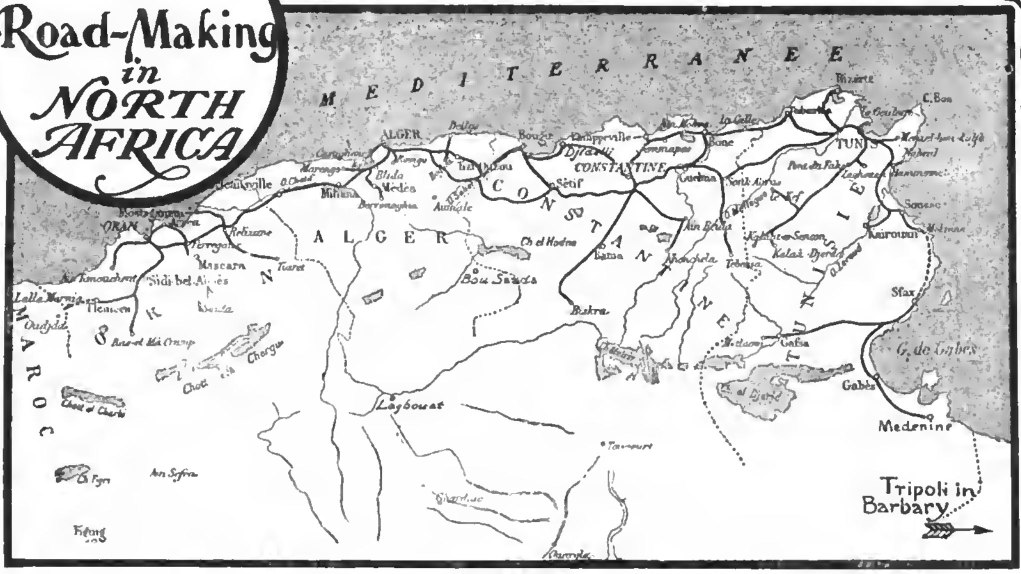
The models described have been arranged according to price classification, under the following heads: Cars up to $1,000, $1,000 to $1,499, $1,500 to $1,999, $2,000 to $2,499, $2,500 to $2,999, $3,000 to $3,999 and $4,000 and over. It is interesting to note that where 27 different models selling under $1,000, 33 models between $1,000 and $1,499, 29 between $1,500 and $1,999, 12 between $2,000 and $2,499, 29 between $2,500 and $2,999, 24 between $3,000 and $3,999 and 29 at $4,000 and over. The fact that there are 33 distinct models selling between $1,000 and $1,499 clearly shows that this is the most popular price.

In the commercial division there are 86 distinct models embracing all manner of vehicles. The prices range on commercial vehicles from $500 as a minimum to $6,000 as a maximum.

J. C. Coe, of **Saskatchewan**, dropped into Detroit recently, and by the time he had finished his errand had added nearly $100,000 to the accounts of Detroit automobile manufacturers and agents. He was not an agent himself. He told his neighbors of the far Northwest that he was going east, and thirty of them gave him their orders to be executed in Detroit. Coe paid $4,500 for his own machine and several of the others.

Roads and Road-Making in North Africa

By … FRANCIS MILTOUN



anything at all to it or back of it. Four millions of the total population of something less than five millions all told in Algeria, including also two hundred thousand Europeans, are almost entirely dependent upon the good roads of the country for their prosperity. The railway is still in embryo so far as efficient service is concerned, but the "good roads" have arrived. They are the rear arteries of the life blood of a country.

Joanne's "Algerie et Tunisie" and Michelin's "Guide d'Algerie et Tunisie," issued gratis to automobilists by the great tire house, are invaluable to the traveler. The one supplements the other immensely well, and smooths the way in many places that would otherwise seem rough. The maps in both these books are excellent. The "Carte Generale de l'Algerie," on a scale of 1-1,600,000 (which comprises Tunisie), is a large scale road map issued by the French Dépot de la Guerre, is interesting to study and have by one for reference (the cost is only one franc for the two sheets, and it may be had at the Touring Club de France), but certain modifications and new routes have in some instances been made since this map was originally issued, so it must not be trusted implicitly.

Conty's "Touriste en Algerie" gives maps of most of the roads of the Sahei and the Mitidja, the Massif of the Petit Atlas and Kabylie and of the Djurdjura, and in addition gives them in profile, showing the elevations in a most practical and interesting manner, worth much to the unknowing tourist.

The Romans built the first roads in North Africa as they did in Gaul. They built them with the labor of soldiery, helped out with the compulsory labor of land owners and tenants, as the Roman

BEFORE the conquest of Algeria by the French in 1830 there existed not a single kilometer of good road as it is known to-day, only by-paths, tracks and trails, where roamed the Bedouin and the Moor. It is a notable fact that to-day, scare three-quarters of a century later, a great trunk line, a "Route Nationale" worthy to rank with the best of those in France, parallels the coast line from the Moroccan frontier to Tunis, and sundry other side roads practically duplicate it throughout, besides a half dozen important ramifications reaching down into the desert wastes of the Sahara.

Primarily the making of these routes was a military strategy, though almost immediately they became a necessity of trade, a developer of commerce. To-day they form almost the only *reseau* of routes suitable for automobile traffic in an exotic land. The United States did her part in suppressing the Barbary pirates, but France has developed the African Mediterranean littoral in a commercial sense, and has made good roads grow where before were only camel-*pistes* and mule-tracks.

What is true of Algeria applies as well to Tunisia, though the French protectorate over that country began only a quarter of a century ago. Since that time, however, between three and four thousand kilometers of main roads have been built or relaid, and every body is happy and prosperous, though the Tunisian native is forbidden to emigrate, and the Bey himself may not *se moucher* without the permission of the French, France knew what Tunisia needed if the Bey didn't, and she proceeded to give it to the country. Result: commercial prosperity, good roads and a yearly increasing number of automobile tourists who are there seeking for new worlds to conquer.

Give a new country good roads and good railways and it is bound to prosper if there is

CÔTE de MÉDEA

EL KANTARA

legions hereabouts, according to Momsen, never numbered over 27,000 men. The plan might work well to-day, in America, for instance, where good roads are needed badly, or in Britain, where an indolent soldiery are causing untold expense of upkeep and returning very little. The procedure must have a centralized supervising power, as did that of the Romans, and county councils and petty bailiwicks, with cheap and nasty ideas of economy, should not be allowed to thrust their inefficiencies on the tax-paying public. Hitherto, in recent centuries, when local authorities have tried to build roads independent of a head supervising power, and have afterwards attempted to link them up with other short lengths, built by other self-willed beadles and bumbles, one and all have made a mess of it. This is fact and history combined. Road building is, or ought to be, considered a national work. The Romans knew and recognized this, and the French, and that is why Roman roads and French roads were and are "good roads."

IN THE GORGES OF PALESTRO

DESERT ROAD TO SIDI OKBA

OVER THE COL DE SFA

The "Itinerary of Anthony" has much to say in its folios of the roads of North Africa, and states also that where stone roads did not exist the routes of communication, trails and *pistes* were surveyed and marked with *bornes milliaires* of the same species as those which radiated from the great golden milestone of Rome itself.

Besides roads the Romans built bridges (the two go side by side), and that's why the French Département des Ponts et Chaussées handles road-making and bridge-building to-day as did the Romans and Napoleon before them.

The bridge of El Kantara, between Batna and Biskra, is the outcome of a Roman work on the same site rebuilt by the unesthetic military geniuses of 1862 in an entirely clumsy manner, though for all that it still stands a massive monumental work, albeit it has entirely lost its aspect of antiquity

The roads of Algeria are beautifully engineered. Route Nationale No. 1, at the Col de Ben Chicao, rises to a height of 1,220 meters, and the caravan route between Djelfa and Laghouat to 1,275 meters. Route No. 9, near Setif, too, rises over 1,100 meters. In spite of these elevations, all of them achieved from the lowest levels, and in comparatively short distances, the grades are seldom more than 5 per cent. (1 in 20). On route No. 3, practically at the entrance to Constantine, there is a bit of a climb of 20 per cent. (1 in 5), about all even a modern automobile can tackle comfortably.

The three following surveys indicate certain of the characteristic topographical features which one meets on a cross-country Algerian road.

ITINERARY NO. I

Towns	Altitude in meters	Kilo-meters	
Alger	...	...	
Blida	...	50	Gorges de la Chiffa.
Médea	920	90	20% côte.
Boghari	623	177	Great Arab market.
Bougzoul	658	198	Commencement of the desert mirages.
Guelt-es-Stel	920	268	Caravan serail.
Rocher-de-Sel	...	303	Salt mountain.
Djelfa	1150	331	Cold in winter.
Ain-el-Ibel	1040	368	Deep sand for some kilometers.
Laghouat	795	442	Chef-lieu of Cercle Militaire de Laghovst, 5.000 inhabitants, of which 300 Europeans. Hotel Horace.

ITINERARY NO. II

Towns	Altitude in meters	Kilo-meters	
Alger	...	...	
Maison Carrée	...	12	
L'Arba	128	30	Native market.
Col de Sakamody	741	50	Very picturesque.
Tablat	...	68	Dejuner (Auberge).
Aumale	880	124	Night stop.
Sidi-Aïssa	672	156	Tiny oasis. Road from here to Bou-Saâda has recently been put in good shape (1907) (macadamisée); one can stop here at a pinch. Hotel.
Bou-Saâda	578	248	Good for three or four days' excursion to El-Hamel; guide; small Arab at Hotel.

ITINERARY NO. III

Biskra to Touggourt via the Caravan route, 204 kilometers

Caravan pace	50 kilometers a day (4 days)
Horseback	32 hours
Diligence	24 hours
Automobile	10 hours

Following the itinerary and schedule of the camel caravans the journey works out as follows:

First day	51.6 kilometers to Chegga
Second day	52.8 kilometers to Mraier
Third day	44.6 kilometers to Ourlana
Fourth day	54.9 kilometers to Jouggourt

Hotel accommodation exists only at Mraier en route. At Chegga and Ourlana the hordj or caravanserai offers shelter only. Food and drink must be carried.

The traffic conditions of Algeria are extraordinary. At a busy corner in Algiers 6,000 *colliers* (horses, mules and donkeys) pass per day, while on certain of the highroads in remote districts the number falls to 60 *colliers.* The average on the Routes Nationales of France is 185. Algeria, then, with its limited population has proportionately a far greater traffic by road even than France. This enormous going and coming by road in Algeria (and Tunisia as well) has necessitated "good roads," and as such the roads of North Africa exist to-day. And they are well kept amid great difficulties, for excessive dryness for the greater part of the year mitigates greatly against the easy upkeep of stone ballasted roads, the *routes empierrées* or the French system of good road classification.

AN OUTPOST HOTEL at FIGUIG

In Algeria there are 3,000 kilometers of "Routes Nationales," 600 kilometers of "Routes Départementales," about 7,000 kilometers of "Chemins de Grande Communication" and another 2,000 of minor, but well-engineered and well-kept roads called "Chemins d'Interet Commun."

These roads, be it recalled, are nearly all of them lengths of modern roadway paralleling the coast. Crossroads are few, as yet, the tangents running to Bou Saâda, Biskra, Laghouat and Djelfa, being the chief of the "good roads" running across country, and the latter are only practicable for automobile traffic in their entirety under favorable conditions. The *pistes,* or caravan routes, are practically unsuited to wheeled traffic of any sort, and, of course, are not included in the figures given.

Adequate road signs are to a great extent lacking if one omits the governmental mile stones or "bornes kilometriques." In the vicinity of Algiers, and in certain other localities, the French Alpine Club has put up *poteaux indicateurs,* which render, even to automobilists, valuable services as far as they go. One of these is shown on one of the preceding pages.

From Blida ascending the wonderful Gorges de Chiffa, beyond the Ruisseau des Singes, rises the Côte de Médea. Médea is one of the celebrated centers of wine-growing in Algeria and its *crus* are of the first rank. For this reason a good road became an early necessity. The Côte de Médea is on the main road from Alger to Laghouat and is the scene of the annual hill-climb of the Automobile Club d'Algerie. It is a 6 to 10 per cent. steady rise for the most part. It rises up the mountain side in those picturesque hair-pin lacets which one usually only associates with Switzerland or Dauphiny or Savoy in France, where the roads are even more wonderfully engineered and graded than those of Switzerland, great as the latter may be or actually are.

The main road leading out from Algiers is most interesting throughout, as here and there it cleaves the plain, tunnels through a rock wall and finally climbs up to a bare, dreary height and passes through a gateway known as the Portes de Fer. It is a tangible monument to the prosperity of the neighboring country which has developed as a result of the accomplishment of this great Route Nationale.

The mountain road through Kabylie is in quite a different category, though it serves the region well enough. This road on the main is simply a strategic highroad conceived by the military authorities as a thing to be valued for the future rather than for the present alone. The mountain region of Kabylie is about the wildest through which it is possible to pass an automobile to-

ROAD THROUGH DJIDJELLI

day, though before March it is no unusual thing for it to be snowed up for days and days.

The direct road via Ménerville and Salestro is practicable throughout the Winter, though at its greatest height, even here in semi-tropical Africa, a meter or more of snow has been known to lie on the road for days, and only last season the railway itself was snow-bound for twelve hours or more. And this is Africa!

SOME TUNISIAN ROADS

From Bougie there is a remarkably picturesque road traced through via Djidjelli and Zeraia to Constantine, 257 kilometers. It is a *"corniche"* road beside the sea for nearly 100 kilometers, and from many points of view, principally that of a savage wild environment, it is the peer of that more famous "corniche" between Nice and Monte Carlo, where auto scorchers and racing electric trams have made one of the most beautiful strips of coastline in the world extremely dangerous and hideous. This road via Djidjelli is reckoned by the government authorities as a "route empierrée, en bonneétat." A daily diligence covers the same road, and all the difficulties encountered can be summed up in the few words which describe the lacets and twistings and turnings as dangerous at high speeds. Otherwise the roadway is superb.

From Setif to Constantine, *"la ville Sérienne"* of the ancients, which most of us have hitherto known only by the contemplation of Vernet's picture of its famous siege now in the gallery at Versailles, is but 127 kilometers, the road rising and falling continually, and then shooting up into the air on a 20 per cent. flight just as Constantine is reached.

The road out from Constantine to Philippeville and Bone, over the Col des Oliviers, is interesting and sufficiently dangerous in some of its rises and falls to be exciting. It is, in fact, a remarkably good piece of road building, and on it even a low-powered automobile can beat the railway between the two points every time.

From Constantine to Batna via Kronbs is 119 kilometers of quite the best long stretch of roadway to be found in North Africa. Batna is hotter than blazes in Summer and about as cold as Greenland in Winter. This is caused by the fact that it sits on a high plateau. Between seasons it is delightful as to climate.

Out from Batna on a round of 80 kilometers of dreary sun-baked, but well-built roadway lie those wonderful buried cities of the Roman occupation of the past—Timgad and Lambèse. There is nothing so grand yet discovered above or below ground, excepting Pompeii.

There is a string of these buried Roman cities running southwesterly from Tunis and they, as well as the roads connecting them, were built by Roman soldiery, with the assistance of such native labor as was available. To-day the excavations at Lambèse are being carried on with the labor of the prisoners of the great penitentiary nearby who also have been put to work on the roads, not at mere stone breaking or oakum picking, or left in solitary confinement. Here's an idea for using a vastly increasing supply of manual labor, of which there is a superabundance.

To El Kantara from Batna is 87 kilometers, the road of the plain now climbing the foothills of the Aures until it finally culminates at the rock-wall, known as the Gorge of El Kantara, literally the curtain which shuts off the desert from the sown. The pass through the gorge, the old Roman road crossing the now dismantled bridge, the modern road and the railway as well form a wonderfully picturesque and practicable combination. The route from El Kantara plunges down a 50-kilometer descent via the Col de Sfa to the edge of the desert at Biskra.

Though the road here ranks as a Route Nationale, it degenerates into a vague undefined track over the Col de Sfa. It takes up with its old form again later on. There are 10,000 camels passing this way to a hundred wheeled carriages and one automobile. When the reverse is the case—or before—the Col de Sfa will doubtless be leveled off a bit and the rough places smoothed out. At present the Col de Sfa in Algeria is a little brother to the mountain road up Mont Ventoux in Provence, a 22-kilometer hill climb up a finely graded road with a very loose surface. The Saharan track would be more nearly suited to the automobile were it not for these soft patches of sifting sand.

THREE KINDS OF TRANSPORT IN ALGERIA

In ten hours from Biskra, if all goes well, an automobile will be at Tougourt, in the very midst of the sandy ocean of the Sahara, where the Hotel de l'Oasis will be found not bad. Garage accommodation, as such, is, of course, non est, and supplies of essence and oil for the return journey will have to be carried or sent down from Biskra, the *bidons* (the regular two-gallon tins of the petroleum trade) slung together across the hump of a camel.

En route for Tunis the road doubles back from Biskra, 226 kilometers, to Kroubs, and to Bone another 180 kilometers.

From now on the road to the Tunisian frontier lies via La Calle and Tabarka, and is a long way from being a bee line; in fact, it is well-nigh 200 kilometers out of plumb. Via Souk-Ahras and Le Kef, from Kroubs, there is only a *"piste carrossable,"* unsuitable enough for automobile traffic to-day except at the expense of pneumatics and "la mecanique."

There are no topographical difficulties to be encountered on these roads of the Constantinois, the eastern province of Algeria, and they are rather more highly developed than those of Western Algeria. Habitations hereabouts are infrequent, however, and a leaky radiator, pump or petrol tank might possibly mean that an automobilist would be uncomfortably stalled if precautions were not taken beforehand.

From Bone to Tunis is nearly 300 kilometers, and, take it all in all, the itinerary is as varied a one as will be found in all North Africa, the road surface being entitled to rank as "very good," with perhaps bad spots here and there.

The roads of Tunisia are also of the same class as those of Algeria and are ranked "very good." Of this class there was in 1907 5,000 kilometers (practically all trunk lines) already open, with 200 kilometers more in the making, and still other great projects all looking to the developing of the *Sud-Tunisie*.

The roads in the environs of Tunis are almost invariably excellent. Particularly is this true of those running from Carthage and its three superimposed buried cities to Bizerte and its modern arsenal; from Nabeul and its potters to Khorbus and its baths, and from La Marsa to the great dam at Zaghouan.

Teboursouk and Dougga and their Roman remains are only a hundred kilometers away over a trunk line road, and Kairouan, the Holy Musulman city of Tunisia, with its open door mosques (all others in the country being shut against dogs of infidels) but 155 kilometers, and all of it over good surfaces.

Beyond, still towards the South and the great desert, are Sousse and Monastir, the quaintest of Mediterranean ports, and the great amphitheater of El Djem, one of the most astonishingly placed Roman monuments one ever came across, sitting close beside the modern Route Nationale the descendant of an ancient road, built here at a period contemporary with the great Roman arena. Southward another 60 odd kilometers is Sfax. From Sousse to Sfax is a great gap not yet bridged by railway. The service is kept up by automobile omnibuses. This speaks well for the roads of Tunisia, that the automobile can go where the railway has not attempted to stretch forth its streaks of iron rust.

From Sfax to Gafsa runs a cheap sort of railway, mostly used to transport phosphate from the mines, but carrying passengers as well, with considerable difficulty—to the passengers.

This automobile service between Sousse and Sfax runs in competition with the conventional stage-coach of old, the French diligence in fact, except that it is hitched up behind six mules and presided over by one swarthy Arab to hold the lines and another to do the lashing out with a rawhide, and the swearing.

The prices for the various kinds of accommodation offered are as follows. If any far Western stage company thinks of installing a similar service the figures as to what is being done here may be of some service.

First class, in automobile, 128 kilometers, 25 francs.

First class, in diligence, 128 kilometers, 12 francs.

Second class, in diligence (on the roof), 128 kilometers, 8 francs.

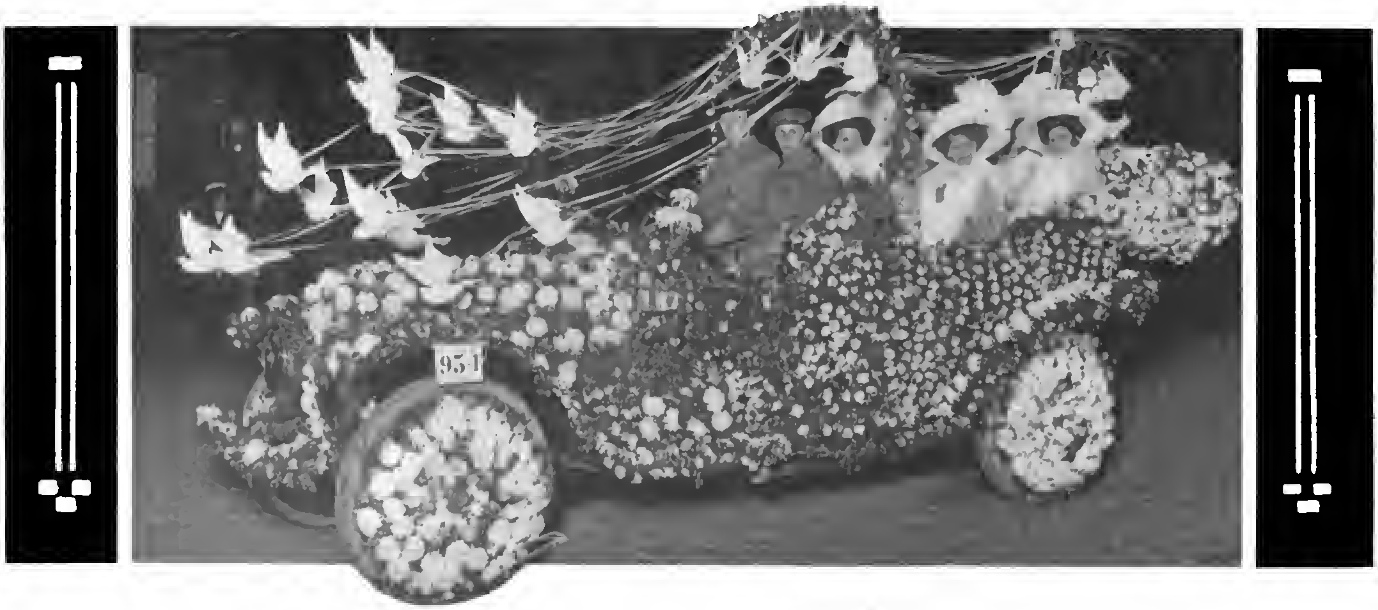
The automobile takes six hours en route and the diligence fourteen. Time is money, even in Algeria!

As far as Gabès, 405 kilometers from Tunis, the road still holds good, and to Medenine, another 75 kilometers, it is practicable, though leaving much to be desired here and there as to surface which is apt to be overblown with soft shifting sand.

Beyond Medenine, not far away now, is the frontier of Tripoli in Barbary, under the dominion of the Sultan of Turkey. Automobiles are not in favor in the realms of the Sultan, nor are there as yet roads suitable therefor, so unless one is prepared to continue their route by aeroplane this must end the automobilist's North African itinerary.

To Theater by Aeroplane—According to the English *Automotor Journal*, the management of Her Majesty's Theater, Carlisle, has placed on its programs the announcement that for the convenience of patrons coming from a distance aeroplanes can be stored free of charge.

There will be no motor car exhibition in Berlin next year, as at the general meeting of the German manufacturers and traders the motion to resume show promotion, which has been interrupted since November, 1907, was defeated.



Pierce-Arrow Car, Owned by William Bausch, with Which He Won a Rochester, N. Y., Floral Parade

Arch of Septimus Severus, Rome, with Palatine Hill on Right, and Packard with Boston Automobilists in Foreground

MANY AMERICANS ABROAD THESE DAYS

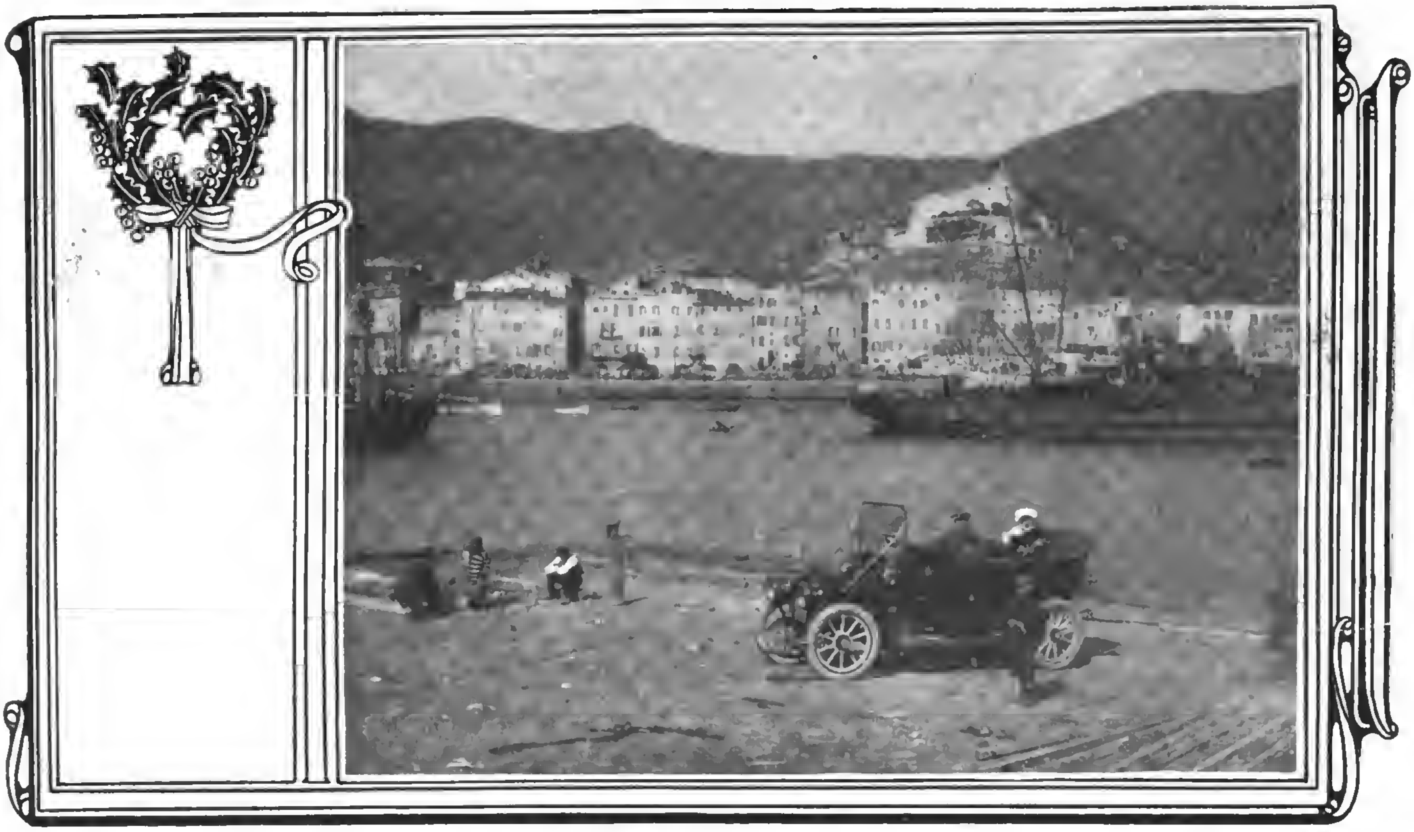
PARIS, Dec. 24—When France proposed to impose a tax on automobilists from abroad who use her fine highways she evidently did not realize that these same automobilists this year left behind them a train of gold representing, on a moderate estimate, not less than $7,200,000. "The Packard Motor Car Company alone," declared H. D. Wilson, their Paris agent, to THE AUTOMOBILE representative, "is responsible for turning $450,800 into the hands of French hotelkeepers and others. This year 250 of our cars have passed through France. They carry, on an average, six persons and remain one month. Each person spends on necessaries—ignoring such luxuries as works of art, curios, etc.—the sum of $10 a day; thus a little calculation shows the correctness of the total sum of $450,800."

But the Packard company is not the only one sending cars to Europe for touring purposes. Figures supplied by the Royal Automobile Club of Great Britain, the Touring Club of France, the Automobile Association of Great Britain, and the Association Generale Automobile, show that 2,000 triptyques have been issued to American and English automobilists this year. This, however, by no means completes the number having entered France with foreign cars, for many owners pay the customs deposit instead of taking out a triptyque; others come over with European cars on which there is no duty to be deposited; a certain number of rich Americans maintain an automobile in France and use it only on their annual trips to this country. A still larger number prefer to hire an automobile from one of the many agencies established for that purpose in Paris.

On a moderate estimate the triptyques only represent 50 per cent. of the automobiles employed by Americans and English for touring through France. The total number is certainly not less than 4,000 for the present year. The American automobilist rarely remains less than six weeks; his English cousin is content with a much shorter period, but the average stay can be taken as a month. Estimating six persons in each car, a stay of one month, and an expenditure per person of $10 per day, the amount of money left behind is $7,200,000. The automobile is directly responsible for this entire sum, for no account is taken of the hundreds of Americans who tour in the ordinary way, nor of the sums the automobilists spend on objects having no connection with touring and every-day living expenses.

The most remarkable feature of the European touring move-

Packard Tourists Opposite the Ancient Roman Forum



The Harbor Front at San Remo—Tourists Enjoying the Delightful Climate and Picturesque Features of Southern France

ment is the number of American-built cars that are annually brought over. Packard seems to be at the head of the list with its 250 for the present year. This only represents the number of cars that have been reported. A certain number of owners, having no need for spares or for touring information, arrive and return without the Paris office being aware of their presence. In addition to the complete stock of parts and the up-to-date touring information, the Paris branch now maintains a mechanic, sent direct from the factory at Detroit, and on duty during the season.

At Rear of Palace of Justice, Rome—Cavour's Statue

N. S. Goodsill, the Pierce-Arrow Motor Car Company's European representative, reports 112 cars during the first nine months of this year, and estimates that the total will be 125 to the end of December. Nearly all the cars are six-cylinder models, of 1909 production, and carry an average of five passengers. Last year there were a few bad smashes, due to inexperienced handling. During the present season the sale of spare parts has been confined to brake liners which give out on the long mountain descents with their perfect surfaces, unknown in America. Though not established for selling, the missionary work done by the visiting automobiles is so effective that the Pierce agent will be obliged to obtain an option on a certain number of cars next year.

Peerless is the third firm having a Paris spare parts and information bureau. M. Bousquet reports that the number of automobiles already reported and expected during the coming portion of the year will be from 70 to 80. These three are not the only American firms represented by tourists in Europe this season. The others, however, do not maintain offices on this side, nor are their cars seen very frequently. Among those that the writer has come across are White steamers, Locomobile, Thomas, Ranier, Maxwell, Welch, Ford, Mitchell and quite a number of other representative American makes.

The recent international agreement on the acceptance of driving licenses in countries other than of issue will doubtless have a stimulating effect on automobile touring during the coming season. Many would-be tourists have refrained from bringing over their cars on account of reports of the red tape involved in securing the necessary permits. In many cases these difficulties were exaggerated, it is true, but no one could find fault with the present regulations. A single examination, which may conveniently be taken in either France or Germany, will admit to every Continental country the tourist is likely to visit.

How Jacob's Ladder Became Climbable

By Cortlandt Field Bishop

THE extreme western part of Massachusetts consists of the region known as the Berkshire Hills. These, roughly speaking, extend north and south between the Connecticut river and the New York State line. In other words, this region comprises the broad upper valley of the Housatonic river and the mountains to the east thereof, forming the watershed between the two rivers just named. This district is hilly in character and sparsely settled, its population being far less than formerly when the now-abandoned farms were occupied.

To the east, this region is drained by the numerous branches of the Westfield river, which empties into the Connecticut not far from the city of Springfield. The route that has been adopted for the main trunkline of State highway across the commonwealth of Massachusetts, from the city of Boston toward Albany, ascends the valley of this river from Westfield, closely following the railway. At the town of Chester, some twenty-nine miles from Springfield, this highway leaves the railway and gradually ascends westward following the windings of Walker brook. Up to this point the grades have been slight and the roadway nearly all of macadam.

For thirty-three miles from Springfield there was practically no choice of routes for the tourist who wished to visit the Berkshires in his automobile. But from the crossroads known as Bonny Rigg Corners, there were two roads. The one to the north rejoins the railway at Becket Station and proceeds to Pittsfield up and down a series of short hills over wretched roads with bad surfaces. The other alternative was to proceed due west, surmount the watershed by a long steep ascent and descend less rapidly, but without crossing intermediate ridges to the Housatonic river at Lee, whence several years ago a splendid highway was built to Pittsfield. It is the last route which bears the name "Jacob's Ladder," and it is doubtful whether there is any stretch of road in the New England States which has caused more trouble to automobiles and their owners.

Starting from Bonny Rigg Four Corners, the ascent rapidly became greater, the road surface poorer and poorer, until, as one emerged from a wooded tract, there appeared right ahead an almost perpendicular stretch which seemed to reach to the heavens. Some years ago there was at the base of the "Ladder" itself a spot on which for many years, before the advent of the automobile, the roadmakers had utilized as material for repairs the refuse sawdust from an old mill. This place was known far and wide as "Sawdust Hole," and few were the automobiles that could get through it. When dry it was hard enough, but the intelligent farmers in the region discovered that sawdust mixed with a little water would stop any automobile, no matter what its power. Consequently, they made a practice of adding a little sawdust whenever rain fell and water when it did not. As a result, the autoists, after vain efforts to extricate their cars, were forced to go back to the nearest house for horses, and the regular schedule price for their use was based upon the horsepower of the stranded car. "Sawdust Hole" was put out of business five or six years ago as a result of the expenditure of a fund raised by some of the automobile owners of Lenox.

But "Jacob's Ladder" remained, and it was not till October, 1909, that the old road over the crest of the watershed was abandoned. The writer has been familiar with "Jacob's Ladder," or Morey Hill as it used to be called, for more than twenty years, and he can well imagine with what feelings the autoist who had emerged from his struggles with "Sawdust Hole" beheld it for the first time reaching far up above him. The road surface was never good—it was always rough and narrow, and there were two or three spring holes near the top which were fatal in wet weather. The farmer in the nearest house kept his horses ready, and few were the automobilists who did not contribute to his daily income. In some spots the grade amounted to nearly 20 per cent.

Jacob's Ladder as It Once Was

All is now changed. "Jacob's Ladder" is a thing of the past, and as a result of a campaign which has been carried on vigorously for five or six years, the watershed between the Housatonic and Connecticut valleys is crossed by a wide, well-built macadam road, whose grade nowhere reaches 7 per cent. It has required the combined and persistent efforts of many persons and many interests, but in the Winter of 1908 a special appropriation of $50,000 was secured from the Massachusetts Legislature for the improvement of this stretch of highway.

The most important part of the work done under this appropriation begins at the foot of the final ascent, and at a point one mile west of "Sawdust Hole" the new road leaves the old

Road In Process of Construction

location and curves off to the left in a wide sweep, and reaches the watershed at a point a quarter of a mile south of the former summit and nearly two hundred feet lower. It then bends to the northwest and descends with a gradient of about 6 per cent., rejoining the old road at the foot of the hill, the total length of the new layout being about 6,800 feet.

In addition to this "Jacob's Ladder" proper, a strip of two miles of macadam, covering the former "Sawdust Hole" and the approaches from the east, was built under this appropriation, and it was opened to travel in October of this year. Not only the road itself is of a permanent character, but bridges and culverts of armored concrete have been built, and concrete parapets and wooden guard rails provided where necessary.

In 1909, a sum of $25,000 was secured for the purpose of improving the highway from "Jacob's Ladder" westward toward the town of Lee. With this money, a stretch of four miles of bad and narrow road has been entirely rebuilt, drained, and graded. In several places the road has been relocated and steep pitches avoided or reduced. Substantial concrete bridges have been built, but no macadam laid. The narrow road along the north shore of Greenwater pond has been widened and raised above the highwater mark.

As a result of the work of these last two years, there remain only a few miles of unimproved road in this main trunkline of highway which extends across the commonwealth of Massachusetts from Boston to the New York State line, there to join the main road which will soon run through to Buffalo. There remain about two miles in the eastern part of the township of Chester and about five miles in the towns of Becket and Lee which are still unimproved. It is to be hoped that the combined influence of those who own automobiles in Massachusetts, and allied interests, will be brought to bear upon their representatives in the Legislature in order that at the session which opens on January 1, sufficient money may be appropriated to complete the work so well done in 1908 and 1909. No finer ride may be imagined than that which is now accessible from Springfield to Pittsfield across the once dreaded "Jacob's Ladder."

Completed Road Around the Ladder.

ON GOOD ROADS

From the report of the Committee on Good Roads at the Annual meeting of the Carriage Builders' National Association, at Washington, D. C., the following interesting excerpts are taken:

"Better roads are one of the pressing needs of the United States. In the innumerable things that have had to be done to put the country in the commercial, industrial and social position it has achieved in such a marvelously short time, road building until very recently has largely been overlooked, and the important place occupied by highways in the expansion of a nation might not even yet have been so generally recognized if it had not been for the advent of the bicycle and the automobile.

"Within the last decade not only the drivers of vehicles have come to want good roads, but the people and the interests which will financially profit by them have awakened to what they are losing by poor highways.

"When the means of communication are bad, people are disinclined to venture far from home, and social and business relations are narrower in the country districts. Many a farmer curtails his crop simply because he has no way to market them.

"The railroads have come to realize that they are losing hauls that they might have if the agricultural districts remote from the large cities had good roads over which to get their produce to the cars.

"Some of the railroads of Virginia, for example, have taken hold of the question in a practical way. Virginia is entering upon an era of road building; to help open the State, as it were, certain railroads have made a proposition to carry all material for road building at cost, and all laborers and machinery intended for the work free. Much will be saved in this manner that can be devoted to road building, and the railroads will reap a return in increased freight traffic."

Cortland Field Bishop on the Ladder's Top, 1909

Mr. Bishop Stuck on Jacob's Ladder In 1906

De Lesseps' Monoplane of Original Design in the Shop of the Societe de Construction d'Apparells Aeriens

FRENCH AVIATORS DEVELOP NEW POSSIBILITIES

PARIS, Dec. 24—Count de Lesseps, son of the French engineer who dug the Suez Canal, has set up a new record for the Issy-les Moulineaux ground and the Blériot cross-Channel type of aeroplane. After a short apprenticeship, the aviator succeeded in remaining aloft 1 hour and 30 minutes. Although all the early flights were made on the Issy ground, no aviator has attempted to make an endurance flight at this place. The performance is also a record for this type of machine, the previous longest flight being performed by M. Blériot, and not exceeding 45 minutes.

In his intervals of teaching Lee Guinness, the British millionaire brewer, famed for his ownership of the Darracq eight-cylinder record-breaking automobile, Hubert Latham is flying over the Mourmelon plain with various loads on his Antoinette. His latest exploit is to carry a cinematograph operator together with all his equipment. The flight, which was of about eight minutes' duration, was made at a height of fifty feet, the operator turning the film through the machine all the time while in the air. The supplementary weight was about 250 pounds, of which the operator was responsible for 140. This is the first time moving pictures have been taken from a flying machine, but not the first time photographs have been obtained. When Latham attempted to cross the English Channel last Summer he had a kodak fitted up in the bow of his aeroplane. Exposures were made with it, but owing to landing in the water everything was destroyed.

Louis Paulhan, who, after considerable hesitation, has decided to desert his native land for a few months in America, has just completed his apprenticeship on a Blériot monoplane. He can now fly on three different kinds of aeroplanes: Voisin and Farman biplanes, and the Blériot monoplane. The first two mentioned are so similar that a man who has mastered one ought to be at home on the other. The Blériot, however, is of such a different type that it is surprising Paulhan should have been able to fly with it on the first attempt. The French pilot appears to have been afraid of legal trouble with the Wright Company if he came to America, and in order to prevent the seizing of his machine he has removed the ailerons from the Farman and the wing-warping mechanism from the Blériot. The Voisin did not need changing, for the Wrights have never claimed that it infringed.

Jacques de Lesseps, in Costume

SMALL SANTOS MACHINE IS POPULAR

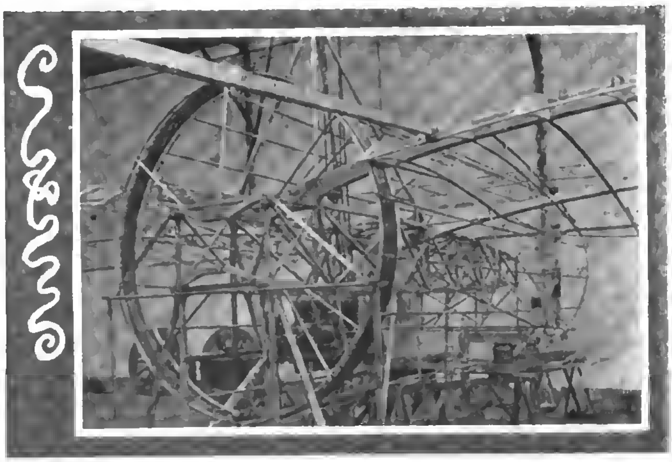
PARIS, Dec. 23—Since Santos-Dumont met with success in flying his "Demoiselle" aeroplane there have been a number of persons who have endeavored to construct a similar machine on the model offered to the public by the young Brazilian. The latest and most interesting of these copies is one produced by M. Nieuport, of magneto fame, who although following the general Santos-Dumont design, has introduced a number of interesting improvements. Instead of placing the seat entirely below the wings, Nieuport has built a kind of cockpit in the centre, the base of it being partly below the wing surface and the upper portion only slightly projecting. The tubular radiator, instead of being placed under the wings, as on the original "Demoiselle," is carried on each side of the cockpit.

The motor, the new two-cylinder opposed built by Darracq, is placed in front of the pilot and slightly below the front edge of the wings. It drives a two-bladed wooden propeller built by Chauvière. Instead of bamboo, steel tubing is used almost entirely for the framework of the machine. Starting is made on two pneumatic tired wheels set very far apart, while landing is performed on skids. Hayden Sands, the first American to learn to fly an Antoniette aeroplane, left Paris this week for Egypt in order to give flying exhibitions. Mr. Sands will take part in the meeting at Heliopolis, near Cairo, next February, and later will visit India and continue a trip around the world. The machine which he will employ is the one with which Latham, his instructor, made his record height flight and flew across country in order to keep an appointment with Marquis de Polignac.

Arthur Duray, who has figured in all European automobile races, and drove for De Dietrich in some of the Vanderbilt events, is now taking lessons on a Farman biplane and intends to compete in the Egyptian aero meet next February.

WRIGHTS TO USE DAYTON AUTO FACTORY

Dayton, O., Dec. 27—The recently incorporated million-dollar Wright Company, which is supported by such financiers as Cornelius Vanderbilt, August Belmont, Howard Gould, Robert J. Collier, Andrew Freedman, Morton S. Plant, E. J. Berwin, T. P. Shonts, Allan A. Ryan and Russell A. Alger, will build its aeroplanes in the factory of the Speedwell Motor Car Company, in this city. The Speedwell Company is not sacrificing any of its present manufacturing space for the aeronautical work, but is adding a new building of 8,700 square feet for the use of the Wrights. This building will be ready for occupancy some time in January, and will have a capacity of about four machines a week. It is stated that the company has already 175 orders, and they continue to come in so rapidly that manufacturing must be pushed at utmost speed to catch up.



Framework of Bertrand Monoplane with Cylindrical Body

LOS ANGELES MEET MAY BE ADJUSTED

At the meeting of the Aero Club of America to be held Thursday the final decision will be made concerning the sanction for the aeronautical meet of the Los Angeles Aero Club. The national body objects to the conditions for the prizes offered, saying that $20,000 of the prize money cannot possibly be won. There is an offer of $10,000 for a dirigible flight from Los Angeles to San Francisco, and another $10,000 for a balloon trip to the Atlantic, both feats regarded as physical impossibilities. President Bishop, however, believes that the matter can be adjusted and the sanction granted.

DETROIT WILL PRODUCE 60 PER CENT. OF ALL CARS MADE

By LEN G. SHAW

DETROIT, Dec. 28.—Now that the official statisticians have busied themselves with pencil and paper and solemnly aver that the year 1910 will witness the production of approximately 200,000 motor cars, it is interesting to note what part the hub of the automobile industry is planning on playing in these proceedings, and what it will probably accomplish.

There are twenty-four full-fledged automobile companies in Detroit, in addition to which are several who have not yet cast aside their swaddling clothes. Five of these concerns will write their output of cars in five figures, and at least four others will reach the five thousand mark or better before the end of a season that is already well on its way. All the others will produce automobiles at a rate that, now considered very commonplace, two years ago would have placed them among the leaders.

Forecasting a season's output and living up to the forecast are two vastly different things, as many a factory manager can testify to his sorrow. This statement is particularly applicable at a time like the present, when difficulty in securing parts and even raw materials is a factor that must be reckoned with. According to factory managers, who speak advisedly, and whose determination is to live up to their predictions, Detroit will during the present season give the country no less than 120,00 automobiles. That means that if their expectations are realized this city will produce sixty per cent. of all the cars it is figured will be made in the United States this season. But the best laid plans of factory managers, like those of mice and mere men, oft go wrong.

If the marvelous building operations now in progress are concluded in time, and if parts and raw materials can be secured in the desired quantities, and if skilled labor is always available, and if there are no delays in the matter of transportation facilities, and if the sales departments busy themselves sufficiently, there is no reason why Detroit's automobile factories should not produce the number of cars now being planned. However, on those "ifs" hinges much, and those in close touch with the situation, and accustomed to discounting such matters, agree that if local makers produce 100,000 cars they will be going some. Even if that figure is not reached, and the output drops to 90,000, a point that is regarded as very conservative, there will be no occasion to be ashamed of the showing, as that will still be 8,000 in excess of the actual output of cars in the entire country in 1909.

First and foremost, of course, in the matter of numbers come the E-M-F interests, who, seeing a favorable disposition of their disagreement with the Studebaker Automobile Company, are laying plans to build 25,000 Flanders Twenties and 15,000 E-M-F Thirties. Close behind comes the Ford, with 21,746, others who require five figures to tell the tale being the Cadillac and the Brush, with 10,000 each to their credit in the forecast. The Hupmobile proposes building 7,500; Chalmers-Detroit, 5,200; Hudson, 5,000; Regal, 5,500; Packard, 3,000; Everitt Thirty, 2,500; Demot, 3,000; Krit, 1,000; Abbott, 1,000; Warren, 1,000; Owen, 500; Welch-Detroit, 500; Detroit-Dearborn, 500; Herreshoff, 1,500; Detroit electric, 1,500; Anhut, 750; Paige-Detroit, 3,000; Van Dyke, 3,000; Grabowsky, 300.

Of course, many of these figures are predictions, founded on good faith, but entirely dependent upon conditions that may arise. The older concerns will all be able to make good, in spite of the great increase over that of last season. They have been through the mill. Some of the younger ones will experience difficulty in living up to expectations that would terrify those older in the game. Nevertheless, it is absolutely certain that if the aggregate output of the country is 200,000 automobiles, Detroit will come very near to producing fifty per cent. of these, if, indeed, it does not furnish the majority, this assertion being made after liberally discounting the plans of all local makers save those who are in a position to absolutely live up to predictions. At all events, the man who wants a Detroit built car need experience little uneasiness through fear that his wish cannot be gratified, provided, of course, he has the purchase price.

PARIS, Dec. 20.—Sport of all kinds demands special costumes if one would be well and comfortably clothed. Just as the automobile brought about, at first, leather and then fur clothing, those who go up into the air in balloons and aeroplanes have found that something especially warm and wind and chill resisting is required.

The designs herewith are no phantasies; each has been tried recently by French aeronauts and not found wanting, though perhaps susceptible of some modification. Certainly they are not graceful nor even becoming, but one thinks they are quite suitable to voyaging through first a strata of half-frozen cloud, then a sheet of rain and finally a band of crisp, zero atmosphere or less, and all these things are the aeronaut's destiny once he rises up from Mother Earth.

The particular costume herewith was of impermeable camel's hair like the waterproof "loden" of the mountaineers. It is extremely light, fairly supple and graciously warm, each and all desirable qualities. The garments are so made that with a cap, or *casque,* for the head two pieces cover one from forehead to feet, including the hands and even the feet; thus preventing currents of air from circling around the ankles. The automobilist himself would appreciate this.

Another material recently tried, lighter even than the foregoing, is paper. As M. Maire, the librarian of the Sorbonne, puts it, the Japanese have long known the use and value of paper for articles of clothing, while we ignore the fact that a penny paper quadrupled and laid across the chest has many times the value, as a heat preservative, of the best woolen tricot ever knitted by hand or machine.

It is up to the aeronauts and aviaters to popularize vests and plastrons of paper, and then, when we can buy them anywhere along the road, will spring up a new and important traffic in the product and industry which will bring millions to somebody.

Another aviater's costume has just been launched on the market, made of *Kapok* or the *duvet* of Java, a species of vegetable fiber, a poor grade of cotton perhaps, which, in the form of a lightly padded suit, is at once light, warm and waterproof.

M. Painlevé, member of the Institute of France, who accompanied Wilbur Wright in his prize-winning flight at Le Mans recently, when he gained half a million francs, stated that in little more than an hour he was nearly frozen stiff. What he meant, perhaps, was that he was cramped, but a combination of inactivity and being continually in a stiff breeze without the least shelter gave a sense of freezing because of lack of circulation. This would have been greatly allayed had some species of wind- and cold-resisting clothing been adopted, and so comes the special tailor for aeronauts. Fifth avenue tailors, get busy!

From Buffalo, N. Y., comes a report that Dr. Charles Meyers made a three-quarter mile flight in a machine of his own construction at a height of 10 feet. The trial was not public.

THE DIARY OF AN UP-TO-DATE MAN

INDIANAPOLIS, Dec. 27—Some people think it costs a lot of money to be thoroughly well groomed and up-to-date, but Charles Pinkham Jones keeps a diary that includes an expense account with a glimpse of which your correspondent was favored the other day, and from it he is able to give exact figures as to what it costs a bachelor, who uses modern labor-saving appliances instead of a valet, to present himself every morning at the bank, the perfect pattern of a well-groomed man. Here is the record for an average morning:

	Electric current K.W. Hours.
Rose at 7 o'clock and took an electric bath, for which the current used was	.3333
Heated bedroom for ½ hour with electric stove	.5000
Heated water for shaving on electric stove	.0333
Used electric boot cleaner	.0133
Pressed trousers with electric iron	.0400
Ironed silk hat with electric ironer	.0333
Kneaded dough for a loaf of bread with electric kneader	.0066
Boiled a pint of coffee on electric stove	.0666
Cooked a chop by electricity	.0666
Aired my room with electric fan	.0238
Turned on electric piano while I ate my breakfast	.0500
Cleaned the knives and forks with electric cleaner	.0010
Polished the plates with electric polisher	.0050
Curled my moustache with electric curling iron	.0025
Lighted a cigar with electric lighter	.0003
Rode in electric elevator to the basement	.0033
Drove my Waverley Electric 4½ miles to the bank	1.0000
Total kilowatt-hours	2.1789

for which I pay 10 cents per hour or 22 cents in all. This does not take account of the current used in my electric clock, but as a single K.W. hour will keep that running for ten years it seems safe to disregard the clock.

After this who will question the economy of electric power?

For the information of any reader who does not understand the term we will add that the kilowatt hour is the unit of measuring electric current charged for by the lighting company. It means the use of a thousand watts of electricity, or the equivalent of one and one-third horsepower, for one hour.

LOUISVILLE WILL HAVE BOULEVARD

LOUISVILLE, KY., Dec. 27—Louisville is to have a boulevard which will encircle the entire city. It will be constructed in such a manner as to connect all the parks beginning at Cherokee park, and taking in Iroquois and Shawnee parks, thence running northward along the river front to Portland and back over the city streets to the Highlands and Cherokee park. The estimated cost of the boulevard will be $189,000. Part of the right of way has already been secured, and, it is believed, there will be little difficulty in securing the remainder. The boulevard has been considered at great length in the past but owing to the cost it has been laid over from time to time. The Louisville Automobile Club have taken the matter up and will push the project until the work is finished.

Pioneer Autoist, Now a Londoner, Sends Greeting

How I Made My Car Pay For Itself

By Ernest Cawcroft

THE discussion of a subject of this nature marks a radical departure in the development of automobile literature. Seldom has an automobile been deemed an asset except when in the possession of the trustee of the bankrupt's estate reduced to cash in readiness for division between the owner's creditors; rather has it been regarded as a distinct liability. A man buys a house to stop paying rent to the other fellow; he buys an automobile and his payments to the other fellow are just beginning. Hence, it is obvious that in a dollar-discussion of the automobile the question must turn upon the profits of the machine as figured not only in money but in health preserved and in pleasures gained.

But the improvement in the mechanism of automobiles, coupled with the marked movement of middle-class Americans to utilize the car as a means of concentrating the expense of their family pleasures, forces a consideration of the subject in this latter-day light.

The nature of this article forces as well as excuses a few personal remarks. I am a lawyer and the owner of a Maxwell runabout of the 1909 design. If I magnify the importance of the assembled mechanism by referring to it as an automobile in the feminine gender, "she" has not paid for herself; but if I call it a machine and consider it in the neuter, "it" has paid for itself. I am going to consider it in the latter gender because my knowledge of the expense of the feminine gender is confined to bringing suits in which the wife never was to blame and the husband always named as the defendant. Nor is there a possibility of that knowledge being increased in view of the fact that a runabout will not carry a chauffeur; and, unlike the two-horsed rig of the rural swains, it takes both arms "to steer the thing." One commercial advantage of the runabout is that there is no place to seat a chaperon unless you go to the expense of putting an additional seat on the tool box. Hence I am going to tell you how my machine has "paid for itself."

Commerce is an exchange of equivalents; and surely there has been no greater commercial development in our age than the creation and exchange of an automobile for the cash of the purchaser. I gave six hundred dollars to the makers for my machine, but it has given me stimulated vigor, including increased lung power (surely a legal asset comparable with a knowledge of Blackstone), and a tendency to recreative sociability which neither I, nor the manufacturers, possess as a sale product. In other words, the running of the machine has given me more than six hundred dollars worth of stored vigor and concentrated health. I need not show that my physician's bills were so much less this season than last year to demonstrate the truth of this conclusion; I feel it in my bones, and until a man does feel his health resident within himself, until he knows as a man that he is healthy without waiting for the physician's certificate to enable him to draw his accumulated lodge benefits, he has not gained that surplus of vigor which the machine is designed to assure. Determined by ordinary business methods, can there be any doubt of the fact that my machine has paid for itself when I tell you that it has increased my capacity for decisive work, added to my ability to get a definite thing done with a resolute concentration of purpose? A machine which serves to thrill the physical man; a machine which keeps his head and feet warm at the same time, and from within his own body, no matter how strenuous his mental exertion, has paid for itself, even if the debit and credit sides of the automobile ledger do not balance.

May I ask you to bear in mind that I am a country lawyer living in the Empire State's provincial interior, subject both to the limitations and liberties of my environment. I have been in the habit of forsaking my office for a month of each year for the purpose of satisfying the spirit of the Wanderlust by roaming anywhere from Glasgow to the Panama canal, or northerly to Edmonton under the shadow of Canada's Arctic sunlight but I could not practice law at either of those points and my business suffered during the month of my absence. Then since the time came that I had wandered enough to answer in my own mind Ruskin's question apropos travel: "What is it after you get there?" I had been looking around for a mechanism which would satisfy my daily demand for a change of scene without sacrificing my permanent post-office address. I found that mechanism in my Maxwell, and now I am on the job in my office every morning exchanging honest legal advice for real money, while enjoying my vacation every day after banking hours. The automobile certainly is a good business proposition, to use the vernacular of the commercial traveller.

But my machine and your automobile are destined to be a greater source of profit with the passing of the years. In other words, the machine is going to pay for itself over again. The use of the machine is tending, and is destined to effectively modify, the mercantile system of America and the social habits of Yankee business and professional men. Returning travelers have long regarded as a subject for admiring comment the habit of British business and professional men of leaving their shops at 4 o'clock for a brief evening excursion. To be sure, this habit is due somewhat to what zealous Americans, for want of a better term or epithet, regard as British stolidity; but it is coupled with the English conviction that wealth without health is not worth the task, and that it is the duty of every English man to take daily advantage of those social opportunities afforded by a compact population located in a country of such small area, contiguous to two sea coasts. These are the causes which have induced early closing in England; this is the situation which enabled the writer to observe English business men playing tennis on Oxford green at 10 o'clock one July evening; and this is the combined social and recreative system which must be inaugurated in this country lest the vitality of our substantial families be sapped. But what will induce it but the automobile? And can we expect it to arrive, as a national habit, unless it is stimulated by the knowledge that it is a source of profit?

The fact should not be overlooked that American professional men have remained in their offices beyond reasonable hours because they had no means of going to a definite place for recreation. Population is widely distributed in interior America and sociability without companionship is futile; but the automobile has eliminated the twenty miles which intervene say between a law office and a lake resort; and the possibility of earning the gasoline during the day's work, and then of having a daily vacation without sacrificing the business of the month, are the forerunners of the coming of the English system of persistent recreative vacations. The automobile, unlike the Pullman car, means some play every day, and a business man with that advantage is going to return to his day's work with a stream of warm blood running to his head, which is the nursery of commercial ideas. This is just where my machine and your automobile have been made to pay for themselves.

While I have not deemed it necessary to tie the text of this discussion to the dollar mark, I am convinced that I have made my car pay for itself in cash in part. The calculation becomes a matter of time saved and money earned. During the three years which have elapsed since my admission to the bar of New York State, I have been impressed with the unwillingness or inability of the rural law offices to keep pace with the evolution of modern business. There is a duplication of offices and of the 194 volumes which constitute the New York reports, sometimes there is an excuseable duplication of stenographers, but then every office needs its decorations in addition to a picture of Daniel Webster, and in any event something must be done to retain the interest of the law clerk in the work of the office. But in the midst of this unwillingness and duplication it occurred to me that it was time to abolish as many "whereases" and "aforesaids" as is possible in the practice of the profession and to put the office machinery on "high gear." And my machine has tended to pay for itself in that it has accelerated the coming of that day. I had noticed that the young physician was using the auto as a right-hand assistant and I had been pained to wait in police court while my clients were brought in by gasoline machinery, and then it occurred to me that some machinery other than a Smith Premier and a telephone should be attached to a young lawyer's office; and so I bought my Maxwell in the conviction that I could make the car pay for itself.

A concrete demonstration of the truth of the latter conclusion was afforded during the first week that I operated the car. The whole transaction was a matter of machinery. I arrived at my office in the morning and the telegraph machine brought me a message stating that the attorney-general in Albany wanted me on the long distance telephone machine at 10 o'clock. I learned that he desired to enter suit for a penalty against a farmer for violating the pure milk act, and he wanted the action brought with some speed plus. I dictated the complaint to a typewriter, and that Saturday afternoon at 2 o'clock the law student and I started for a jaunt over the hills of Chautaqua county to serve the papers on the defendant. We moved along the shores of Lake Chautaqua, and over the historic French portage to the shores of Lake Erie, where we found the defendant amidst his grape vines. Returning from our thirty miles we came down the other side of Lake Chautaqua just to tip off a farmer that he "must either pay or be sued," and we collected sufficient money on the spot to warrant the taking of a fee large enough to pay for the next week's gasoline and cylinder oil. But the real point of this paragraph may be summarized by calling attention to the fact that the suit was brought in quicker time than the anxious attorney-general may have anticipated, and this did not disturb the enjoyment of our Saturday afternoon outing.

The utility of the automobile should be viewed as a time-saver and money-maker. I could never make any money out of my clients by advising them over the telephone; but I can induce them to pay my fees when I "meet them face to face," to use the touching words of the Methodist hymnal. And, right there, my car has earned many a dollar for itself. Letters sent out on the rural delivery lines have seldom induced farmers to pay, because the dishonest ones believed that no lawyer would stake the constable to a horse and carriage to make the trip over poor roads to serve a summons on a person of doubtful responsibility; while the honest ones always had the excuse during August that they could not call until the crops were in, and the pretext during January that no bills could be settled until the taxes were paid. But when the law student journeyed to their respective habitants in the machine, it was a question of pay, or offer a well-grounded excuse. Needless to say, a student with my car and his gall never failed to collect.

This brings me to the point that the supreme need of a young lawyer is to "get next" to his client. The automobile just meets this situation; it may be used with propriety to run to the country districts where the dying woman wants to make her last will and testament, and in a variety of real estate transactions it has proved to be of service in going to the spot, determining the vexing boundaries, and returning with speed to complete the legal papers. It is needless to amplify the fact that the machine may be utilized in a variety of ways in obviating those delays which have prevented the profession from keeping pace with the money-earning development of the modern business man. This implies time saved and money earned; and these are the elements which make a car pay for itself.

Need I say in passing that there is a money value in using the car to "know" one's own habitat. Increasing acquaintance follows, as a matter of course; but it is well to keep in touch with the situation in the rural districts surrounding a small-sized city. This matter of personal contact, this problem of getting knowledge of the situation based on the earth, is overlooked by those professional men who do not dabble in politics enough to keep them in touch with the passengers on "the gravel train." But the inability to judge the local situation from the fourth floor of an office building, and the remedy for that incapacity provided by the automobile, has been impressed upon my mind of late. Long before I either wanted, or perceived, the professional utility of a car, I had prepared a variety of briefs advocating the improvement of the main highways of the county and state. These briefs were predicated on the bad condition of the highways hereabouts, and, while I have nothing to say in defense of those same roads in the light of later knowledge, I am willing to admit that the highways then in mind have been found to be in better condition than anticipated. Certainly a student of the conditions surrounding the city in which he lives and an observer of the situation in those rural sections which give life to the business in which he is engaged, can get his money out of his car by using it for "a rubber-neck wagon" through the hay and grape lands of Chautauqua County.

And now it is 4 o'clock of a bright Sunday afternoon. I have worked for three hours giving form to this narrative, and as I am about to substitute the "clickety-click-click" of my typewriter for the "honk, honk" of my car, why can you wonder that I am convinced that I have made my machine pay for itself?

NEWS FROM GARAGES IN MANY CITIES

New Haven, Conn.—A garage and repair shop has been opened at Commerce and Temple streets by the Wheeler & Wuestefeld Company. A turntable, automobile elevator, a modern locker system, up-to-date wash stands and repair pits, waiting rooms for chauffeurs and patrons and an extensive repair shop are a few of the advantages. Entrances on both Temple and Commerce streets do away with any necessity of turning around or backing inside the garage.

Amsterdam, N. Y.—Green & Warnick will occupy their new garage about April 1. The building is to be 75 by 85 feet, two stories in height and of fireproof construction. The first floor will contain the office and stock room and storage space for about 30 cars. The second floor will be partly occupied by a large repair shop, with room for storing 30 or 40 additional cars.

Holyoke, Mass.—The Magna Automobile Company has moved into its new two-story building at the corner of Division and Railroad streets. The company has good facilities for handling both local and transient automobilists. A large machine and repair shop is maintained in the basement.

Mishawaka, Ind.—John L. Wilklow, a former liveryman of this city, intends to have an up-to-date garage soon. He has begun the erection of a two-story building on his property adjoining the new Mishawaka Hotel. The building will be of brick, 100 by 20 feet.

Pittsburg—The Pittsburgh Automobile Company has leased a plot 40 by 100 feet on Baum Street, near Beatty, East End, and is having plans prepared for a three-story fireproof garage. The company's present location is at Seventh Avenue and Grant Boulevard.

St. Catharines, Ont.—The Reo Garage, of this city, has originated a new storage scheme. Cars sent to be overhauled will be stored during the winter if desired, and no charge will be made except for work done and the repair parts at list prices.

Cincinnati—Work is nearly finished on the new garage of the Jungclass Automobile Company at Reading road and Maple avenue, Avondale, and it is expected that it will be ready for occupancy this week.

Cartercar an Awful Hard Puller, Outpulls Traction Engine

George Reason, branch manager for the Cartercar Company of Detroit, says that he is not afraid to hitch the Cartercar to anything, because of the steady pull the car exerts through its friction transmission and chain-in-oil drive, and that this is possible because of the unlimited number of speeds on a Cartercar.

Premier in Vaudeville—To help Santa Claus in bis annual labors, five vaudeville performers at one of the Indianapolis theaters started giving entertainments in the hotels, clubs and restaurants before and after theater hours, assisting the fund raised by a local newspaper. However, they found it no small task to visit all the places afoot. When H. O. Smith, of the Premier Company, heard of this he tendered the use of one of the company's automobiles, and from that moment the vaudevillians became familiar sights in the streets of Indianapolis. They raised more than $500 for the fund, and as a result hundreds of little shavers found that old man Santa had jammed their stockings full on Christmas morning, much to their delight.

Omaha Dealers' Meeting—At a meeting of the Omaha, Neb., Automobile Show Association, held last week, the following officers were elected: J. J. Deright, president; J. T. Stewart, vice-president, and C. G. Powell, secretary and treasurer. The officers, with Willard Hosford and T. R. Kimball, constitute the board of directors. There are at present 20 members of the association, and as many more applications for membership on file, so great has been the growth of the trade in this city. The show this year will be held in the Auditorium under the management of Messrs. Powell and Hosford.

Hoblitt Is Promoted—Fred M. Hoblitt, who will be remembered by future generations as the hero of the horse-fly-in-the-carbureter epic, found on his return from a trip in the West that he had been appointed supervisor of agencies of the American Locomotive Company. During the trip he established agencies in San Francisco, Seattle, Denver and Minneapolis. From the latter city he telephoned to New York an order from the Twin City Taxicab Company for 85 taxicabs, 10 pleasure cars and two trucks. The order was accepted by telephone.

Washington Oil Tank Finished—The Wayne Oil Tank Company has about completed work on the large tank system in the naval yards at Wasbington, D. C., and it is ready for shipment. The equipment consists of 14 tanks with long-distance pumps. The tanks will be used for the storage of many different oils and preparations, and will vary in capacity from 10 barrels to 1,000 gallons. Iron of a heavy gauge has been used in their construction, and the pumps are a special self-measuring pattern. The whole is pronounced by experts to be a most thorough system.

Fisk Wins in Texas—A set of Fisk tires on an Overland car won the prize offered for tire performance in the 550-mile Dallas-Fort Worth, Tex., endurance run. This car and the Cole pilot car, also a Fisk user, were the only ones to receive perfect tire scores; neither experienced any trouble, nor was it necessary to touch either casings or tubes throughout the run. The contest was over execrable roads, and the fact that tbe winning car crossed the finish line carrying more than 100 pounds of mud, by actual weight, gives some idea of the conditions encountered.

New "Six" from Ohio—The Sebring Motor Car Company, of Sebring, O., announces the 1910 model of the Sebring "Six," a 35-40-horsepower car, selling at $2,750. To try the mettle of the new product a test run was made to New Liverpool on the high gear, witb the gear lever sealed in place. Another car of well-known make which accompanied the local product was forced to change gears repeatedly, but the Sebring took the steep hills on the route without difficulty.

More from South Bend—This hustling Indiana city gets its name in print again through the organization of the Yuster Axle and Transmission Company, capitalized at $100,000. The incorporators and directors are Maurice L. Yuster and Arthur E. Wile, of Rochester, Ind., and Joseph W. Ricketts, of the Ricketts Automobile Company, South Bend. The company has leased a plant consisting of three one-story buildings, which affords facilities for the employment of 50 men.

Lovell-McConnell Enlarges—A new plant is being built by the Lovell-McConnell Company, of Newark, N. J., on a large plot at Wright and Emmet streets, Newark, which it recently purchased. There will be a two-story machine shop, 200 by 50 feet; a foundry, 75 by 40 feet; a fireproof building for storing excelsior; a private garage and a power plant. The Lovell-McConnell Company makes Klaxon horns and other automobile accessories.

Newspaper Science—As an example of the deep technical knowledge of the average newspaper reporter and the resulting product of his busy pencil, we recommend this quotation from the Chicago Journal, November 26, sent us by C. H. Gould. It follows: " . . . was run over and seriously injured in cranking his car. He left the sparker in when he began cranking. The sparker ignited and the automobile started. He was knocked down and run over."

Taking Sugar to Fort Lee—In the Edgewater-Fort Lee hill climb, December 5, a three-ton American truck carried a full load of sugar in barrels up the grade in 5:15. The distance was 3000 feet, and the grade was said to average 17 per cent. The truck took the hill and was not steaming or showing other signs of distress at tbe top. It is to be hoped that the sugar in question was not weighed at the New York custom-house.

Simms Magnetos in England—Reports from across the Atlantic tell of the winning of the $5,000 *Daily Mail* aero prize by J. Moore Brabazon on an aeroplane of his own design, fitted with a Greene motor and Simms magneto. An Indian motorcycle, also fitted with a Simms magneto, recently broke the world's records for 20, 50 and 100 miles on Brooklands track.

Autocar Succeeds the Horse—So successful has been the test made by the Philadelphia postal authorities with the Autocar wagons that last week Postmaster-General Hitchcock secured a contract for four machines, for use on the outlying service. The terms call for a rental of $3,000 a year per car, including the driver. This deal will enable the department to do away with nine horse-drawn wagons.

More Warner Tops—The Warner Pole & Top Company, of Cincinnati, has enlarged its plant about 300 per cent., according to a statement from the company, and will be in new quarters ready for business by January 1. Preparations have been made to take care of an increased business during 1910, and it is expected the output will be 1,000 tops.

To Remedy Parts Shortage—The Stoll Pressed Steel Company, of Buffalo, N. Y., has filed articles of incorporation with a capital stock of $50,000. The incorporators are Daniel H. Stoll, Charles G. Hornung and others. The company will manufacture automobile frames and metal stampings.

Relocation of Buckeye Jacks—Due to increased business it became necessary for the Buckeye Jack Mfg. Co., of Louisville, Ky., to seek larger quarters. The company therefore purchased a commodious plant at Alliance, O., to which it will move about January 1.

IN AND ABOUT THE AGENCIES

Stewart Speedometers, Chicago—A sales office has been opened at 1312 Michigan avenue by the Stewart & Clark Mfg. Co., in order to give prompt attention to the wants of the city trade. Heretofore Chicago patrons have been obliged to go to the factory on Diversey boulevard.

Regal, Pittsburg—Joseph Feicht, who has the Pittsburg agency for the Regal, has taken over the building of the Central Automobile Company, at 5989 Center avenue, and will locate there.

Thomas, Boston—Charles S. Henshaw, Boston agent for the Thomas, has leased the store at 587 Boylston street, and in the future this will be the local home of the Thomas Company.

Great Western, Macomb, Ill.—The Great Western Automobile Company has made arrangements with A. T. Ewing, Son & Deems, of Macomb, to handle the Great Western line.

Stevens-Duryea, Newark, N. J.—A. G. Spaulding & Company have leased the store formerly occupied by H. J. Koehler at 849 Broad street, and will exhibit the Stevens-Duryea.

PERSONAL TRADE MENTION

James W. Gilson, sales manager of the Mitchell Motor Car Company, appeared in a new rôle on Christmas day. He rendered a song of his own composition at the celebration in the Bijou Theater, which was turned over to the poor of the city, and then Mr. Gilson appeared as Santa Claus.

George D. Wilcox, formerly of the Empire Sales Company, of Syracuse, N. Y., has been appointed district sales manager for the Regal Motor Car Company. He will make his headquarters in Syracuse for the present.

WESTERN MOTOR'S NEW MARION PLANT

LOGANSPORT, IND., Dec. 27—There is no industry to-day that occupies such a commanding position as the automobile industry. Its wonderful growth in recent years has astounded the world and put to flight all the conservative ideas of careful business men. This is due to two things—the necessity existing for a means of travel, speedy, reliable, at the constant command of the public, and the fact that the gasoline motor in its present high state of perfection has made this possible.

Manufacturing automobile parts as a business is comparatively new, but today commands the attention and investment of the most progressive men in the world. There is scarcely an automobile placed upon the market that does not profit by the opportunity of securing certain parts manufactured by factories especially devoted to their production, and using these as the means of assembling a perfect car.

The life of an automobile is the motor; without it it is dead. So that the necessity of having a motor absolutely reliable, thoroughly durable, is most apparent. The Rutenber motor, manufactured by the Western Motor Company, stands very high in the estimation of the public as a motor of this character. Built by one of the oldest established firms, it has been in existence practically fifteen years, and is the oldest four-cylinder motor upon the market. This company has its own foundry, making every casting that enters into the construction of the motor, thus avoiding delay or faulty workmanship.

The world's record, made in 1906 by a stock car equipped with a 4½ by 5 Rutenber motor, held good until this present season, when a special racing car, upon an especially prepared track, was able to lower the record. This speaks very well for the every-day qualities of this motor as compared with other regular products.

Miller's New Atlanta Branch

In accordance with his pushing policy to locate a branch office wherever business conditions warrant. The cut above shows the new store recently opened in Atlanta, Ga. This is located at 66 Edgewood avenue, a very favorable location for the automobile supply business. It is to be hoped that branch number nine will fare as well at the hands of the Southern people as its other Northern branches have.

Being absolutely certain of the future of the industry, the Western Motor Company has built a large new factory, following plans furnished by the Kahn Construction Company of Detroit, Mich., at Marion, Ind., and with their two large factories, the other at Logansport, Ind., they will have a production of practically 10,000 engines per year, thus placing them in the foremost rank of motor builders in the country.

The management has been enlarged, each factory being under the supervision of members of the firm, whose experience and ability insure a continuation of the same perfection in design and the same excellent workmanship that has always characterized these motors. The present officers of the company are: F. B. Wilkinson, president; J. F. Digan, vice-president; E. H. Wolcott, secretary; J. Wills Stephenson, treasurer; E. A. Rutenber, mechanical engineer, with a directorate consisting of the same gentlemen and in addition A. C. Barley, C. G. Barley and J. L. Barley.

Perspective View of Western Motor Company's Marion Plant